

DAR-9500f

Review Station

Operation Manual

Read this manual thoroughly before you use the product.
Keep this manual for future reference.

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Introduction

This operation manual describes operation of the Review Station.

Please read this manual thoroughly before using this equipment.

If precautions described in this manual are not kept, it may cause damage to the system, operators and patients. And also, it is difficult to describe an unpredictable precautions, so please contact our service representatives if you use the system by not described procedure or have any questions in this manual.

This manual should be kept available for future reference.

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Categories of Information

In this manual, safety and utilization information is categorized and indicated as follows.

Symbol	Significance
 DANGER	Indicates critically hazardous situation that, if not avoided, may result in serious injury or death.
 WARNING	Indicates indirectly or potentially hazardous situation that, if not avoided, may result in serious injury or death.
 CAUTION	Indicates hazardous situation that, if not avoided, may result in minor or moderate injury, damage to the product, or fire.
 NOTE	Indicates information for proper use of the product.
 Prohibition	Indicates an action that must not be performed.
 Instruction	Indicates an action that must be performed.
 Reference	Indicates additional information for better performance or utilization of the equipment.

Precautions for Installation and Use of This System

Please observe the following “Operating Precautions for Safety in the Use of Electric Medical Equipment”.

(It is mandatory that this document be attached pursuant to No. 495 Dispatch from Director-General, Pharmaceutical Affairs Bureau, Ministry of Health and Welfare, dated June 1, 1972.)

“Operating Precautions for Safety in the Use of Electric Medical Equipment”

- 1. Only an experienced technician should operate the equipment,**
- 2. When installing the equipment, pay attention to the following items:**
 - (1) Do not install system near water faucet or similar equipment.
 - (2) Install it away from potential sources of problems such as abnormal pressure, temperature or humidity, drafts, direct sunlight, chlorine dust or sulfur gas.
 - (3) During transportation and operation of the equipment, avoid tilting, vibration and any impact.
 - (4) Keep the equipment away from areas where chemicals or gases are stored.
 - (5) Use only the correct electrical power source with matching frequency, voltage and current (or wattage).
 - (6) Check the condition of the battery power source (power and polarity) before operating the equipment.
 - (7) Properly ground the equipment
- 3. Before operating the equipment, pay attention to the following items:**
 - (1) Check the conditions of switch contacts, polarity, dial settings, and meters, and make sure the equipment performs correctly.
 - (2) Confirm that the ground is connected properly.
 - (3) Check all wiring for proper and correct connections.
 - (4) Pay attention when using more than one unit at a time, because it may lead to an incorrect diagnosis and cause complications.
 - (5) Check the conditions of any external electric circuit, that will be directly connected to a patient.
 - (6) Check the condition of the battery power source.

4. While operating the equipment, pay attention to the following items:

- (1) Do not exceed recommended times or the amount of radiation needed for diagnosis or therapy.
- (2) Observe the equipment and patient continuously for early detection of problems.
- (3) When a problem is detected with the equipment, take proper action to stop the equipment without harming the patient.
- (4) Do not let the equipment touch the patient.

5. After operating the equipment, pay attention to the following items:

- (1) Turn off the switches and return the dials to their original position in the prescribed order. Then, turn off the main power switch.
- (2) Do not pull the power cable forcibly from the outlet using the power cord.
- (3) When storing the equipment, pay attention to the following factors:
 - (i) Keep it away from the water.
 - (ii) Store it away from the potential causes of problems such as abnormal pressure, temperature or humidity, draft, direct sunlight, chlorine dust or sulfur gas.
 - (iii) Avoid tilting, vibration and any impact when storing.
 - (iv) Store the equipment away from areas where chemicals and gases are stored.
- (4) Clean all attachments, cables and contacts, and store them in one place.
- (5) Keep the equipment clean to avoid problems during the next use.:

6. When the equipment is found to be out of order, do not try to repair it. Immediately call a certified repair technician for repair.

7. Do not modify any part of the equipment.

8. Preventive maintenance:

- (1) The equipment and its parts should be periodically checked.
- (2) If the equipment has not been in operation for an extended period of time, test it prior to actual operation to make sure it works correctly and safely before use.

9. Operate properly according to the operating manual.

Precautions in Use

WARNING



Instruction

The responsibility for managing use and maintenance of medical equipment lies with the user.

Use of this device is restricted to a diagnostic radiology technician or a person with a certificate indicating equal proficiency.



Prohibition

Do not modify the equipment.

Repair and inspection of the inside of the equipment is dangerous. Be sure to contact our service agency for repair and inspection of any kind.



Instruction

Perform periodical maintenance.

Maintenance is required to assure the safety and performance of this equipment. For details on the maintenance inspections to periodically be performed by the operator, please refer to the descriptions contained in this operation manual.



Instruction

Repair and maintenance of this equipment can only be performed by engineers approved by SHIMADZU.

Maintenance must be assigned to specially trained experts. Contact the Shimadzu Service Representative for repair and maintenance.



Instruction

Beware of X-ray exposure.

Improper use of the X-ray equipment might cause the operator or patient to be accidentally exposed to X-ray radiation. During X-ray radiation, any person other than the subject patient should not stay in the irradiation room. If circumstances compel any nonsubject person to stay in the room, ample protection should be provided for that person.



Prohibition

Do not splash water on the equipment.

Splashing water might cause an electric shock. When cleaning the equipment, use a cloth dipped in an antiseptic solution (Medical Alcohol) and squeeze out all excess liquid before wiping only the surface.



Instruction

Accuracy of displayed values are not guaranteed.

Displayed values measured by the measurement functions of this equipment are not absolute values but relative values based on the capability of the instruments used.



Prohibition

Do not use the Injector which is not conformed to the standard of IEC60601/1.

This operation manual does not cover instructions for the X-ray high voltage generator, the X-ray tube unit, the FPD (Flat Panel Detector), and the monitors.

The Limited Product Warranty

The system warranty is for one year from the date of purchase.

The following failures or damage are not covered by the warranty.

1. **Failure or damage due to the installation, relocation, or service not performed by a SHIMADZU Service Representative or a SHIMADZU designated contractor**
2. **Failure or damage caused by products from other companies (except those purchased from SHIMADZU).**
3. **Failure or damage due to repairs using non-SHIMADZU certified service parts.**
4. **Failure or damage caused from not following the notices and procedures described in this manual.**
5. **Failure or damage due to an operating environment that is outside the requirements stipulated in this manual.**
6. **Failure or damage due to natural disasters such as fire, earthquake, flood, and lightning.**

Service after the expiration of the warranty is available at a reasonable cost and should be performed by the SHIMADZU Service Representative.

Revision History

DOCUMENT REVISION	DATE	COMMENT
(M517-E225) Original	2012.11	
(M517-E225) Revision A	2013.3	<ul style="list-style-type: none"> • Update window images. • Add adjustment procedure of brightness and contrast with mouse. • Add correction of image comment. • Update the name of each button and item. • Update the Direct X.
(M517-E225) Revision B	2013.9	<ul style="list-style-type: none"> • Apply to RDSR. • Add HV Flip of image. • Add Peak Hold to DSA tool. • Update each images. • Update each buttons and item names. • Update the description of Special Information in chapter 2.
(M517-E225) Revision C	2014.3	<ul style="list-style-type: none"> • Change description in Environment conditions.
(M517-E264) First revision	2018.4	<ul style="list-style-type: none"> • Change Document No to separate from the document for other countries. Original document is M517-E225C.
(M517-E264) Revision A	2018.6	<ul style="list-style-type: none"> • Change Administration. • Change some GUI.

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1

About this Manual

This chapter introduces this Manual, describing its organization and terminology.

1.1 Safety

Read all of the instructions contained in this Manual before operating this product and save this Manual for later use. Follow all warnings, cautions, and instructions.

1.2 Operation Modes

Review Station features two operation modes; User and Administration. Except when otherwise stated, the information in this Manual is for the User.

Mode	Description
User	Any user not defined as Administrator runs Review Station in User mode. This is the normal operation mode in which all day-to-day work should be done. There are usually at least two user types; Technician and Physician. The Technician prepares for a procedure by entering patient and procedure information whereas the Physician performs the procedure.
Administration	The system administrator runs Review Station in Administration mode, gaining the ability to perform full configuration.

1.3 Terminology

The following terminology is used in this Manual:

image or loop	Used interchangeably, any still image or image sequence acquired during a study. A sequence of images can be played back at acquired speed (e.g., 30 fps), providing high-resolution full-motion video.
study	Refers to both the medical diagnostic procedure itself and all related information and images captured during the procedure. The study also includes descriptive information such as patient demographics and identification codes entered before the procedure is performed. It may also include annotated images.
GUI	Graphical User Interface, a graphical system of windows, buttons, and controls used to simply communicate with and operate systems.
DICOM	Digital Imaging and Communication in Medicine, is a set of rules that allow medical images and associated information to be exchanged between imaging equipment, computers, and hospitals.
Lossless Compression	Digital compression in which data loss never occurs. Original data (image) condition is achieved after decompression.
Lossy Compression	Digital compression which is not fully reversible but typically allows images to retain sufficient detail for analysis.
Performing Physician	A physician who performs or is directly-involved in the study.
Referring Physician	The physician who originally requested the study that must later review the study result.

2

System Overview

This chapter provides an overview of the system capabilities and features and describes optional functionality.

2.1 Introduction

The Review Station enables the user to play back, send, and receive DICOM image loops. Angiographic analysis can be performed and images can be printed on the DICOM printer.

2.2 Features

Review Station has the following features:

1. DICOM image loops can be played back, sent, and received.
2. RDSR can be displayed, sent and received.
3. Images can be printed on the DICOM printer.
4. Images and loops can be permanently stored in DICOM format on CD/DVD discs, providing both economy and portability.

2.3 System Components

Review Station consists of the following standard and optional components:

2.3.1 Standard Components

No.	Name	Installation Location	Quantity
1	Review Station	Control room	1 set
2	19" Monochrom LCD monitor	Control room	1 set
3	Keyboard and mouse	Control room	1 set

2.4 Specifications and Functions

2.4.1 Image Processing

■ Specifications

1. Image operation performance:
 - The 1024×1024 image processing (noise reduction filter processing etc.) is performed at a maximum of 30 frames/sec.
 - The image processing (Window level adjustment and edge enhancement, etc.) is performed at a maximum of 30 frames/sec.
2. Display D/A converter:
 - 8 bits/256 step or more

■ Functions

Serial Animation Display (Cyclic Display)

Serial animation up to 30 frames/second is available.

Real-time Edge Enhancement

Sharp images are acquired by emphasizing the subject edge with spatial frequency emphasis. It is selectable as either 5×5 Convolution processing or unsharp processing, as a technique of the spatial frequency emphasis.

Negative/Positive Inversion Display

Images can be displayed as acquired (positive) or the inverse (negative).

Gamma Correction

The display gamma can be selected.

Animation Zoom

Still images and loops can be zoomed to up to 2.5 times of original size.

Auto Window Control

Images are displayed with automatically-controlled stabilized contrast.

Re-masking of DSA Images

A new sub image is created by re-selecting the mask image arbitrarily.

Re-registration of DSA Images

The mis-registration is reduced by moving the mask image up, down, right and left, and by executing subtraction at the position with the live image.

Landmarking

Modifies the Mask weight on DSA image.

Noise Reduction

Reduces image noise.

Peak Hold

Extract and display the position of white and black peak in the image.

2.4.2 Image Display Specifications

1. Output video signal:
 - Non-interlaced
2. Display image matrix:
 - 1280 × 1024 or more
3. Display step:
 - 256 Step
4. Maximum brightness:
 - 400 cd/m² or higher for Monochrome LCD Monitor in examination room
5. Image processing:
 - Window level adjustment
 - Edge enhancement processing
 - Negative/positive reversal
 - Gamma correction
 - Image magnification
 - Re-masking
 - Re-registration
 - Landmarking
 - Peak hold
6. Character display:
 - Fixed format (patient information etc.)
 - Free format (annotation etc.)
7. Image analysis:
 - QCA (quantitative coronary analysis)
 - LV (left ventricular analysis)

2.4.3 Image Analysis

■ QCA (Quantitative Coronary Analysis)

The level of the blood-vessel stenosis is quantitatively analyzed. The vessel wall is recognized automatically when the stenosis part is specified, and the stenosis rate is displayed.

■ LV (Left Ventricular Analysis)

The function of the left ventricle (LV) is quantitatively analyzed. When inner wall of LV is specified, LV lumen capacity and ejection fraction, etc. are calculated.

2.4.4 Image Recording

■ Specifications

1. Magnetic disk:
 - 1024 × 1024 pixels (12-bit): 100,000 frames
2. Media:
 - CD-R (650 MB):
 - 512 × 512 pixels (8-bit): approx.4,800 frames or less per disc
 - 1024 × 1024 pixels (12-bit): approx.600 frames or less per disc
 - DVD-R (4.7 GB):
 - 512 × 512 pixels (8-bit): approx.30,000 frames or less per disc
 - 1024 × 1024 pixels (12-bit): approx.4,000 frames or less per disc

■ Other Functions

Image Recording (CD-R, DVD-R)

The study including still images and loops can be saved on CD-R or DVD-R.

▼ **NOTE** The number of frames that can be stored is depending on the compression rate for each image.

2.4.5 Network

■ Specifications

- (1) DICOM image/RDSR storage
- (2) DICOM image/RDSR receive
- (3) DICOM image print

■ Functions

DICOM Image/RDSR Storage

Images and RDSR are automatically transferred to an image server via DICOM network.

DICOM Image/RDSR Receive

The image server can be queried and then images and RDSR can be received via DICOM network.

DICOM Image Print

Images can be printed on DICOM printers.

2.5 Special Information

2.5.1 Classification

The classification of protection against electric shock:

- Class I equipment

NOTE It means that CLASS I EQUIPMENT, that is, electrical equipment in which protection against electric shock does not rely on BASIC INSULATION only, but which includes an additional safety precaution in that means are provided for ACCESSIBLE PARTS of metal or internal parts of metal to be PROTECTIVELY EARTHED. (International standard IEC 60601-1:2005).

The degree of protection against electric shock:

- Equipment not including Applied Part.

The classification of EMC (Electro-Magnetic Compatibility):

- Group 1 and Class A

NOTE This system belongs to Group1 and Class A equipment in accordance with EN60601-1-2:1993. The device uses radio-frequency energy only for its internal function, and is not intended to deliver energy to the patient. Small leakage of radio frequency energy can be harmful to sensitive equipment. The main power line of this device in the clinical site should be connected to an isolated power supply to decrease electrical noise.

The degree of protection against effects of water:

- Ordinary equipment

WARNING



Prohibition

This equipment is not protected against immersion in liquid.

Never use this equipment in a place in which immersion in liquid may occur. Never spill liquid on the surface or inside the equipment. Otherwise, electrical shock may occur.

When liquid is spilled, contact our service office or a Shimadzu service representative.

The degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide:

- This equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

! WARNING



Instruction

Risk of explosion:

There is a risk of explosion if the equipment is used near flammable anesthetics.

2.5.2 Labeling

■ Storage and Transport Labels

The label for storage and transport condition is attached on the package.



2.5.3 System Safety Symbols

Safety symbols displayed on the system are as follows:

Symbol	Location	Meaning
	On warning / caution labels. Labeled on the side of Review Station.	Attention.

2.5.4 Environmental Conditions

■ Setup and Operating

Refer to the Operation Manual which system to be combined.

■ Storage and Transportation

Refer to the Operation Manual which system to be combined.

2.5.5 Other Software Installation

WARNING



Prohibition

Do not install other software on the computer. Do not connect peripheral equipment, or modify the computer hardware.

Otherwise, the system may fail to start because of a change in the OS environment or a driver conflict. Not heeding this warning will invalidate the warranty.

2.5.6 Internet Connection

CAUTION



Prohibition

Do not connect this system to the Internet.

Do not connect this system to other computer networks that can be linked to the Internet.

Shimadzu shall not guarantee the security against virus infection or leak of hospital/patient information through Internet connection.

2.5.7 Data Erasure or Loss

CAUTION



Instruction

Be sure to backup important data to external storage such as CD-R.

Data saved on magnetic disk may be erased because of improper operation or system accident.

Since it is possible that external backups may become damaged, multiple backups are recommended.

Note that Shimadzu will not be held responsible for data erasure or loss.

2.5.8 Disposal

If you must dispose of the product, the following caution must be observed:

CAUTION



Instruction

The device contains substances which may pollute the environment if disposed of incorrectly. Contact our service office or representative for disposal of the system or any parts.

2.5.9 Action for Environment (WEEE)

To all users of Shimadzu equipment in the European Union:



WEEE Mark

Equipment marked with this symbol indicates that it was sold on or after 13th August 2005, which means it should not be disposed of with general household waste. Note that our equipment is for industrial/professional use only.

Contact a Shimadzu service representative when the equipment has reached the end of its life. They will advise you regarding the equipment take-back.

With your co-operation we are aiming to reduce contamination from waste electronic and electrical equipment and preserve natural resources through re-use and recycling.

Do not hesitate to ask a Shimadzu service representative, if you require further information.

■ Other

This system is connected to the hospital network via a router with firewall. The firewall function provides protection against threats to network security such as unauthorized access and viruses.

3 System Startup and Shutdown

This chapter describes how to start up and shut down the system.

3.1 Startup

Follow this procedure to start up the system:

1

Press the power button on the front of Review Station as shown here:



Review Station (PC)

NOTE If after pressing the power button, the green indicator does not turn on, the breaker switch may need to be turned on.

2

As the GUI starts up, it briefly displays the software splash screen which includes information such as software version.



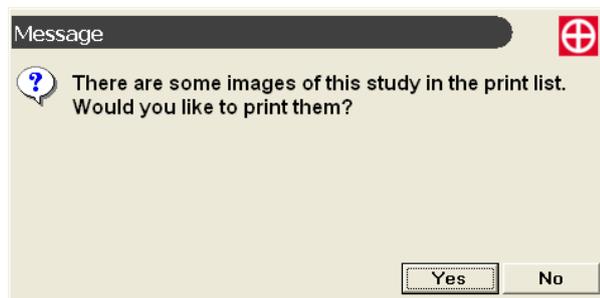
3.2 Shutdown

Follow this procedure to shut down the system:

- 1 On the Review side menu, click [Exit].

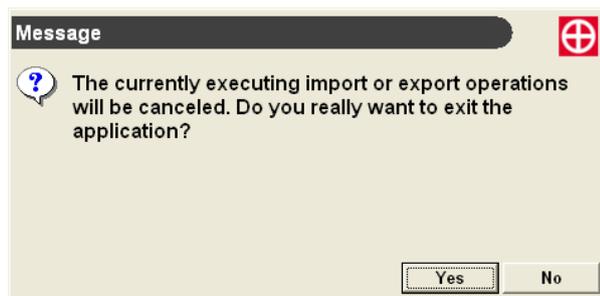


- 2 If there are images in the print list that have not yet been printed, you can choose to print them now.

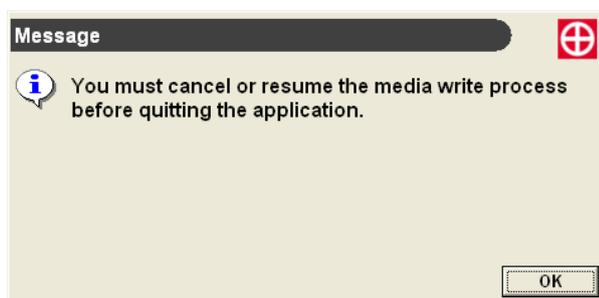


Click [No], to discard the images from the print list. Click [Yes] to print the images.

- 3 If a network transfer or CD/DVD read is in progress, you can wait for it to finish or cancel it. Click [No] to allow it to finish. Click [Yes] to cancel it; loops and images already transferred, will be available at next startup.



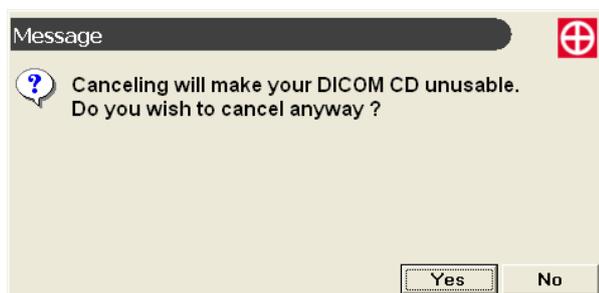
- 4** If a media (CD/DVD) write is in progress, a message appears indicating that you can either wait for completion or cancel it. Click [OK] to clear the message. If possible, wait for the media write to finish.



- 5** If necessary, you can click [Cancel Media Write] on the side menu.

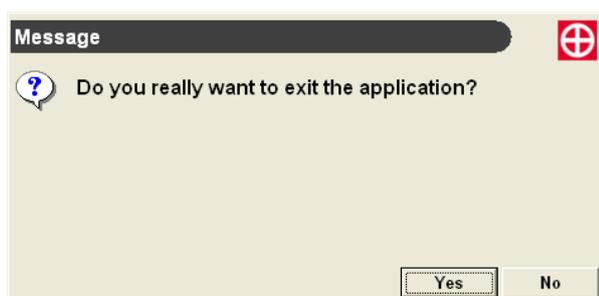


- 6** When prompted, click [Yes] to cancel the write and discard the media or click [No] and wait for the write to finish.



If the installation personnel or administrator configured a shell command to be executed upon shutdown, and the command fails, a message to this effect will remain on screen until it is acknowledged.

- 7** Finally, you are prompted to complete the shutdown. Click [Yes] to complete the shutdown.



8

Wait for the system to be completely off (display monitors go blank and the power indicators of Review Station go off), and then go on to the next step.

NOTE If trouble occurs when trying to shut down the system, shut down by following the instruction below:
Press and hold the power button of Review Station for more than five seconds to turn off the power.



Review Station (PC)

4 Review Basics

This chapter takes you on a tour of the Review process, including finding studies and playing and printing their images.

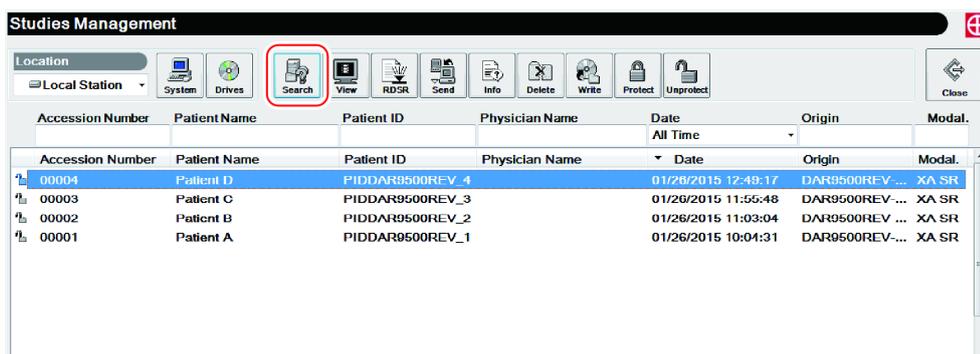
The key steps of the Review process are introduced here as follows:

4.1 Startup and Study Selection

1 In the upper-left corner of the Image Viewer window, Click [Open] to display the Studies Management window

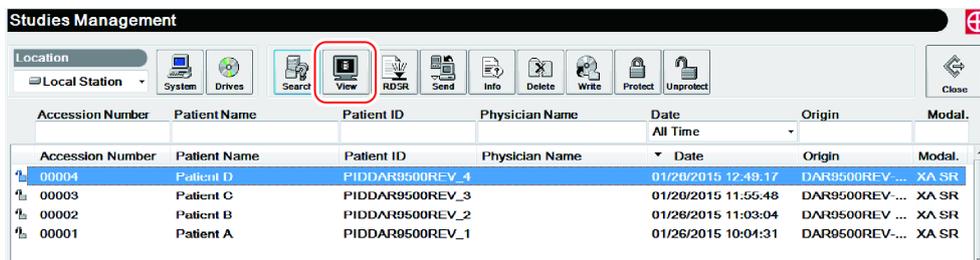
▶▶ Reference See "5.1 The Studies Management Window" P.25.

2 Click [Search] to search for all studies performed within the default date range. All matching studies are listed with one row of information per study in descending Date order.



3 Click anywhere in the row for the study that you wish to review and then click [View].

Alternatively, just double-click any row to view a study.

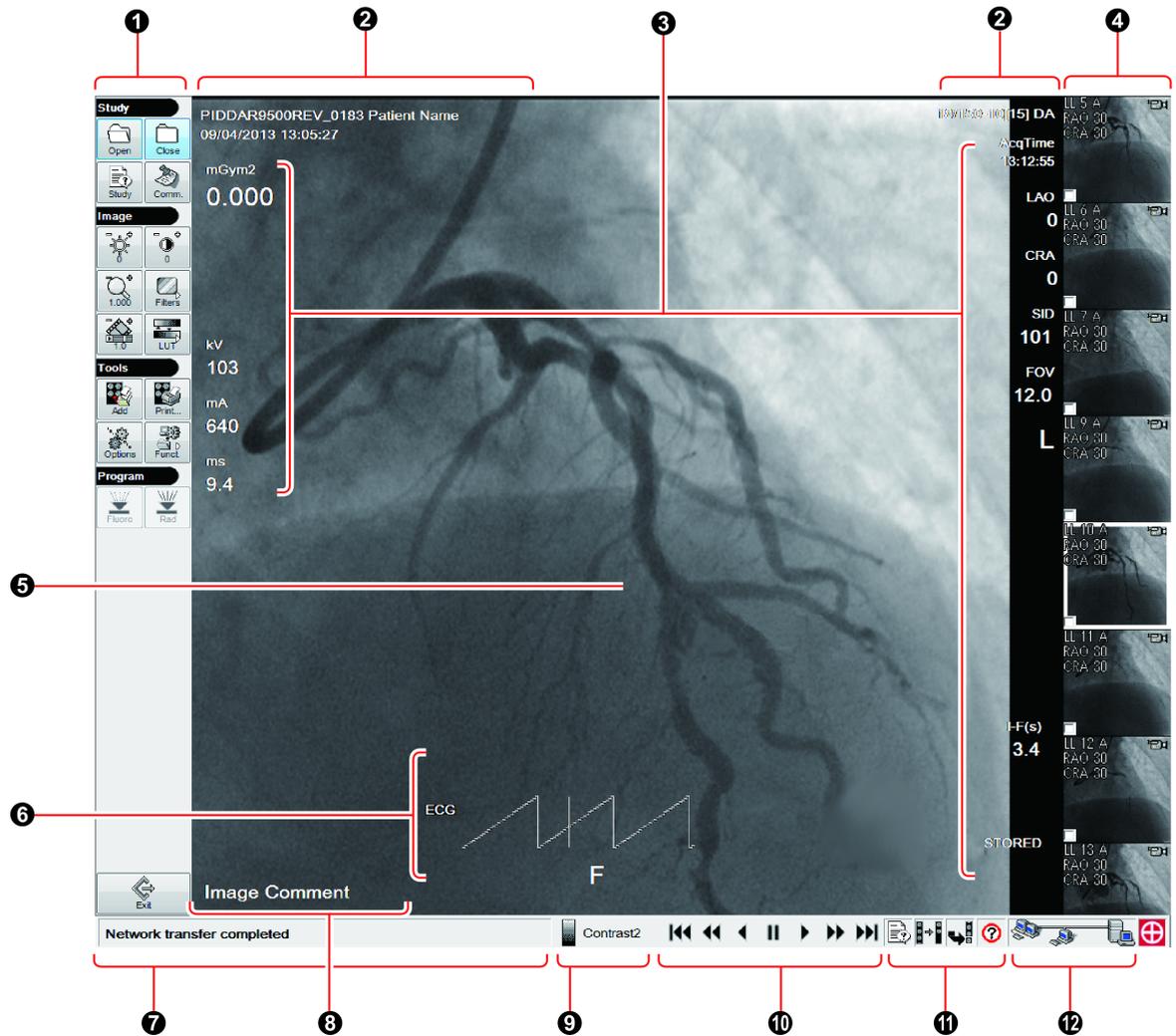


The first loop of the study begins automatic playback.

NOTE When you select a study that contains multiple image qualities for the same loop such as raw and lossless, only the best quality loop is displayed. To view a specific quality, select it in the Series list and then click [View].

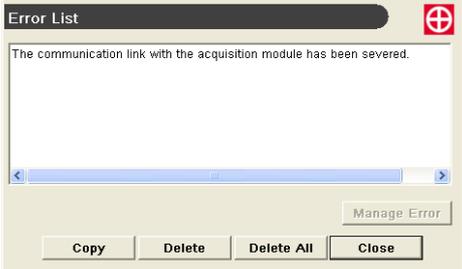
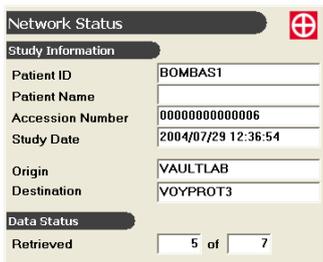
4.2 The Main User Interface Window

The main Review Station graphical user interface (GUI) window is displayed on the monitor. It features a Side Menu, an Image Viewer, an Image Selector, and a Cine Control and Status bar along the bottom. Additional elements such as acquisition parameters are superimposed over the Image Viewer window.



NOTE The above sample screen is made from a composite of images. Not all elements appear at the same time. The key elements of the main user interface window, numbered in the above illustration, are defined in the following table:

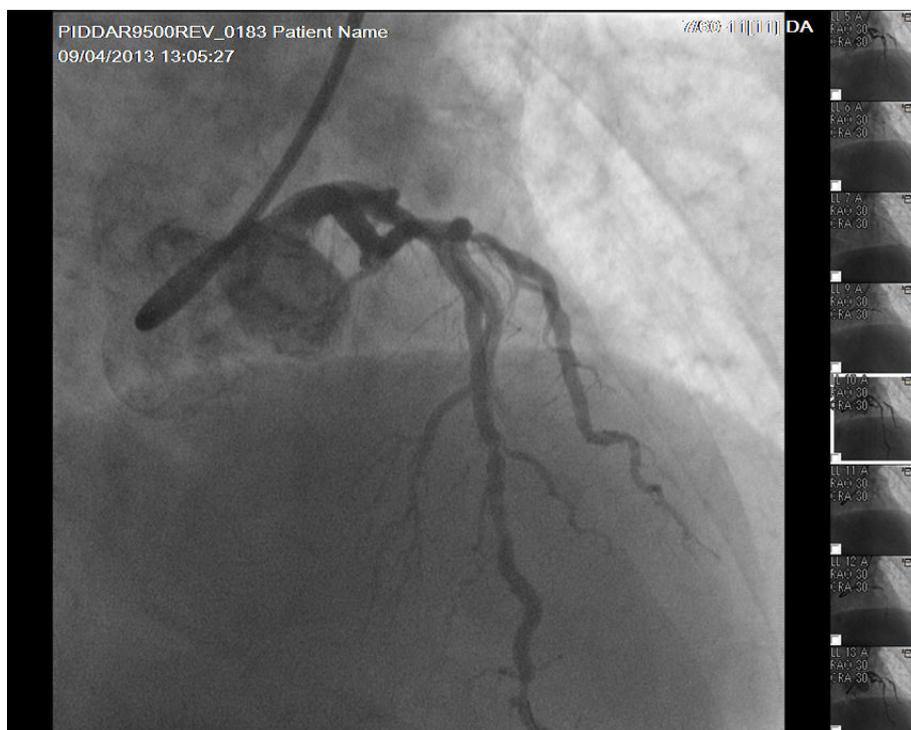
No.	Description
①	Side Menu: Provides access to all major functionality.
②	<p>Study Information: Displays study information as follows:</p> <ul style="list-style-type: none"> • Image/loop, expressed as: FRAME/TOTAL_FR-IMAGE[TOTAL_IM] (IM_TYPE) FRAME = Frame number TOTAL_FR = Total number of frames in loop IMAGE = Current image/loop number (A for plane A, or B for plane B) TOTAL_IM = Total number of loops IM_TYPE = Type of images (Such as DA, DSA, 3D-DA) (LL = Lossless (if not LL, then raw)) • Study accession number • Patient Name • Patient ID • Study ID • Study Date and Time
③	<p>Parameters: Dynamically-updated Information (individually configured):</p> <ul style="list-style-type: none"> mGym²: Cumulative X-ray dose (mGym²) of displayed loop. kV: X-ray tube voltage in kilo-volts. mA: X-ray tube current in milliamperes. ms: X-ray pulse duration per image, in milliseconds. LAO or RAO: Oblique angle of the detector in degrees in which angles toward the patient's left are displayed with [LAO], and angles toward the patient's right are displayed with [RAO]. CRA or CAU: Sagittal angle of the detector in degrees in which angles toward the patient's head are displayed with [CRA], and angles toward the patient's foot are displayed with [CAU]. SID (cm): X-ray source to detector distance in centimeters. FOV (in): Detector field of view in inches. I-F (s): The period of time when turn ON the injector with overlay by frame. Acq Time: Acquisition time. STORED: The status of an image. <p>Patient Direction:</p> <p>Direction of a patient body is indicated as follows:</p> <ul style="list-style-type: none"> H = Head F = Feet R = Right L = Left A = Anterior P = Posterior
④	Image Selector: Displays one icon per loop or still image. For loops, the icon is automatically created from the image that is one third of the way into the loop. For example, in a 9-second loop consisting of 270 images, the icon is created from the 90th image.
⑤	Image Viewer: Is the main area for viewing and working with images.

No.	Description	
6	Probe Signal:	During review, up to four probe signals, including ECG and blood pressure, can be displayed as curves superimposed over the lower half of the Image Viewer window. A moving cursor (vertical line) is synchronized to the currently-displayed frame.
7	Status Messages:	Are displayed when needed in both the Image Viewer and Studies Management windows.
8	Comments:	Display the image comment which is configured for the current image.
9	LUT:	Displays name of active brightness/contrast Look-Up-Table (LUT) profile.
10	Cine Control:	Provides transport controls for loop playback. 
11	Modes & Info.:	<p>These buttons appear as needed in this order: Display Study Information, Set Playback Mode, and Display Error List.</p>  <p>If the Display Error List button is visible, click it to display the list like this:</p>  <p>Select any message and then click [Copy] to make a text copy of the message. Select any message and click [Delete] to delete it. To delete every message, click [Delete All]. Click [Close] to close the error list.</p>
12	Network Activity:	<p>Displays a simple animation during network activity. Also, click this area to display a Network Status box:</p>  <p>To hide the Network Status box, click the Network Activity area (lower right of bottom bar) again.</p>

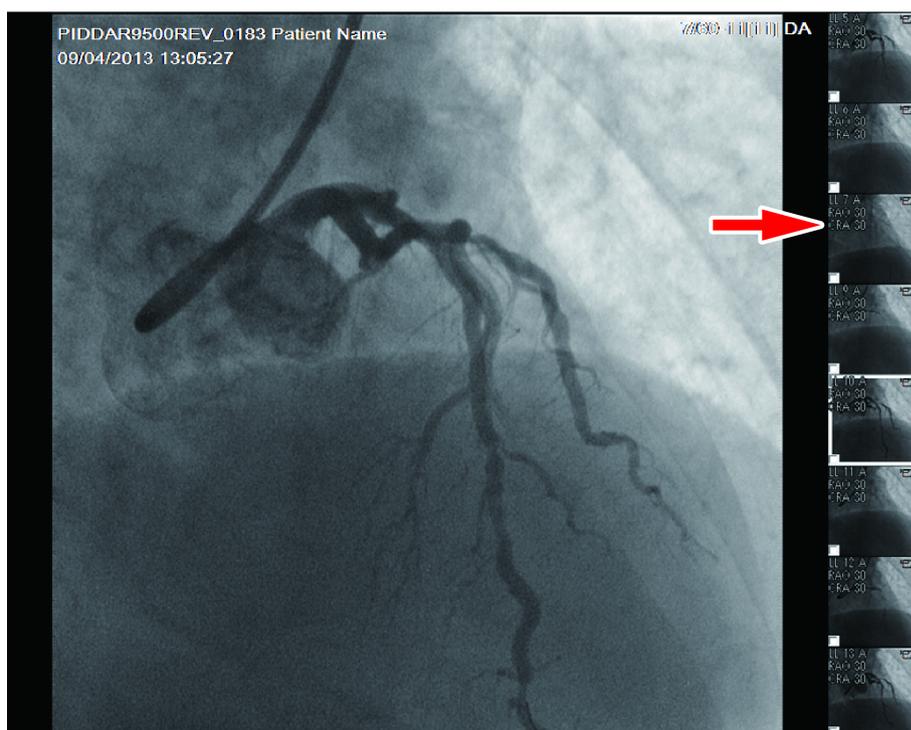
 **NOTE** Image edges may be blacked out by shutters (see ["8.5 Adjusting Shutters"](#) P.91).

4.3 Viewing Images

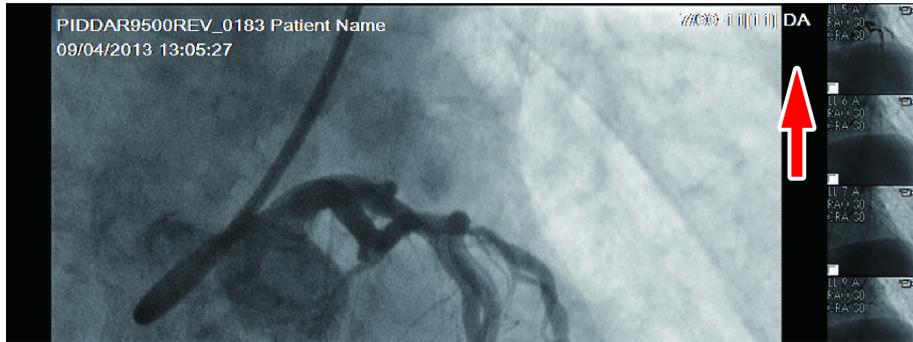
To review a loop other than the first one, click one of the Image-Selector icons. The loop corresponding to the icon begins playing.



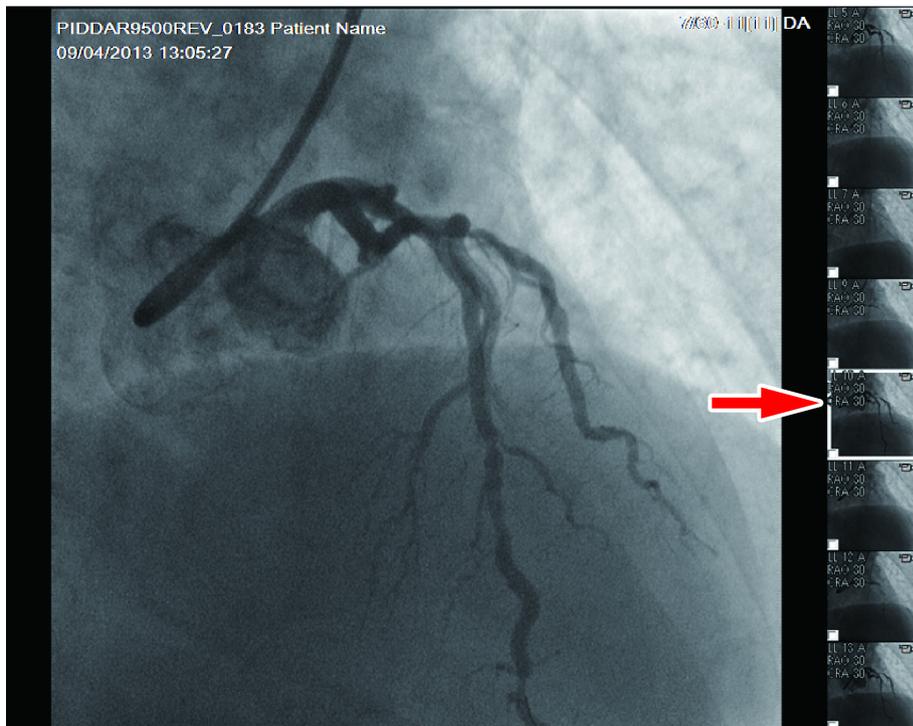
If there are many loops in the study, the Image Selector may continue off the bottom of the window. Right click (without releasing mouse button) on an icon near the bottom of the window (for example, loop 7 A).



Drag the mouse upward, scrolling icons for earlier loops off the top of the window and revealing previously-hidden icons.



When you see the icon of a loop that interests you, release the mouse button and then click the icon to begin playing that loop. In this example, we are playing loop 10 A.



4.3.1 Controlling Image Playback

Control image playback with the mouse wheel or via the on screen Cine Control bar on the bottom border of the Image Viewer window:

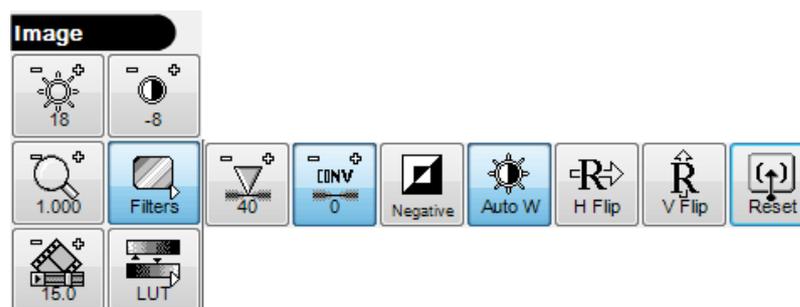


▶▶ Reference For details, including information on keyboard shortcuts, see "6.1 Controlling Image Playback" P.42.

4.3.2 Adjusting Image Appearance

Adjust image appearance via onscreen Brightness, Contrast, [Auto W. Level], Zoom, and [Filters] buttons.

▶▶ Reference For details, see "6.2 Adjusting Image Appearance" P.44.



4

4.3.3 Identifying Loops and Still Images

The Image Selector shows small images for both loops and still images. Small icons are super-imposed over the upper-right corner of each small image to indicate whether the small image represents a loop or still image.

Icon	Meaning
	A multi-image loop that can be played back as video. The loop number is displayed in the upper-left corner of the Image Selector icon.
	A multi-fluoroscopy image loop that can be played back as video. The loop number is displayed in the upper-left corner of the Image Selector icon.
	A still image created as either an annotated image or reference image. Still images appear in the Image Selector after the loops. The loop number, and in square brackets, the image frame number, are displayed in the upper-left corner of still Image Selector icons.

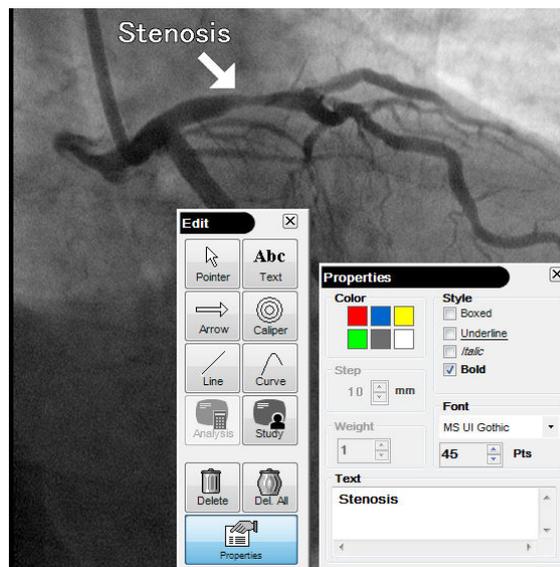
4.4 Displaying Study Information

To display study information including patient demographics, click [Study] on the side menu. The Study Information dialog box for the study being reviewed appears.

►► Reference For details, see "6.4 Displaying Study Information" P.51.

4.5 Creating Image Annotations

To add annotations to a loop image, pause on the image of interest and click [Funct], [Abc Edit] on the side menu. You can now add arrows and text and set properties such as color and size for each item you add.



►► Reference For details, see "6.7 Working with Image Annotations" P.57.

4.6 Saving an Image as a New Object

To save an image, including any annotations, as a new still-image object, click [Funct], [Save] on the side menu, and then [Yes] to confirm the save.

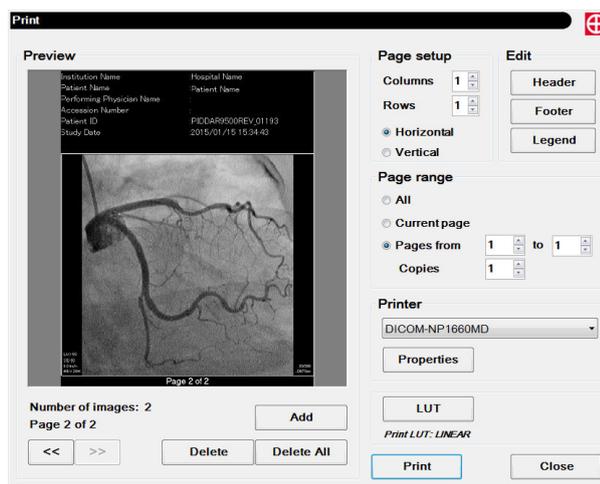
▶▶ Reference For details, see "6.8 Saving Images" P.60.

4.7 Printing Images

To print an image, including any annotations, display the image that you wish to print and then click [Add] on the side menu. Then click [Print].



The print window appears with an image preview :



Choose the desired printer in the Printer list and click [Print] to print the page as previewed.

▶▶ Reference For details, see "6.9 Printing Images" P.61.

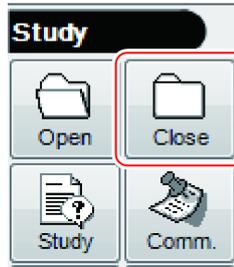
4.8 Using Advanced Features

To use advanced features, consult their respective chapters as follows:

- ▶▶ Reference • "7 Performing Angiographic Analysis" P.75
- "8 DSA Image Adjustment Tools" P.88

4.9 Completing your Review

When you have finished reviewing a study, click [Close] on the side menu. You can then click [Open] to open the Studies Management window and select other studies for review. This completes the tour of the review process.

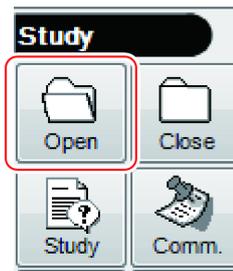


5 Studies Management

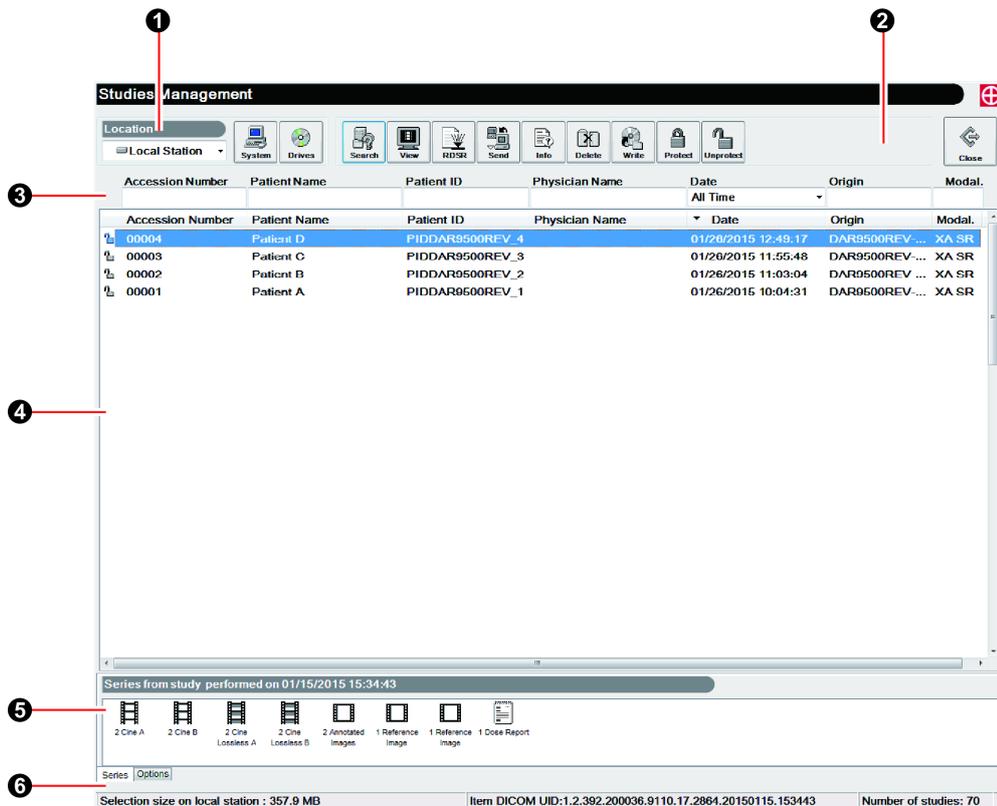
This chapter walks you through the Studies Management process, beginning with a look at its user interface.

5.1 The Studies Management Window

The Studies Management window is displayed by clicking [Open] on the side menu.



It is made up of a columnar Study List, Search Criteria boxes, and an Action Bar along the top. Study Series and messages are displayed at the bottom.



No.	Name
①	Study Location
②	Action Bar
③	Search Criteria

No.	Name
4	Study List
5	Study Series (or Options)
6	Message & Information

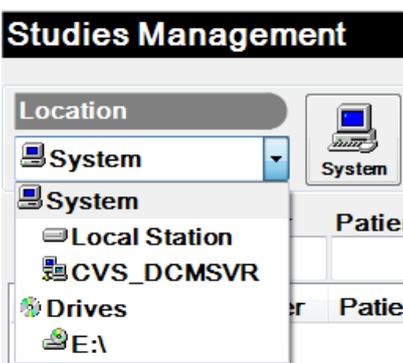
NOTE The above sample screen is a made from a composite of images from both monitors. Not all elements appear on both monitors or at the same time.

The key components of the Studies Management interface are described here as follows:

Section	Page
"5.1.1 Study Location"	P.26
"5.1.2 Action Bar"	P.27
"5.1.3 Search Criteria"	P.28
"5.1.4 Study List"	P.28
"5.1.5 Series Tab"	P.30
"5.1.6 Options Tab"	P.31
"5.1.7 Messages & Information"	P.31

5.1.1 Study Location

The Location box and buttons [System] and [Drives] set the target of the [Search] button as follows:

	<p>[System] sets the [Search] target to the local system hard drives plus all configured servers. Enter search criteria and click [Search] to find studies.</p>
	<p>[Drives] sets the [Search] target to the CD/DVD drives. It then searches all CD/DVD drives, displaying the results in the Study List.</p>
	<p>In Administration mode, Location becomes a drop-down list enabling individual selection of servers and drives as the [Search] target.</p> <p>▶▶ Reference See "10.4 Location Box Enhanced Functionality" P.98.</p>

5.1.2 Action Bar

Studies management functionality is accessed via the action bar.

 **NOTE** Not all Action Bar buttons appear at all times and in all modes.

The purpose of each Action Bar button is summarized as follows:

Button	Purpose
	Searches based on the search target set by the [System] and [Drives] buttons, plus all search criteria. All matching studies are displayed in the Study List. The Date search criteria is always used.
	Displays the selected study or studies in the Image Viewer window. Alternatively, you can double-click anywhere in a Study List row to view a study.
	(Available if there is dose report.) Displays the dose report.
	(For non-local studies) When a single study is selected in the Study List, [Series] displays all study series types contained in this study. When two or more studies are selected in the Study List, this button causes the Study Series information to be retrieved for each study but not displayed until only a single study is selected. Series are automatically displayed for local studies.
	Available only for studies on a network server or CD/DVD, [Receive] copies all selected studies to the local system.
	Sends selected studies to another server or system. If configured, notification messages are displayed and emails are sent for each send.
	Available only when a single study is selected in the Studies Management window for the local system or CD, [Info] displays detailed information about the patient who is the subject of the selected study. You can also use this button to anonymize or modify text-based information in the local study.
	(Present for users only if enabled by installation personnel) Available only for unprotected studies on the local system, [Delete] permanently deletes the selected studies from the local system after asking for confirmation. Protected studies cannot be deleted, although they can be first unprotected (see [Unprotect] below) and then deleted. To preserve the integrity of your archive system, do not delete studies that have not yet been archived to server or CD/DVD.
	Available only for studies on the local system or a network server, [Write] prepares the selected studies for writing and then writes them to CD/DVD.
	Available only for studies on the local system, [Protect] enables protection for the selected studies so that they cannot be deleted.

Button	Purpose
	Available only for studies on the local system, [Unprotect] clears protection for the selected studies. It is generally not recommended to unprotect studies that have not yet been archived to server or CD/DVD.

Detailed usage information for these buttons is provided as needed throughout this Manual.

5.1.3 Search Criteria

One Search Criteria box is provided above each column in the Study List. You can filter what is searched for by entering words or parts of words in one or more Search Criteria boxes and then clicking [Search]. All studies matching the search criteria are listed.

▶▶ Reference See "5.2.2 Finding Studies" P.32 for the procedure.

5.1.4 Study List

The Study List provides one row of information per study in columns organized as follows:

Column	Content
Icon	Denotes each study's location and protection state as follows:
	Icon Location and Protection State
	 Protected on local system
	 Unprotected on local system
	 On a network server
 On a CD/DVD	
Accession Number	A unique identification number for the study.
Patient Name	The full patient name, with last name first.
Patient ID	The patient ID code.
Physician Name	The full name of the study's performing physician, with last name first.
Date	The date on which the study was performed.
Site	An institution-defined field which indicates the origin of the study.
Origin	An institution-defined field which more precisely indicates the origin of the study. For example, this could indicate the diagnostic lab in which the study was performed. There can be multiple Origins per Site.
Modality	The DICOM abbreviation for the imaging modality, for example, [XA] for X-ray angiography.

■ Sorting

Click any column heading to sort by information in the column. Each click of a column heading alternates between ascending and descending sort order.

■ Scrolling in the Study List

You can scroll the Study List contents both horizontally and vertically by clicking and dragging the respective scroll bars.

The vertical scroll bar only appears when there are too many studies to fit in the Study List display area. To scroll the Study List vertically, drag (point to slider, click down without releasing, and drag mouse in desired direction) the vertical scroll bar slider downward to see studies further down the list, or upward to see studies up the list. Alternatively, spin the mouse wheel (if available) toward yourself to scroll down the list or away from yourself to scroll up the list.

The horizontal scroll bar only appears when all columns of information cannot fit across your display. To scroll the Study List horizontally, drag the horizontal scroll bar slider to the right to see more columns to the right or drag it to the left to see more columns to the left.

If you have a high-resolution display, the horizontal scroll bar may not appear at all.

■ Widen or Narrow Columns as Desired

If the text in any columns ends with “...” that means that there is hidden text to the right. To reveal the text, use the mouse to widen the column by pointing to its right heading edge, waiting for the mouse pointer to change to a vertical bar with arrows, and then clicking the mouse and dragging the column edge to the right. Release the mouse button once the column is the desired width. To narrow a column, do the opposite by dragging the heading’s right column edge to the left.



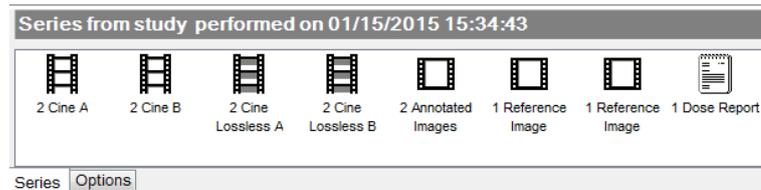
■ Making Selections in the Study List

You can select studies in the Study List in a variety of ways as follows:

- To select a single study, click the mouse anywhere in the desired study row. The row becomes highlighted.
- To select several non-adjacent studies, use this [Ctrl]-click technique. Point to the first study row and click the left mouse button. The row becomes highlighted. Press and hold down the [Ctrl] key and then continue clicking all other desired rows without releasing the [Ctrl] key. When finished selecting rows, release the [Ctrl] key. All selected rows are highlighted.
- To select two or more adjacent study rows, use this [Shift]-click technique. Point to the highest row that you want and click the left mouse button. Point to the lowest row that you want and hold down the [Shift] key and click the left mouse button. Release the [Shift] key. All selected rows are highlighted.
- To select all studies in the Study List, use [Ctrl]-[A] (press [Ctrl] and [A] simultaneously).

5.1.5 Series Tab

Sharing the same screen area as Options, the Study Series sub-window appears when you click the [Series] tab to the left of the Options tab. The Series tab is shown by default. Most studies contain one or more series of images, image loops, or special items such as reference images. When a single local study is selected in the Study List, all series for the study are shown in the Study Series sub-window with one icon per type. Series type icons include a brief label beneath them, indicating the type preceded by the number of items within that series.



Possible series types and their corresponding icons are as follows:

Icon	Series Type
	Cine (raw) Cine DSA (raw)
	Cine Lossless Cine Lossless DSA
	Annotated Image Reference Image
	Dose Report

NOTE The Studies Series type icons are only displayed when a single study is selected in the Study List.

■ Selecting Specific Series Types

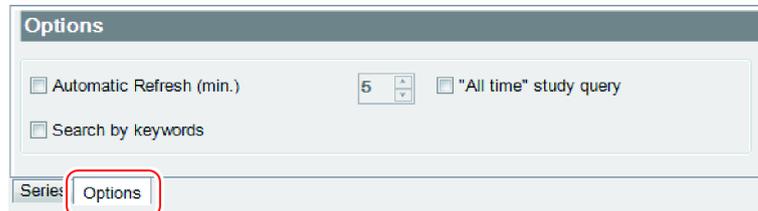
You can select series types in the Series sub-window in a variety of ways as follows:

- To select a single series, click the desired series icon. It becomes highlighted.
- To select several series icons, use this [Ctrl]-click technique. Point to the first icon and click the left mouse button. The icon becomes highlighted. Press and hold down the [Ctrl] key and then continue clicking all other desired series icons without releasing the [Ctrl] key. When finished selecting icons, release the [Ctrl] key. All selected icons are highlighted.

NOTE When you view a study that contains multiple image qualities for the same loop such as raw and lossless, only the best quality loop is displayed. If you wish to view a different image quality, select it in the Series tab and then click [View].

5.1.6 Options Tab

Sharing the same screen area as Study Series, the [Options] tab appears when you click its title to the right of the [Series] tab in the lower-left window area.

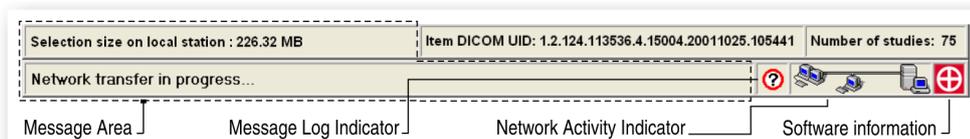


▶▶ Reference See "10.7.2 Options Tab" P.109.

5.1.7 Messages & Information

The two-line Messages & Information area at the bottom of the window provides status messages, error messages, DICOM UID (Unique Identifier), study count, a message log indicator, a network activity indicator, and software version information. For detailed network activity information, click the Network Activity indicator, an information box appears.

Click the Network Activity indicator again to close the information box.



5.2 Managing Studies

5.2.1 Introduction

This section describes how to perform common study management tasks as follows:

Section	Page
"5.2.2 Finding Studies"	P.32
"5.2.3 Downloading Studies from Servers"	P.34
"5.2.5 Importing Studies from CD/DVD"	P.36
"5.2.6 Sending Studies"	P.37
"5.2.7 Writing to CD/DVD"	P.38
"5.2.8 Setting Study Protection"	P.41
"5.2.9 Deleting Local Studies"	P.41

NOTE Before continuing, become fully familiar with ["5.1 The Studies Management Window" P.25.](#)

5.2.2 Finding Studies

To find studies to work with, follow this procedure from the Studies Management window:

1

Set the Date criteria to include the dates of the desired studies. Choose the desired value from the Date drop-down list.

Date	Selection
Today	Studies dated today.
Yesterday	Studies dated yesterday.
This Week	Studies dated in this calendar week. For example, if you choose this on a Wednesday, the Studies list will be restricted to the four days Sunday through Wednesday.
Last 7 Days	Studies dated within the last 7 days including today.
This Month	Studies dated on any day so far in this calendar month, including today. For example, if you choose this on July 11, the Studies List will be restricted to studies dated July 1 through 11.
Last 30 Days	Studies dated within the last 30 days, including today.
This Year	Studies dated on any day so far in this calendar year, including today. For example, if you choose this on January 15th, the Studies List will be restricted to 15 days, whereas if you choose this on December 15, the Study List will be restricted to approximately 349 days.
Last Year	Studies dated on any day in the previous calendar year.

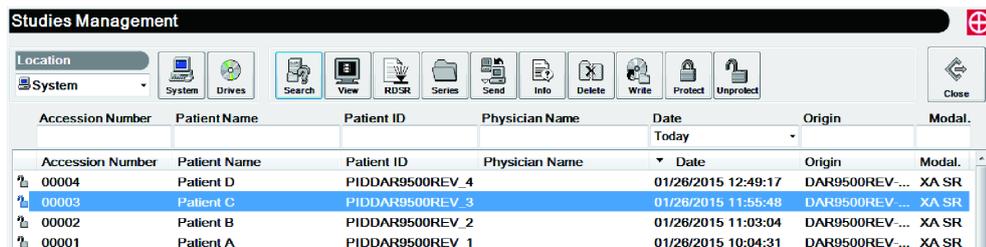
Date	Selection
All Time	All dates. When a server is included in the search, it is enforced that the [All Time] Date criteria be combined with at least one other criteria item to avoid excessive results.
Custom Date	Studies dated on the specific date chosen from a pop-up calendar.

2 Enter your search by entering whole or partial words that you know appear in the desired studies in one or more search criteria boxes.

By default, search criteria matching is only performed at the beginning of the searched text in the corresponding fields of the Search List (for example: criteria*). This can be changed so that search criteria matching is performed throughout the searched text (for example: *criteria*) by checking the [Search by keyword] option as described in ["10.7.2 Options Tab" P.109](#).

3 Click [Search] to perform the search.

The studies List is now restricted to all studies that match the search criteria.



The screenshot shows the 'Studies Management' window with a search results table. The table has columns for Accession Number, Patient Name, Patient ID, Physician Name, Date, Origin, and Modal. The results are as follows:

Accession Number	Patient Name	Patient ID	Physician Name	Date	Origin	Modal.
00004	Patient D	PIDDAR9500REV_4		01/26/2015 12:49:17	DAR9500REV...	XA SR
00003	Patient C	PIDDAR9500REV_3		01/26/2015 11:55:48	DAR9500REV...	XA SR
00002	Patient B	PIDDAR9500REV_2		01/26/2015 11:03:04	DAR9500REV...	XA SR
00001	Patient A	PIDDAR9500REV_1		01/26/2015 10:04:31	DAR9500REV...	XA SR

If there are too many studies to fit in the Study List, use the vertical scroll bar to scroll downward as previously described in ["Scrolling in the Study List" P.29](#).

4 To see columns that have scrolled off the right side of the Study List, use the horizontal scroll bar.

5 If a column contains text that ends in "..." widen the column as previously described in ["Widen or Narrow Columns as Desired" P.29](#). If this causes a column to disappear off the right edge, use the horizontal scroll bar to scroll to the right.

5.2.3 Downloading Studies from Servers

Once you have found the desired studies in the System Study List, you can download them to the local system.

NOTE If you do not download server-based studies before writing them to CD/DVD, they will first be automatically downloaded to the local system before any writing occurs. You may find it preferable to manually download the studies as described here to avoid delaying the writing process.

To download studies from the network, follow this procedure:

1 Click the [System] button.

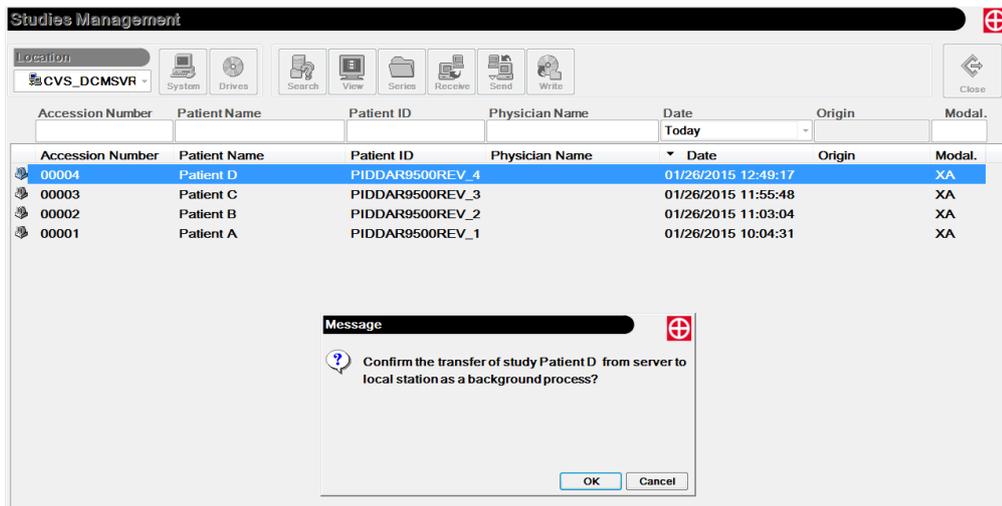
2 Enter the desired search criteria and click [Search].

All matching studies contained on the local system and all configured servers are displayed.

Studies on a server are denoted with  in the Icon column of the Study List.

3 With the desired server-based studies selected in the Studies List, click the [Receive] button. A confirmation box appears.

4 Click [OK] to confirm the downloading of all highlighted files.



5 A message is displayed once a study has been downloaded.

5.2.4 Displaying RDSR

If there is RDSR in the study, click [RDSR] button on the action bar to check the description.

Acq.	Frames	Exposure Time	ms	Time	DUP	Plane	LAO/RAO	CAL
1	35	35000	1000...	11:08:01	Rad_Cardio_CAG[15f-10s]	F	LAO 0	
2	14	1400	100.000	11:08:05	Fluoro_Cardio_10pps	F	LAO 0	
3	13	1299	100.000	11:08:08	Fluoro_Cardio_10pps	F	LAO 0	
4	31	27900	900.000	11:08:09	Rad_Cardio_CAG[15f-10s]	L	LAO 0	
5	12	1200	100.000	11:08:10	Fluoro_Cardio_10pps	F	LAO 0	
6	11	1100	100.000	11:08:12	Fluoro_Cardio_10pps	F	LAO 0	
7	11	1014	100.000	11:08:13	Fluoro_Cardio_10pps	L	LAO 0	
8	13	1299	100.000	11:08:14	Fluoro_Cardio_10pps	F	LAO 0	
9	12	1200	100.000	11:08:16	Fluoro_Cardio_10pps	F	LAO 0	
10	9	900	100.000	11:08:16	Fluoro_Cardio_10pps	L	LAO 0	
11	12	1200	100.000	11:08:17	Fluoro_Cardio_10pps	F	LAO 0	
12	9	900	100.000	11:08:18	Fluoro_Cardio_10pps	L	LAO 0	
13	10	999	100.000	11:08:19	Fluoro_Cardio_10pps	F	LAO 0	
14	8	799	100.000	11:08:20	Fluoro_Cardio_10pps	L	LAO 0	

Cumulative DAP (mGym2): n/a
 Cumulative AK (mGy): n/a
 Fluo Time (min.): 4.0 Display Pulsed Fluoroscopy Information as Continuous Fluoroscopy

Restore Close

On the Dose Report window, enable to modify the display by following operations.

- Drag and move the title to change the order of titles.
- Right-click on the title to display the list to select the display title.
- Click [Close] button to save the changes.
- Click [Restore] to return to the initial setting.
- When check [Display Pulsed Fluoroscopy Information as Continuous Fluoroscopy], enable to display "mA", "ms" and "Exposure time" as continuous fluoroscopy.

- NOTE**
- Method of calculation for fluoroscopy time is different on RDSR and system. Therefore, fluoroscopy time is not correspond completely with each other.
 - RDSR is calculated from pulse length and pulse number for conformity among each parameter. On the other hand, measure fluoroscopy time at a certain period of time at start pressing a foot switch to release the switch for the generator.

5.2.5 Importing Studies from CD/DVD

You can import studies to the local system from any compatible DICOM CD/DVD. This is often useful when you wish to work with studies that were performed outside your institution.

To import studies from CD/DVD, follow this procedure:

1 Insert the CD/DVD from which you wish to import studies into the CD/DVD drive.

2 Click the [Drives] button in the upper-left corner of the Studies Management window.

3 The CD/DVD drive is searched for DICOM studies. All studies found appear in the Study List of the Studies Management window. A warning message is displayed if the CD/DVD drive contain no DICOM studies. This message can be ignored if the drive is empty or contains a non-DICOM disc.

To import one or more studies from CD/DVD into the local system, select them in the Drives Study List and then click [Receive]. A confirmation box appears.

4 Click [OK] to confirm the importation of all highlighted files.

5 Once completed, a message to that effect is displayed.

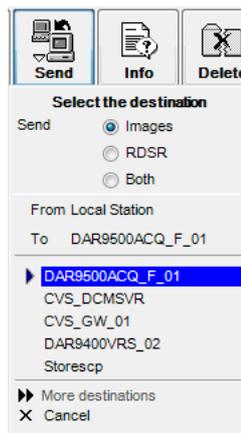
6 You can now see the newly-imported studies in the Studies Management window.

Click [System] to return to the Studies Management window. Adjust or remove any search criteria so that the studies can be seen.

5.2.6 Sending Studies

Studies, loops, and images can be transmitted to DICOM stations. To send studies, follow this procedure:

- 1 Select the desired studies in the Study List.
- 2 Click [Send]. A pop-up menu appears with a choice of destinations.



- 3 Select the sent type and click the desired destination.
- 4 When the confirmation prompt appears, click [OK] to confirm the operation.

If there is no [Send] button on the top action button bar, a destination host must first be configured as described in the DICOM Hosts AE Table item of the ["DICOM Hosts Tab" P.113](#).

If configured, an administrator-defined message will be displayed on the local system upon completion of each send operation. One message appears per send operation whether the operation includes one study or many.

If configured, an email message is automatically sent to an administrator-defined email address list each time a study is sent.

5.2.7 Writing to CD/DVD

Once all studies that you wish to write are visible in the System Study List, you can select them and then write them to CD/DVD.

Recommended Media: Disc, CDR80WKY10SV (Part No.:088-58818-18)

Recommended Media: Disc, DR-47WWY10SNT (Part No.: 088-58818-21)

- NOTE**
- Recommended media as of January, 2015. The recommended media may change in the future without notice.
 - DVD-RW cannot be used.
 - Use the media which is provided from Shimadzu for the system. There is no warranty for functionality and operation when using other media.

■ Select the Studies

1

Select desired studies as described in ["Making Selections in the Study List" P.29](#) or in ["Selecting Specific Series Types" P.30](#).

- NOTE** When, in the Studies Management window, a study that includes both [Cine Lossless] and [Cine] (raw) series is selected or the individual series [Cine Lossless] and [Cine] are both selected, the [Cine Lossless] is made available for writing but not the [Cine].

2

Click the [Write] button. You are prompted to insert a blank disc into the writer. Do this and close the disc tray. Any needed file conversion is performed.

- NOTE** If the [Auto-accept Defaults] option is configured (see ["Display Tab" P.123](#)), writing begins and you are only prompted for additional blank discs. Continue with section ["Insert Additional Blank CD/DVDs" P.41](#).

3

When the Media Writing dialog box appears, optionally change the proposed volume name. You can select the writing item from [Images], [RDSR] or [Both]. Enter a volume name and select the writing item and then click [Start] button. The proposed name is based on a unique sequence number so if you change the volume name, it is advisable to keep the volume name unique, possibly by including numerical digits.

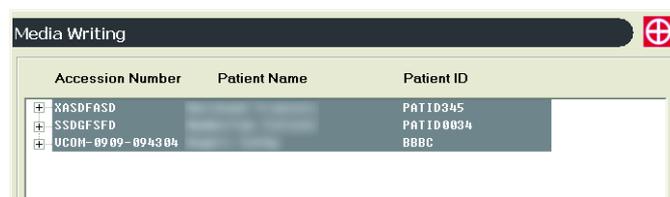


■ Optionally Select Fewer Items

If you wish to write fewer items than selected earlier on the Studies Management window, follow this procedure:

1

Click [Select File]. The detailed selection window appears, initially showing one line of information per study with three columns of information: Accession Number, Patient Name, and Patient ID. This information is displayed in a tree format with the first level being the study, the second level being the study series type, and the third and final level being the study series items themselves.

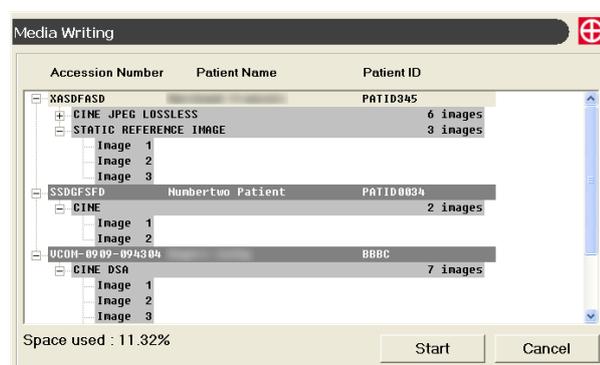


In this example, 3 studies are shown. Any tree branch can be expanded (click the "+" symbol) to reveal all series types for the study, and each series type branch can be expanded to reveal the items in the series.

2

Depending on what level of the tree you click, you can select or deselect studies (first level), study series types (second level), or the actual series items themselves (third level). For the first two levels, a "+" or "-" symbol appears at the left edge of each line in the tree. Click the "+" symbol to expand that branch. Click the "-" symbol to contract an expanded branch.

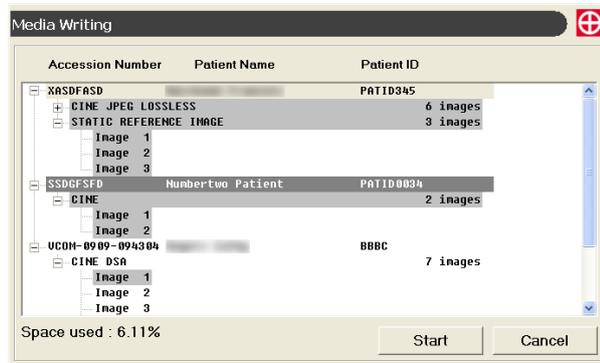
When the tree-based selection window first appears, every study is selected as indicated by the gray highlight. Click "+" symbols as needed to reveal study series types and the series items. Click "-" symbols to contract studies or series types you do not need to see in detail. Once you start clicking the "+" and "-" symbols, the global selection disappears and the individual studies, study series types, and series items for the line in the tree that you clicked are selected and highlighted in gray. Clicking the first level "+" symbols, expands the first level items so that they look like this:



5

3

You can now use the [Ctrl]-click technique to select specific studies, study series types, and series items. In this example, one of the studies is only partially selected:



4

Observe the Space used percentage value at the bottom of the selection window. Percent values greater than 100 indicate that two or more discs must be written. For space efficiency it is recommended that you make selections so that the percent values are close to but not over 100 % or 200 %, and so on.

■ Perform the Write

Follow this procedure to complete the writing process:

1

To begin writing, click the [Start] button. All study series items are checked for integrity.

If any errors are detected and the [Auto-accept Defaults] option is not configured, the study series item tree window of the Media Writing dialog box appears with the offending items highlighted. If desired, take note of the problem items. Click [Continue] to go ahead and write everything else except the offending study items.

If errors are detected and the [Auto-accept Defaults] option is configured, automatic continuation occurs without prompting, skipping items with errors.

CD/DVD writing begins. During the write process, the CD/DVD writer tray is locked shut. Do not attempt to open the tray until the CD/DVD writing finishes.

2

If a defective blank disc or a non-blank disc is inserted, it will be rejected and you will be prompted to insert a new blank disc. Discard the rejected disc and insert a new one. Close the disc tray to continue.

NOTE By default, DSA (Digital Subtraction Angiography) images are saved to media in their subtracted state. This enables easy DSA image viewing in most viewers.

■ Insert Additional Blank CD/DVDs

When CD/DVD writing finishes, you may be prompted to insert another blank disc. Keep inserting blank discs when prompted until finished.

■ Cancel a Media Write Operation

Usually, if you cancel a media (CD/DVD) write, the media must be discarded. To cancel a media write, click [Cancel Write] on the Image Viewer window side menu. Or, in the Studies Management window, click [Write] and then respond [Yes] to the Cancel Media Write prompt.

■ Label CD/DVDs

According to your organization's standards, label the CD/DVD, typically at least including the volume name and date. CD/DVD-safe permanent markers can be used to write directly on the top of the CD/DVD.

NOTE If you plan on affixing paper labels to the CD/DVD, be aware that the labels could partially come off while inside a writer, possibly causing damage, or the CD/DVD may vibrate when spinning due to an unbalanced label. If you must use such labels, assure that they are perfectly centered and are firmly attached without any loose edges.

5.2.8 Setting Study Protection

Studies can be protected or unprotected as desired by respectively clicking the [Protect] / [Unprotect] action buttons. The first column of the Study List indicates protection status, either protected (closed-lock icon ) or unprotected (open-lock icon ) .

5.2.9 Deleting Local Studies

(Feature present for users only if enabled by installation personnel.) Studies on the local system that are in an unprotected state can be manually deleted with the [Delete] button. To manually delete a study, select one or more unprotected studies and click [Delete]. Confirm or cancel the deletion.

NOTE Studies on a network server cannot be deleted. Protected studies cannot be deleted until they have been unprotected. Eventually, unprotected studies that are not manually deleted will be automatically deleted if the system needs to recover the cache space that they are occupying. Automatic deletion of unprotected studies occurs in least-recently accessed order.

6

Review Reference

Become fully familiar with "4.2 The Main User Interface Window" P.16 before beginning this chapter.

For as long as a study remains on the local system (including studies viewed from the network or CD/DVD), the following settings are preserved on a per loop/image basis: Brightness/Contrast, Auto Window Level, LUT, Filters, Zoom, Pan, and DSA parameters such as shutter positions and mask number.

This chapter provides detailed reference information on the Review process as follows:

6.1 Controlling Image Playback

As soon as a study is opened for review, the first loop begins playback. You control playback via the mouse or keyboard.

6.1.1 Mouse and Keyboard

The Cine Control bar on the bottom border of the Imager Viewer window provides seven GUI buttons for controlling playback with mouse clicks.



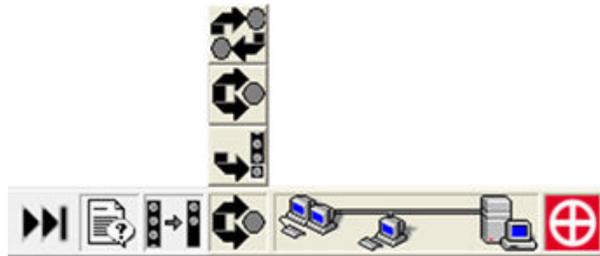
The keyboard arrow keys and mouse wheel can also be used.

No.	Action	GUI	Keyboard	Mouse Wheel
1	Play/show next loop/image.			
2	Play/show previous loop/image.			
3	If playing, pause.		/	Click wheel.
4	If paused, show next/previous frame.	/	/	Spin wheel.
5	If paused, start playing. (Keyboard only: Hold key for more than 2 seconds to begin forward/backward play.)	/	/	Click wheel.

NOTE Use only the arrow keys on the keyboard edit group to the right of the main keys.

6.1.2 Loop Playback Mode

Two Loop Playback Mode buttons are available in the bottom bar:



Button	Name and Function
	Play All Loops: Plays back each loop, one after the other. Still images are skipped. Repeats once all loops have been played.
	Play Single Loop: Plays back the selected loop continuously.
	Not applicable

6.1.3 Adjusting Playback Speed

The current playback speed, in frames (images) per second (fps) is displayed at the bottom of the Play Speed button on the side menu. This button enables you to precisely adjust loop playback speed in either direction (from 10 % to 200 % of recorded speed) as follows:



- Right-click the Play Speed button once to increase the playback speed slightly. Right-click it multiple times to increase playback speed gradually up to maximum speed. Right-click and hold the mouse button to rapidly increase playback speed.
- Conversely, left-click the Play Speed button to reduce playback speed.
- To reset playback speed to recorded speed, click the Play Speed button simultaneously with both mouse buttons.

6.2 Adjusting Image Appearance

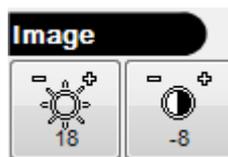
You adjust image appearance via GUI buttons and the keyboard.

NOTE The monitors are already pre-adjusted to optimize contrast and brightness. Do not adjust these settings on the monitors. Instead, make your adjustments as described here. Image appearance adjustments do not alter image files, although the effects of the adjustments are preserved per image/loop for as long as the study is on the local system.

6.2.1 Basic Brightness / Contrast Control

Brightness and Contrast are adjusted on screen via the respective side-menu buttons or with the mouse.

■ Using Side-Menu Buttons



Adjust image brightness (left button) as follows:

- Right-click the Adjust Brightness button to increase image brightness (maximum 100).
- Conversely, left-click the Adjust Brightness button to decrease image brightness (minimum -100).
- To reset brightness to its default (fixed at 0), click the Adjust Brightness button simultaneously with both mouse buttons.

Adjust image contrast (right button) as follows:

- Right-click the Adjust Contrast button to increase image contrast (maximum 1000) (notice the different maximum than that of Brightness).
- Conversely, left-click the Adjust Contrast button to decrease image contrast (minimum -100).
- To reset contrast to its default (fixed at 0), click the Adjust Contrast button simultaneously with both mouse buttons.

■ Using The Mouse

Change image brightness and contrast as follows:

- Press and hold both left and right buttons.
- Move the mouse up/down (brightness) or left/right (contrast) within the visualization zone.

The change in image brightness and contrast is proportional with the mouse speed. Keeping the [Alt] key pressed makes the change independent of the mouse speed.

6.2.2 Advanced Brightness / Contrast Control

■ Auto Window Level Feature

When enabled, via the [Auto Window Level] side-menu button, the Auto Window Level Feature enables brightness / contrast optimization on a frame-by-frame basis.



This automatically compensates for image loops whose images have varying brightness and contrast levels from frame to frame. This can occur, for example, when some frames from a loop of a beating heart, feature many bright areas whereas other frames are substantially darker. When Auto Window Level is enabled, the Brightness and Contrast controls are used to fine tune the brightness / contrast (-100 to 100 Brightness, -100 to 1000 Contrast) set by Auto Window Level. For example, if the results produced by Auto Window Level appear too dim, increase the brightness by right-clicking the brightness control.

NOTE There are two sets of Brightness and Contrast values; one for when Auto Window Level is active, and one for when it is not.

■ LUT Feature

To further optimize image brightness and contrast, you can apply special brightness / contrast profiles to your images via the LUT (Look-up Table) feature.

To apply a LUT profile to your images, follow this procedure:

1

Click [LUT] on the side menu. The LUT fly-out menu appears.



2

Click one of the Curve buttons [A], [B], or [C] to select one of three standard profiles:

- LUT A: Brightens the image by making all grays except for those close to black or white, lighter.
- LUT B: Darkens the image by making all grays except for those close to black or white, darker.
- LUT C: Increases the contrast by darkening the dark grays and lightening the light grays while having little effect on the middle grays.

3

Alternatively, click [Others] and choose the desired custom profile from the list. A graph above the list indicates approximate profile characteristics.

6

4

To revert to the default LUT profile, click [Linear] on the LUT fly-out menu.

If a LUT profile other than the default Linear is selected, its name appears to the right of the LUT icon on the bottom window border like this:



Additional LUT profiles can be created by the administrator as described in "[10.5 Working with LUT Profiles](#)" P.99.

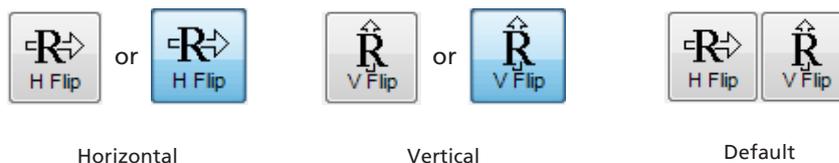
NOTE The chosen LUT profile applies only to the selected loop / image.

6.2.3 Applying Filters

Image appearance can be enhanced by applying filters. Click [Filters] on the side menu. Several buttons fly out to the right. Click one of the first three buttons to set a filter. A filter is only active when its button appears pushed in. Click [Reset] to deactivate all filters. The filters are used as follows:



- The first two filters, Sharpness (Unsharp Mask) and Convolution (High Pass Convolution) enable you to increase the perceived sharpness of the image through edge enhancement. Increase the effect by right-clicking the button or decrease the effect by left-clicking the button. The current value for the filter is displayed on its button in the range -100 to 100. Only one of these filters can be active at a time. Click the button simultaneously with both mouse buttons to set the filter to its default (fixed at 0).
- Click Negative to invert the image so that black is changed to white, white is changed to black, dark gray is changed to light gray, and so on. This effect is in addition to either sharpness filter. To clear this filter, click the button again so that it no longer appears pushed in.
- Images can be flipped horizontally or vertically. Click the [H Flip] button (the figure on the left) or [V Flip] button (the figure in the center) on the side menu to flip horizontally or vertically.



6.2.4 Zooming and Panning

You can zoom and pan images with the GUI and mouse or the keyboard.

■ Using the Zoom Button and Mouse

The current zoom level is displayed at the bottom of the Adjust Zoom button on the side menu.



This button enables you to precisely control zoom level as follows:

- Right-click the Adjust Zoom button once to increase the zoom level slightly. Right-click it multiple times to increase zoom level gradually up to a maximum of 2.5 (250 %) for 1024 × 1024 images and 5 (500 %) for 512 × 512 images. Right-click and hold the mouse button to rapidly increase zoom level.
- Conversely, left-click the Adjust Zoom button to reduce zoom level. Minimum zoom is 1 (100 %) for 1024 × 1024 images and 2 (200 %) for 512 × 512 images.
- When zoomed in, you can pan the image by pointing to the area of interest, clicking down on the right mouse button, and without releasing the button, moving the mouse pointer toward screen center. Release the mouse button once the area of interest is centered on screen.
- To reset zoom level to the default (1 for 1024 × 1024 images, and 2 for 512 × 512 images), click the Adjust Zoom button simultaneously with both mouse buttons.

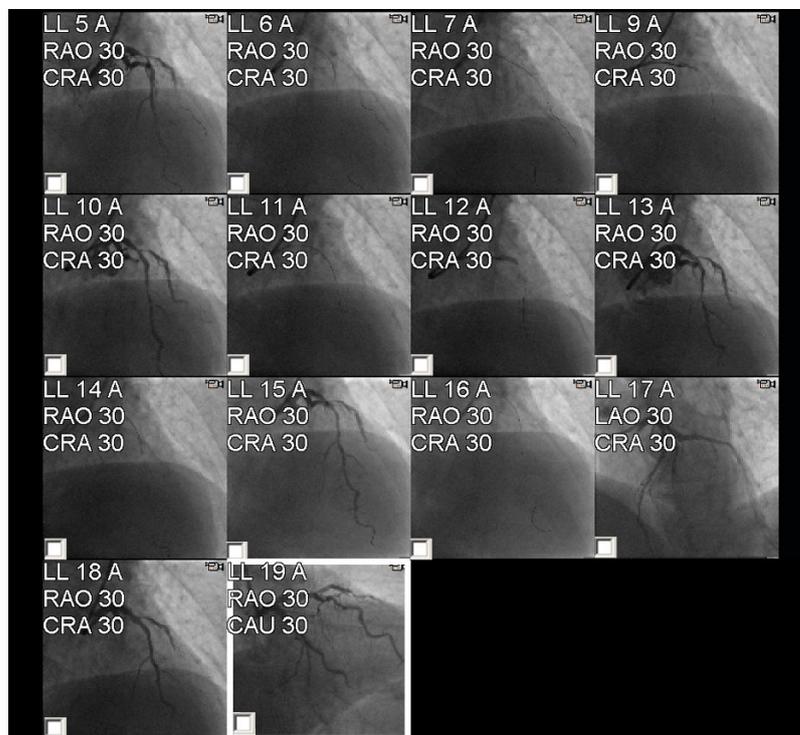
6.2.5 Using Select

It is easy to select the loop with the selection function by mouse and keyboard.
Use Select as follows:

1

Click the [Func] : [Select] button on the side menu. The Image Viewer changes to a 4 × 4 grid of image thumbnails. The loop number and the C-ARM position (CRA-CAU / RAO-LAO) is superimposed in large letters over each thumbnail. Also, a Loop / Still Image icon is superimposed over the upper-right corner of each thumbnail, indicating whether a loop or still image is represented.

A light-colored selector box surrounds the thumbnail of the current loop, the loop that was onscreen when [Select] was chosen.



2

To choose a particular loop to display at full size, first move the selector (light-color box) with the keyboard arrow or [PgDn] / [PgUp] keys, so that the thumbnail of the desired loop is surrounded.

3

Press [Enter] on the keyboard. Alternatively, just click any thumbnail with the mouse.

The selected loop appears full size in the Image Viewer window.

4

If there are more than 16 loops and still images in the study, scroll the thumbnail list downward by right-click upward dragging the thumbnail grid with the mouse, or pressing the keyboard down arrow or [PgDn] key. Additional thumbnails are revealed from below and the initial thumbnails are scrolled off the top. Select a loop for display as already described.

5

To exit Select mode without choosing a loop for display, click the [Func] : [Select] on the side menu.

6.2.6 Using Split

To split the Image Viewer into two side-by-side panes, click the [Func] : [Split] button on the side menu. The Image Viewer splits down the middle with the selected loop displayed in the left pane and the next loop displayed in the right pane. A selection box surrounds the left pane.

To display a loop in the right pane, click the right half of the Image Viewer window (the selection box now surrounds the right pane) and then choose a loop (or image) in the Image Selector. When both panes contain loops, the loop in the selected pane can be played and the loop in the other pane is paused.

Pan to the left or right to see the entire loop.

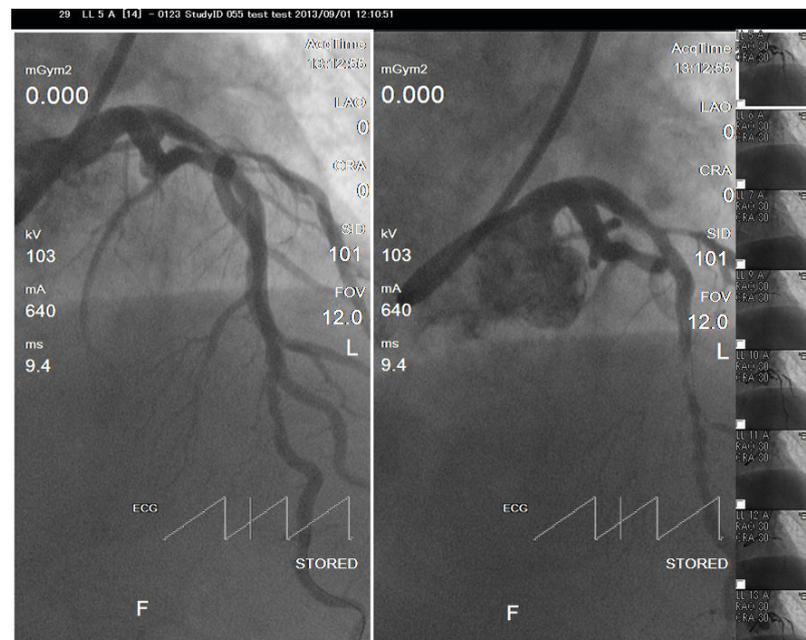


Image processing (Brightness, Contrast, Auto Window Level, Filters, LUT) and playback controls are only applicable to what is displayed in the selected pane.

To evaluate different image processing settings, you can place the same loop in both panes, select a pane and make your adjustments. The effects are shown only in the selected pane. This way, you can experiment with different image processing to see how loop looks with and without the image processing.

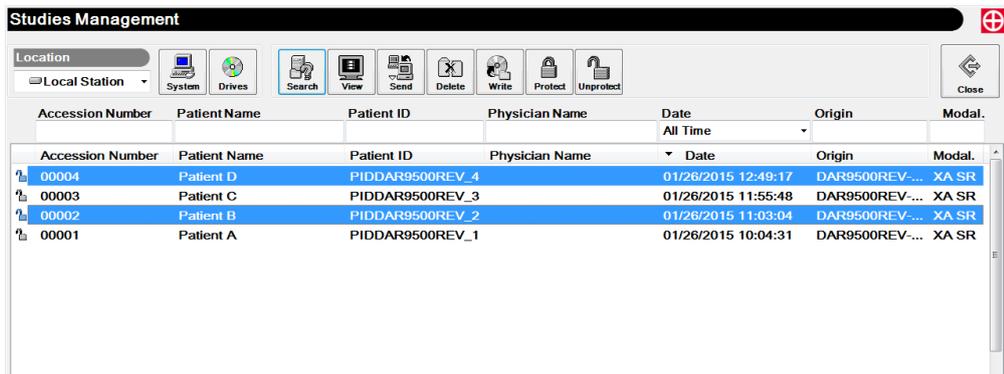
To un-split the display, choose the Split feature again. Whatever was in the last-selected pane is shown in a non-split Image Viewer window.

6

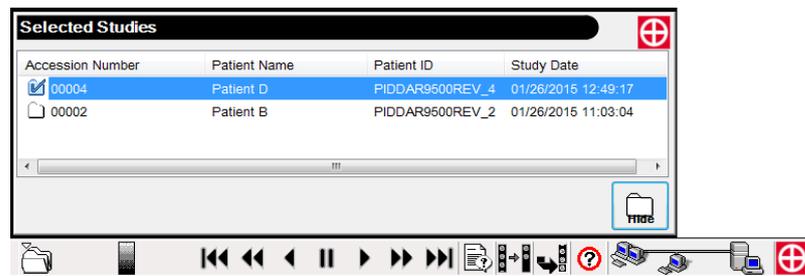
6.3 Working with Multiple Studies

It can be convenient to work with more than one study at a time. Follow this procedure:

- 1 In the Image Viewer window, click [Close] to close any studies and then click [Open] to open the Studies Management window.
- 2 Select multiple studies in the Studies Management window.

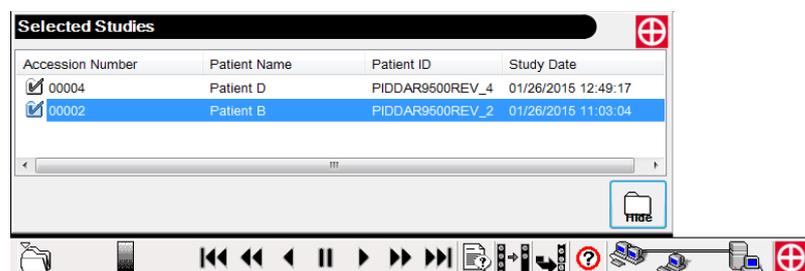


- 3 Click [View]. The newest study's first loop is played in the Image Viewer. Also, a Selected Studies list is displayed at the bottom of the window with a tick mark next to the selected study.



- 4 Choose loops and images for display as desired.

- 5 Click a different study in the Selected Studies List. A tick mark appears next to the study and the study's first loop is played in the Image Viewer.



6 Display loops / images and select other studies as desired.

7 Click the [Hide] button to hide the Selected Studies list. Click the [Selected Studies List] icon  on the bottom window border to re-display it.

6.4 Displaying Study Information

As was seen in the chapter on Review Basics, a Study Information dialog box can be displayed by clicking the [Info] button in the Studies Management window. The same information window can be displayed by clicking [Study] on the side menu, or by clicking the Display Study Information button on the right side of the bottom window border and then clicking the Display Study Information button (top) on the fly-out menu that appears.



The Study Information dialog box includes patient demographics and other information:

Study Information ⊕

Patient

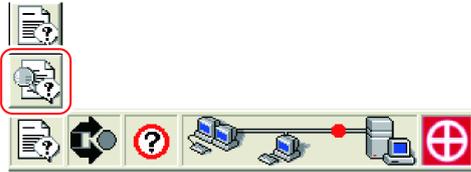
Patient ID		Date of Birth		
PIDDAR9500REV_0135		Month	Day	Year
		01	01	1989 <input type="checkbox"/> Unknown
Patient Name				
Prefix	First Name	Middle Name	Last Name	Suffix
	John		Shimadzu	
Weight	Height	Sex		
180.00 lbs	70.00 inches	Male <input type="checkbox"/> HFS		

Study 01/15/2015 16:34:31

Study ID	Accession Number
12624600	
Modality	Referring Physician
SR	
Study Description	
Performing Physician's List	

Anonymize
Modify
Close

Expert users can also display DICOM header information by clicking the Display Study Information button, and then clicking the Display all DICOM Information button (bottom) on the fly-out menu that appears.



NOTE This information is mainly of interest to those familiar with interpreting DICOM image file headers.

The DICOM Information window provides detailed DICOM header information:



6.5 Modifying Study Information

Text-based study information, including patient demographics, can be modified locally for the purpose of making minor corrections before printing or exporting images.

NOTE Modifications are only made on the local system.

To modify study information, follow this procedure:

- 1 Open the Studies Management window and click the study you wish to modify.
- 2 Click [Info]. The Study Information dialog box appears.
- 3 Click [Modify], enter the administrator (super) password, and click [OK]. The Study Information Modification dialog box appears.

Study Information Modification

Patient Information

Patient ID: PIDPROTOKIRKV11

Weight: 194.00 lbs

Height: 76.00 inches

Sex: Male

Patient Name

Prefix:

First Name: First

Middle Name:

Last Name: Patient

Suffix:

Date of Birth

Year: 1967

Month: 12

Day: 24

Unknown

Study Information

Study ID: ANG1-0002

Accession Number: 1020000010

Study Description: Second Attempt

Institution Name: Shimadzu

Institution Address: Japan

Department Name: Angio1

Year: 2006

Month: 2

Day: 8

Hour: 18

Minute: 17

Second: 19

Referring Physician

Prefix:

First Name:

Middle Name:

Last Name:

Suffix:

Performing Physician's List

Prefix:

First Name: Physician2

Middle Name:

Last Name: Physician2

Suffix:

New

Save

Remove

OK Cancel

- 4 Change items as desired, ensuring that the following value ranges are respected:

Group/Item	Max Length	Permitted Characters / Numbers
Patient Information		
Patient ID	64	Alpha, Number, hyphen <->, period <.>, underscore <_>.
Weight	6	Number, decimal point: 1 to 250 (KG), 2.2 to 550 (pounds).
Height	6	Number, decimal point: 30 to 242 (cm), 11.8 to 95.2 (inches).

Group/Item		Max Length	Permitted Characters / Numbers
Patient Name		60	Combined length of all name fields cannot be greater than 60.
	Prefix, First, Middle, Last, Suffix	60	Alpha, Accents, hyphen, apostrophe <'>, underscore.
Date of Birth			Cannot be in future.
	Year	4	Number, no more than 107 years before current.
	Month, Day	2	Number. Month: 1-12, Day: 0-31.
Study Information			
	Study ID		
	Accession Number	16	Alpha, Number, hyphen, period, underscore.
	Study Description	64	Alpha, Number, Accents, hyphen, period, apostrophe, underscore.
	Institution Name		
	Department Name	64	Alpha, Number, Accents, Special.
	Institution Address	1024	Alpha, Number, Accents, Special, backslash <\>.
	Year	4	Number. Cannot be in future. No more than 107 years before current.
	Month, Day	2	Number. 1-12, 1-31.
	Hour, Minute, Second	2	Number 0-23, 0-59, 0-59.
Referring Physician		60	Combined length of all name fields cannot be greater than 60.
	Prefix, First, Middle, Last, Suffix	60	Alpha, Accents, hyphen, apostrophe, underscore.
Performing Physician's List		60	Combined length of all name fields cannot be greater than 60.
	Prefix, Suffix		
	First, Middle, Last	60	Alpha, Accents, hyphen, apostrophe, underscore.
Alpha: A-Z a-z Number: 0-9 Accents: àâäçèéëëïïöüüüÛÀÂÇÈÉÊËÏÔ <space>			
Special: !"#\$%&'()*+,-./:;<=>?@[^_`{ }~ <space> <backslash excluded>			

5

To add a new performing physician, click [New] in the Performing Physicians List, fill in the name fields, and click [Save]. To edit a performing physician, click the left or rightarrow button to display the previous/next name and then make the changes and click [Save]. To delete the displayed physician, click [Remove].

6 When finished making changes, click [OK] and then [Yes] to begin the modification process. Depending on the size of the study, it will take from several seconds to a minute or two to apply the modifications to every loop and image in the study. A progress bar grows toward the right during this process.

7 Once the modifications are complete, the Study List in the Studies Management window is refreshed, showing any modifications that you may have made to the fields that appear in the Study List.

6.6 Anonymizing Study Information

A study can be copied and then have all patient-identity information replaced with generic values to protect a patient's identity. This is useful when images must be printed or transferred in a non-secure environment.

To create an anonymous [COPY] of a study while leaving the original study untouched, follow this procedure:

1 Open the Studies Management window and click the study you wish to anonymize.

2 Click [Info]. The Study Information dialog box appears.

3 Click [Anonymize]. The Study Information Modification dialog box appears with Patient ID and Patient Name set to the generic value "Anonymous".

Patient Information			Patient Name			Date of Birth		
Patient ID	Anonymous		Prefix			Year	1946	
Weight	245.00	lbs	First Name	Anonymous		Month	12	
Height	66.00	inches	Middle Name			Day	24	
Sex	Male		Last Name	Anonymous		<input type="checkbox"/> Unknown		
Suffix								
Study Information								
Study ID	001-A			Year	2005			
Accession Number	ANG001000000101			Month	10			
Study Description	First attempt			Day	24			
Institution Name	Shimadzu			Hour	17			
Institution Address				Minute	35			
Department Name	Angio1			Second	57			
Referring Physician			Performing Physician's List					
Prefix			Prefix			New		
First Name	Referring		First Name	Performing		Save		
Middle Name			Middle Name			Remove		
Last Name	Third		Last Name	Second				
Suffix			Suffix					
						OK Cancel		

4

Make any additional modifications (respecting value ranges described in "6.5 Modifying Study Information" P.53) and then click [OK] and then [Yes] to begin the anonymization process. Depending on the size of the study, it will take from several seconds to a minute or two to make a complete anonymized copy of the study including all loops and images. A progress bar grows toward the right during this process.

5

Once the anonymization is complete, the Study List in the Studies Management window is refreshed to show the just-added anonymous study. By default, the new anonymous copy of the study retains the original accession number, however, its time and date are changed to the anonymous copy creation time.



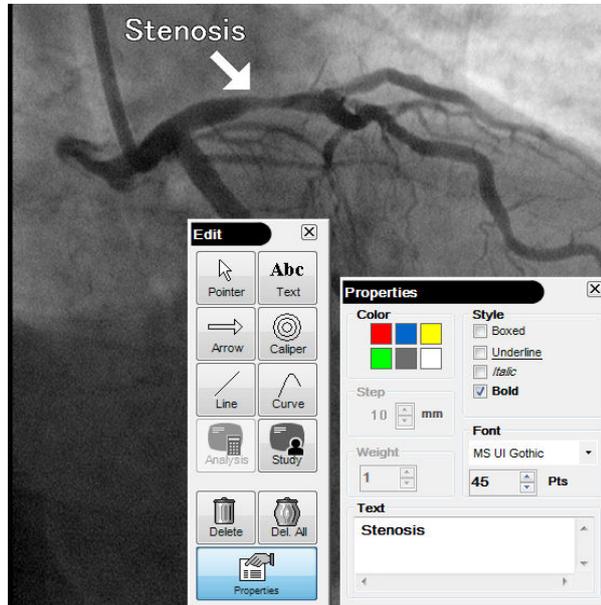
The screenshot shows the 'Studies Management' window with a toolbar and a table. The table has columns for Accession Number, Patient Name, Patient ID, Physician Name, Date, Origin, and Modal. The data row shows 'Anonymous Anonymous' for Patient Name and Patient ID, '01/26/2015 15:04:36' for Date, and 'DAR9500REV-...' for Origin. The Modal column contains 'XA'.

Accession Number	Patient Name	Patient ID	Physician Name	Date	Origin	Modal.
	Anonymous Anonymous	Anonymous		01/26/2015 15:04:36	DAR9500REV-...	XA

6.7 Working with Image Annotations

Any area of interest in an image can be annotated with arrows and text superimposed on the image.

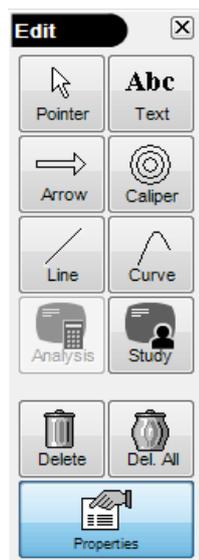
In this sample image a stenosis has been highlighted with the annotation tool.



To annotate an image, follow this procedure.

1

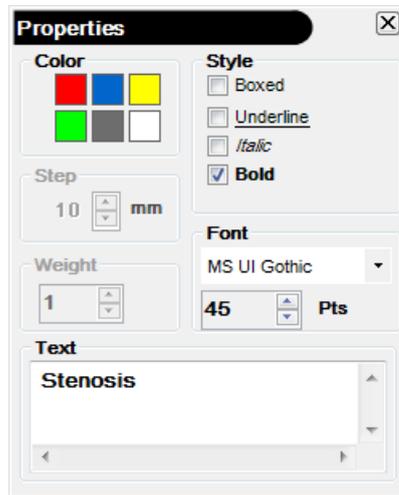
Pause a loop on the image you wish to annotate. Click [Funct], [Abc Edit] on the side menu. The Edit toolbar appears floating over the image.



6

2

To add text, click the [Text] button, move the pointer to where you wish to add text, click and begin typing. The text appears in the Properties dialog box and it is also superimposed over the image. Set color and style as desired.



3

Position the text by dragging it over the image. To add an arrow, click the [Arrow] button, point to the area of interest in the image and click. An arrow appears. Move the arrow around the image by dragging its head. Change the tail angle or length by dragging the tail. Set its color properties as desired.

4

If QCA or LV analysis features are active and analysis information is superimposed over the image while creating an annotation, the [Analysis] button on the Edit toolbar is automatically activated. To hide this information, click the [Analysis] button so that it is no longer pushed in.

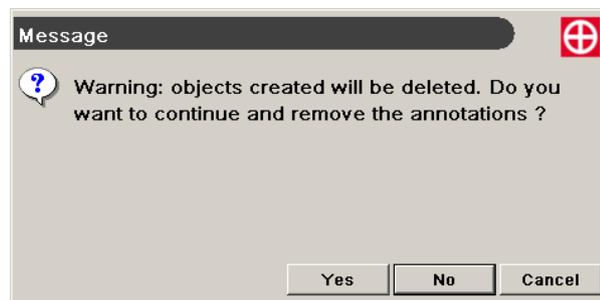
NOTE When image annotations are saved with the study as DICOM objects, all colors are converted to black and white. So once an annotated image has been saved with a study, closed, and then reopened, any colors will be gone.

5

To add a copy of the study information displayed at the top of the Image Viewer window to the annotated image, click [Study] on the Edit toolbar. A movable Study Information line appears over the image. Position it as desired.

6

When selecting other loop, the following dialog will display. Click [No] to maintain the annotation.

**7**

Save your annotated image as described in the next section "Saving Images".

6.7.1 Measurement Tools

ISO center value is registered for calibration coefficient as a default value. Perform calibration as described in ["7.4 Image Calibration Methods" P.84](#) if needed. Once an image has been calibrated, three additional tools become available on the Edit toolbar. The Caliper, Line, and Curve tools can be used to make measurements in an image.

■ Caliper

Select the Caliper tool and click on the image. The caliper appears. Grab the Caliper in the center and move it where you like. Size the Caliper by clicking the largest circle and then dragging inward to shrink it or outward to expand it.

■ Line and Curve

Select the Line or Curve tool and click on the image. A point appears. Click elsewhere on the image to add a second point, and so on. The straight line (curve) connecting those points, is displayed. The dotted line is also displayed starting from the first point, and the length is displayed at the edge of the dotted line. If new points are added or deleted at the edge of the line, the length value is updated.

To stop entering points, click the [Pointer] button. To delete a point, select it at the edge of the dotted line that shows the straight line (curve) length and then click both mouse buttons simultaneously.

The edge point of the dotted line can be moved. When the point is moved, it is possible to change the position of where the straight line (curve) length is displayed. To move a point, drag it to a new position.

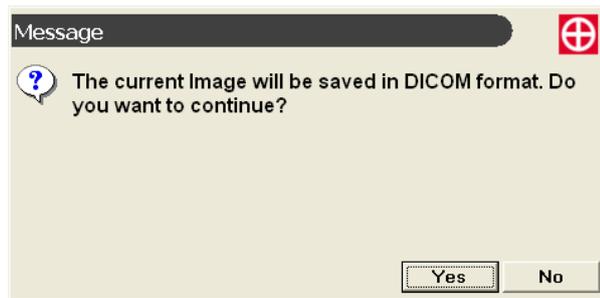
6.8 Saving Images

The [Save] button on the side menu can be used to save still images (with any annotations) from loops.

To save an image, follow this procedure.

1

Pause on the image if it is in a playing loop then click [Funct], [Save]. The following prompt appears:

**2**

Click [Yes] to perform the save. Any color in the image is converted to black and white before saving. Note that once you click [Yes], you cannot delete the new image object.

A new icon is added to the end of the Image Selector list for each image you save.

The upper-left corner of the icon includes the loop number from which the image was saved, and, in square brackets, the image frame number.

Also, when back in the Studies Management window, if you select this study and then click [Series], you will see your just-added object indicated by an increase in the number of objects in the [Annotated Images] series.

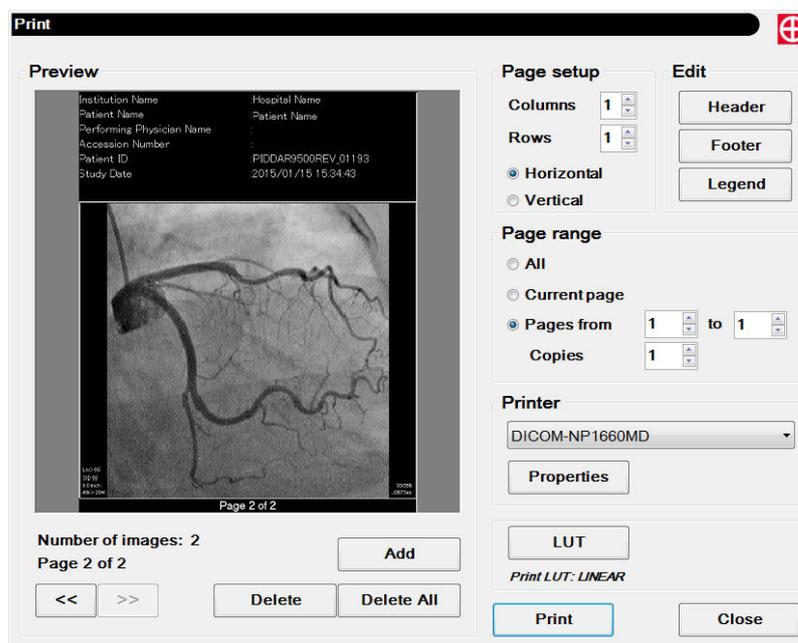
6.9 Printing Images

6.9.1 Selecting Images to Print

To select images for printing, including annotated and reference images, navigate to each image that you wish to print, pausing on it if it is in a playing loop, and click [Add] on the side menu. Continue adding as many images as you like. When ready to see the print preview, click [Print].

NOTE The [Add] and [Print] side-menu buttons are grayed out if no printers are configured. Consult your system administrator for assistance.

If you click [Print], the print window appears like this:



You can then choose the desired printer in the Printer list, either a Windows printer or DICOM printer. You can also configure Headers, Footers, and Legends for both printer types. With the DICOM printer, you can print on special media such as photographic paper and film.

6.9.2 Printing Basics

After choosing [Print], (and selecting printer type) a preview of your selected images is shown, arranged according to the Page setup values. Sufficient pages are added to accommodate the images. For example, if you add a total of 8 images and Columns = 2 and Rows = 2, (4 images per page), 2 pages will be required.

- 1** Navigate through the preview images with the << and >> buttons in the lower-left corner.
- 2** Add images with the [Add] button. If desired, you can close the Print window to see the images better and then click [Print] again to reopen the window.
- 3** Delete images, by selecting a preview image (it is highlighted with a box) and then clicking [Delete], or click [Delete All] to delete every image from the print list.
- 4** In the Page setup box, set the number of Rows and Columns of images per page. For example, setting both Rows and Columns to 3 will give you 9 images per page.
- 5** Choose the desired printer in the Printer list if necessary.
- 6** Optionally configure printer features and set DICOM printer options as described in the two following sections.
- 7** When ready, click [Print] to print the images.
- 8** If desired, you can click [Close] without printing and print later. Your images are preserved in the print list until you delete them or close the study.

NOTE Printed images can be of diagnostic quality only when printed on an approved medical-grade printer that has been calibrated.

6.9.3 Print Features

Print Features such as Headers and Footers can be configured.

NOTE If you print to a color printer (and color printing is enabled) any color element added to an image will be printed in color provided the image has not been archived and closed since you added color elements. Archived images are monochrome only.

■ Horizontal/Vertical

In the Page setup box, you can choose [Horizontal] to fill the page left to right and then down, or [Vertical] to fill it top to bottom and then to the right. For example, if Columns and Rows are set to 2, for 4 images per page, selecting [Horizontal] will cause the first image to be placed in the upper-left area, the second to be placed in the upper-right area, the third to be placed in the lower-left area, and so on. In contrast, [Vertical], will cause the second image to be placed in the lower left and the third image to be placed in the upper right.

■ Modifying the Header and Footer

By default, a header and footer is included on every page. You can use the defaults, adjust them, or completely replace them.

To modify the [Header] or [Footer], follow this procedure:

1

Click the [Header] or [Footer] button. The Header or Footer edit box appears.

Header

Institution Name	:%InstitutionName
Patient Name	:%PatientName
Performing Physician Name	:%PerPhysName
Accession Number	:%AccessionNumber
Patient ID	:%PatientID
Study Date	:%StudyDate

B I U **Alignment** Institution Name

Left Right

 Center

Footer

Page %P of %N

B I U **Alignment** Institution Name

Left Right

 Center

2

Enter any text you like. Press [Enter] to start a new line. Press the keyboard [Tab] key to align text in columns. To delete text, select it (drag over text with mouse button pressed so that selection becomes highlighted) and press the keyboard [Delete] key.

3

Variables and macros for common information such as Patient Name can be included by selecting them from the drop-down list above the Add button and then clicking [Add].

During preview and printing the variables are replaced with the actual values from the study. You can add, delete, and rearrange macros and variables or your own text in any way desired. The variables provide information specific to the image added to the print list.

The following variables are supported:

Variable	Notes
General:	These variables provide general information about the study.
%Institution Name	
%Performing Physician Name	
%Patient Name	
%Study Date	
%Patient ID	
%Study ID	
%Patient Sex	
%Patient Date of Birth	
%Accession Number	
%Page Number	
%Number of pages	
Parameters:	These variables replicate any parameter information associated with the selected image.
%Oblique Angle	C-arm angle with respect to patients body, with negative values toward the patient's left and positive values toward the patient's right.
%Sagittal Angle	C-arm angle with respect to patients head, with negative values toward the head and positive values toward the foot.
%sid	X-ray source to detector distance in centimeters.
%fov	FPD field of view in inches.
%kV	X-ray tube voltage in kilo-volts.
%mA	X-ray tube current in milliamperes.
%mAs	Multiplication value of X-ray tube current and time. The unit is expressed with milliamperere second.
%Time	X-ray pulse (exposure) duration for this image, in milliseconds.

Variable	Notes
%Image Comment	The selected comment (if any).
%Dose of the Loop	Dose of the loop.
%Image Number	Number of the image.
%Acquisition Time	The time which the image was taken.
Frame Information:	These variables provide frame information.
%Frame	The image from which this image was taken.
%n_frame	The total number of frames in the loop.
%Frame Time	The number of seconds since start of loop at which the image was acquired.
%Injection Time	The period of time when turn ON the injector with overlay by frame in millisecond.
%Inverted	Flip information of the image.
Quantitative Coronary Analysis (QCA):	
%QCA Reference	<p>These variables are used inside the %qca macro to provide QCA result values for images with active QCA analysis at the time they are added to the print list.</p> <p>The default [%qca] macro definition is as follows:</p> <pre>%qca(QCA ref %QCA Reference Stenosis %QCA RAO Stenosis mm mm : %QCA RAO Stenosis % %)</pre> <p>Enter this entire definition in one of the legend boxes. This causes QCA results to be displayed like this:</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> QCA ref 3.96 Stenosis 1.43 mm : 63.84 % </div> <p>The variables in this macro only produce results for images on which QCA results had been calculated at the time the image was added to the print list. If this is not the case, no QCA result values are printed.</p> <p>If desired, you can omit some of the individual variables or re-sequence them.</p> <p>▶▶ Reference See also "7.2 Quantitative Coronary Analysis" P.75.</p>
%QCA RAO Stenosis mm	
%QCA RAO Stenosis %	

Variable	Notes
Left Ventricular Analysis (LVA): (See also "7.3 Left Ventricular Analysis" P.80.)	
%LV RAO EDV MI	<p>These variables are used inside the default [%lvrao] macro to provide LV RAO values for images with active LV analysis at the time they are added to the print list. The default [%lvrao] macro definition is as follows:</p> <pre> %laver(RAO 30° Defame) : %LV RAO EDV ml Defame): %LV RAO EDV m² ESV(m²) : %LV RAO ESV ml ESV(m²) : %LV RAO ESV m² EF : %LV RAO EF) </pre> <p>Enter this entire definition in one of the legend boxes. This causes LV RAO results to be displayed like this:</p> <div data-bbox="940 801 1182 1128" style="background-color: black; color: white; padding: 10px; text-align: center;"> RAO 30° EDV(ml) : 65.19 EDV(m²): 27.34 ESV(ml) : 14.15 ESV(m²): 6.16 EF : 79.40 </div> <p>If desired, you can omit some of the individual variables or re-sequence them. The patient's height and weight must be entered on the LV tool bar before proper results can be calculated.</p>
%LV RAO EDV M ²	
%LV RAO ESV MI	
%LV RAO ESV M ²	
%LV RAO EF	

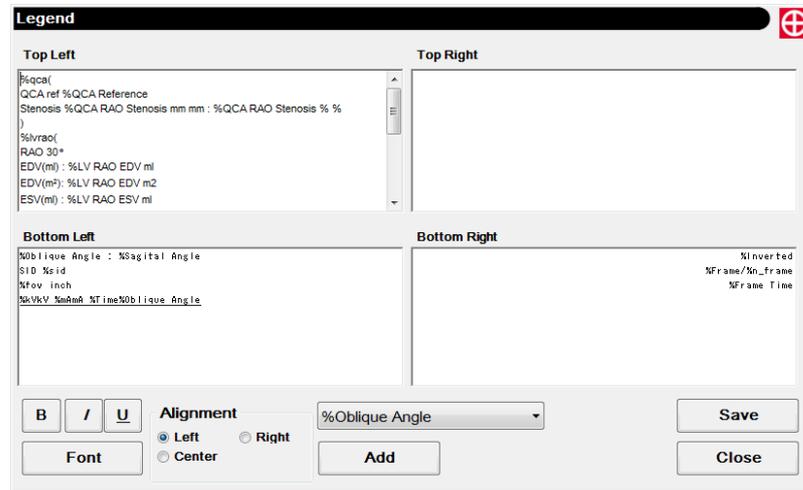
Variable	Notes
%LV RAO LAO EDV ml	<p>These variables are used inside the default [%lvraolao] macro to provide LV RAO values for images with active LVA analysis at the time they are added to the print list. The default [%lvraolao] macro definition is as follows:</p> <pre>%lvraolao(RAO 30°+ LAO 60° EDV(ml) : %LV AO LAO EDV ml EDV(m²): %LV RAO LAO EDV m² ESV(ml) : %LV RAO LAO ESV ml ESV(m²) : %LV RAO LAO ESV m² EF : %LV RAO EF)</pre> <p>This causes LV RAO LAO results to be displayed like this:</p> <div style="background-color: black; color: white; padding: 10px; text-align: center;"> <p>RAO 30°+ LAO 60°</p> <p>EDV(ml) : 45.06</p> <p>EDV(m²): 18.99</p> <p>ESV(ml) : 5.87</p> <p>ESV(m²): 2.73</p> <p>EF : 79.40</p> </div> <p>If desired, you can omit some of the individual variables or re-sequence them. The patient's height and weight must be entered on the LV tool bar before proper results can be calculated.</p>
%LV RAO LAO EDV m ²	
%LV RAO LAO ESV ml	
%LV RAO LAO ESV m ²	
%LV RAO LAO EF	

NOTE Special variables, such as those containing QCA or LV analysis results (e.g., [%QCA RAO Stenosis %]), will only have a value for images that were added to the print list when the QCA or LVA results were displayed.

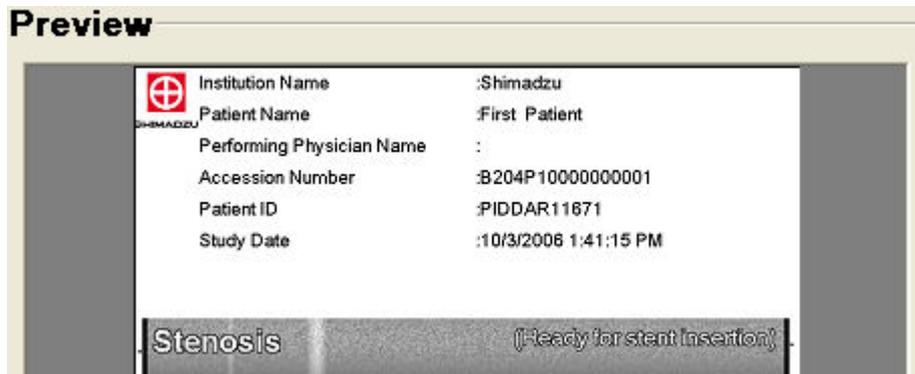
- 4** To format, select the desired text and variables, and then click one or more of the buttons: [B] for bold, / for italic, [U] for underlined, or [Font] for font. For Font, choose Font, Font style, and Size from the dialog box that appears.
- 5** Change text alignment by selecting one or more lines of text and clicking an Alignment button: [Left], [Right], or [Center].
- 6** When finished, click [Save]. Your changes are immediately reflected in the Preview.

■ Modifying the Image Legend

Any Legend text you like can be superimposed over the four corners of the image. To add Legend text, click the [Legend] button, enter your text and variables, and then apply formatting like done for Header in any of the four boxes.



Click [Close] when done. Add a new image and check the results in the Preview. Until modified, this legend will be included on all images subsequently added to the Print list. In this example, the Legend text is inserted in the two upper corners of the image:



■ Selecting Page Range

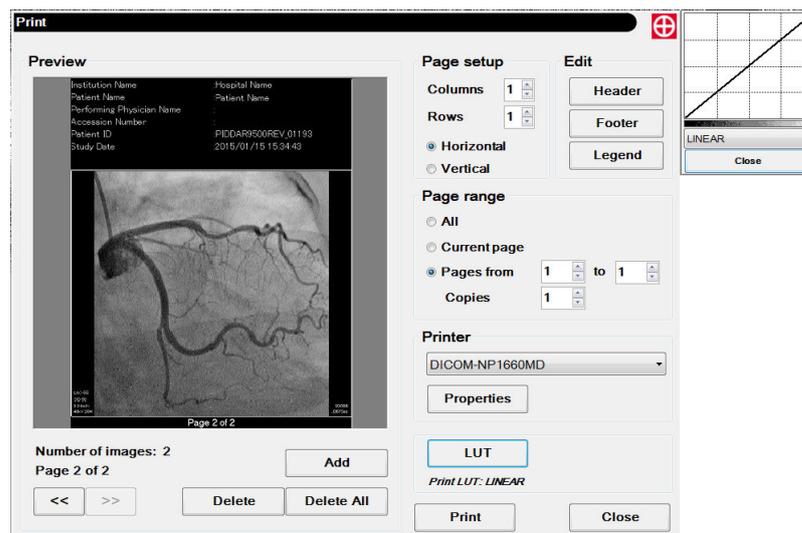
If you wish to print fewer than all images, select the desired page(s) in the Page range box.

■ Setting Printer LUT

If configured at your site, you may be permitted to select alternative printer LUT profiles to control image brightness and contrast. If the current printer LUT profile (name displayed near LUT button) is not appropriate, follow this procedure to set a different one:

1

Click the [LUT] button. A small profile selection box appears at the upper-right corner of the Print window.



2

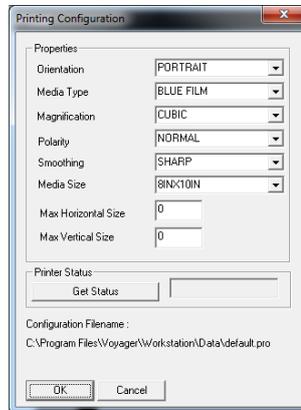
Choose the desired profile from the drop-down list. The chosen profile name appears near the LUT button. If desired, click [Close] to close the drop-down list.

■ Setting Printer Properties

For non-DICOM printers, you can click [Properties] to display the standard Windows Printer Properties box for the selected printer. Adjust printer properties as desired.

6.9.4 DICOM Printer Properties

There are several DICOM printer properties that are configured as follows :



Item	Description
Orientation	Choose [LANDSCAPE] for a page that is wider than it is long, or [PORTRAIT] for the opposite.
Media Type	Choose media such as paper, photographic paper, or film, according to what is supported and available. Black text on a white background is used for paper, and white (clear) text on a black background is used for film.
Magnification	Choose the scaling algorithm used to fit images into the designated page region. For example, BICUBIC will produce better quality than CUBIC, however it will take more time.
Polarity	Only for the image itself, choose [NORMAL] for normal printing or [REVERSE] for reverse (white inverted to black, black inverted to white) printing.
Smoothing	Enabled only for some [Magnification] values (e.g., [CUBIC]). Enter a value supported by the selected printer.
Media Size	Choose media size.
Max Horizontal Size	Specify the sendable maximum image size.
Max Vertical Size	Specify the sendable maximum image size.
Get Status	Click to display DICOM printer [Status].

6.10 Send Selected Loops

Enable to send the selected image. To send the image, follow this procedure.

- 1** From the image selector, put a check mark in the check box at the bottom left of a desired still image or loop.
Right-click on the image selector and select [Select All] on the displayed pop-up menu, enable to select all the images.
- 2** Click [Funct] : [Send] button on the side menu, or right-click on the image selector and select [Send]. A pop-up menu to select a destination is displayed.
- 3** Click the destination.

6.11 Deleting Selected Image

Enable to delete the selected image. To delete the image, follow this procedure.

- 1** From image selector on REF monitor, put a check mark in the check box at the bottom left of a desired still image or loop.
Right-click on the image selector and select [Select All] on the displayed pop-up menu, enable to select all the images.
- 2** Right-click on the image selector and select [Delete] on the pop-up menu, and the message is displayed.
- 3** Click [OK].

6.12 Modifying Image Comments

Enable to modify comments on the image after study. Follow the procedure below to modify the comments.

1 Display an image which comment to be modified.

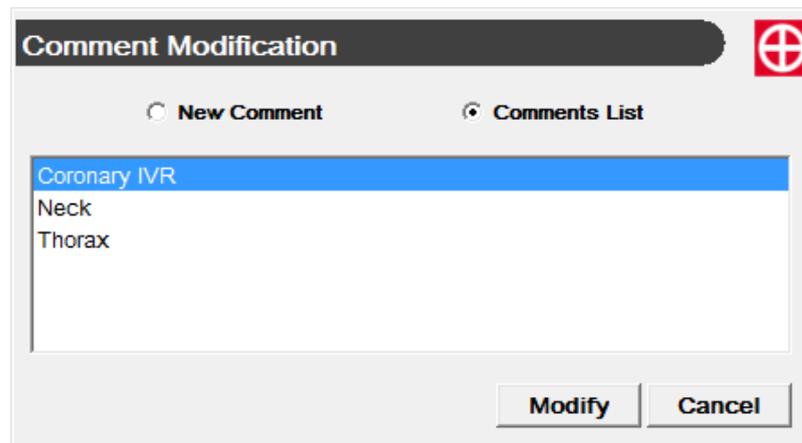
2 Click [Comment] on the side menu.

3 Select [New Comment] to set a new image.

4 After entering a comment, click [Modify] button.



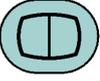
5 To select from registered image comments list, select [Comments List].



6 After selecting an image comment, click [Modify] button.

6.13 Keyboard Shortcut

On Review Station, enable to operate various operation with function keys on the keyboard. The following table shows the configurable functions that user can assign.

Icon	Button Name	GUI State Before	Comments
	Single/Split Display	Reference not split.	ON = Split vertically.
	Left/Right Focus	Reference split.	ON = Right half of split Reference monitor selected.
	Save Still Image	Paused on loop.	ON = Save available.
	16-up Selector	Neither Menu nor 16-up Select shown.	ON = 16-up Select mode. Goes OFF once selection made.
	Live	Image display is subtracted.	Image display is Live (not subtracted). ON = Live.
	Play Forward	Loop not playing forward.	Loop plays forward upon selection. ON = Play Forward available.
	Play Backward	Loop not playing backward.	Loop plays backward upon selection. ON = Play Backward available.
	Zoom In	Image displayed not in maximum zoom.	Zoom level increases slightly upon selection. ON = Zoom In available.
	Zoom Out	Image displayed not in minimum zoom.	Zoom level decreases slightly upon selection. ON = Zoom out available.
	LV Mode	Loop selected.	LV menu shown upon selection. ON = LV menu shown.
	QCA Mode	Loop selected.	QCA menu shown upon selection. ON = QCA menu shown.
	Add Print	Paused on loop.	Image displayed is added for printing upon selection. ON = Add Print available.
	Add annotation's Pointer	Paused on loop.	Pointer tool selected upon selection.
	Add annotation's Text	Paused on loop.	Add text tool selected upon selection.

Icon	Button Name	GUI State Before	Comments
	Add annotation's Arrow	Paused on loop.	Arrow added at mouse cursor location upon selection.
	Add annotation's Caliper	Paused on loop. Image calibrated.	Caliper tool added at mouse cursor location upon selection.
	Add annotation's Line	Paused on loop. Image calibrated.	Line tool added at mouse cursor location upon selection.
	Add annotation's Curve	Paused on loop. Image calibrated.	Curve tool added at mouse cursor location upon selection.
	Add annotation's Analysis	Paused on loop. QCA or LV analysis active.	Analysis results added upon selection.
	Add annotation's Study	Paused on loop.	Study information added upon selection.
	Clear last annotation	Paused on loop.	Last annotation added upon selection.
	Clear all annotations	Paused on loop.	All annotations deleted upon selection.
	Show Annotation properties	Paused on loop.	Annotations properties shown upon selection.
	H-Flip	Loop selected.	Flip an acquisition image horizontally.
	V-Flip	Loop selected.	Flip an acquisition image vertically.
	Peak Hold		Display peak hold image.

7

Performing Angiographic Analysis

This chapter describes the Quantitative Coronary Analysis (QCA) and Left Ventricular (LV) analysis features and their related calibration procedures.

If the advanced QCA/LVA option has been installed, the separate CAAS II for Windows software is launched with the current image when you choose [Funct], [QCA], or [Funct], [LVA].

Disregard this chapter and instead consult the separate "CAAS II for Windows QCA" and "CAAS II for Windows LVA" documentation.

7.1 Introduction

Quantitative Coronary Analysis (QCA) and Left Ventricular (LV) features are available to help assess coronary stenosis and ventricular volumes.

7.2 Quantitative Coronary Analysis

The QCA feature enables you to accurately measure coronary artery stenosis. In automatic mode, you just click a few points in the general area of the stenosis and the QCA feature does the rest, drawing a contour and calculating the degree of stenosis.

WARNING



Instruction

Measurement Errors:

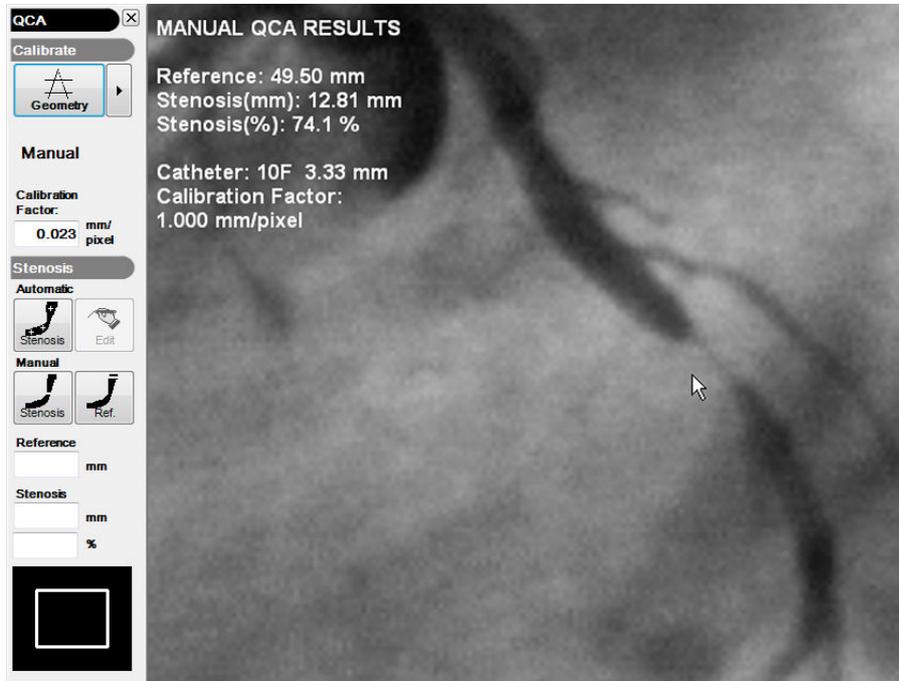
Measuring a vessel diameter from angiography causes several errors. Therefore, do not diagnose or treat based solely upon this analysis result. Use the analysis result as a reference value.

To measure coronary artery stenosis, follow this procedure.

1

Display a study containing both calibration reference and stenosis images. Click [Funct], [QCA].

The image is automatically zoomed and the QCA toolbar is displayed. Calibration and analysis information is superimposed over the image. (Analysis information is displayed depends on the setting. "[Display Tab](#)" P.123)



2

ISO center value is registered for calibration coefficient as a default value. For more detailed analysis result, perform calibration as described in "[7.4 Image Calibration Methods](#)" P.84. This determines the mm to pixel ratio of the image. When calibrated, display an image with a good view of the stenosis.

3

If needed, pan (right-click drag) the image so that the area of interest is centered in the Image Viewer window.

4

You can also pan the image by dragging the pan box at the bottom of the toolbar with either the mouse (left-click drag) or the joystick (hold down button). Drag the pan box in the direction you wish to pan the image.

5

Use the [Zoom] button on the side menu to zoom in or out the image. Right-click on the button to zoom in and left-click to zoom out.



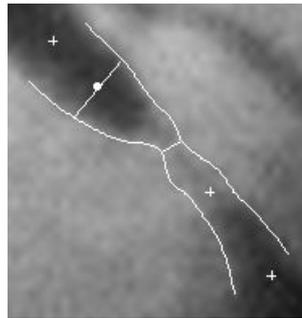
6

Click the [Automatic Stenosis] button. Then click three points along the stenosed artery, with the first point on one side of the stenosis, the second point near the stenosis, and the third on the other side of the stenosis. Then click a fourth point on the part of the artery you judge to be the coronary reference diameter.



7

A contour is drawn along the artery, with the reference point marked by a white dot with a line through it extending to the artery edges. The narrowest part of the artery, the suspected stenosis, is marked with a white line across the artery. The degree of stenosis is calculated based on the ratio between the width of the artery at the reference point versus the width of the artery at the most stenosed point. Drag the reference line along the artery, or adjust other points as desired. The percent stenosis is recalculated instantly.



8

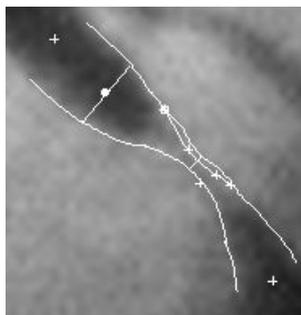
To adjust an auto-generated contour line to fit the artery edge more closely, click [Edit] on the QCA toolbar. The image is zoomed in so you can see the artery more closely. Right-click drag the image to center the area of interest. Click [Redraw] on the Edit toolbar.



7

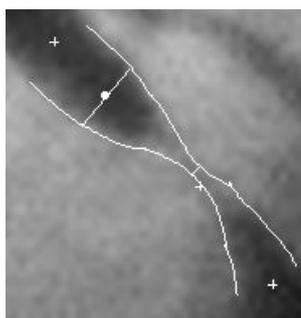
9

On the image, click where you want to start adding points and then click to add other new points along the artery edge where the automatic contour is not close enough. Drag the new points as needed to follow the artery edge. The first and last new points automatically connect to the automatic contour. Click [Apply] to change the contour and recalculate stenosis. When adjusting the contour, press the keyboard space bar to temporarily hide the automatic contour so that you can clearly see the artery edge.



10

The contour is modified, the stenosis indicator line is moved to the new narrowest point, and the stenosis is recalculated and displayed.



Reference	
49.50	mm
Stenosis	
12.81	mm
74.1	%

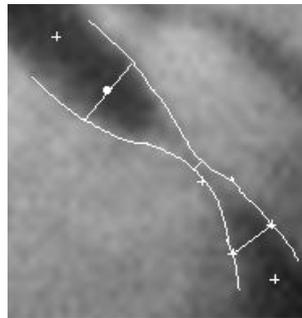
11

To trim off the ends of the contour lines click [Edit] on the QCA toolbar and then [Cut] on the Edit toolbar.

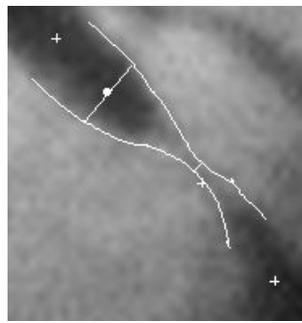


12

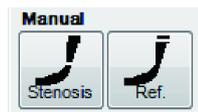
Click points on either side of the ends of the contour lines like this so that the connecting line bisects the contour lines at the desired trim points.

**13**

Click [Apply] to trim the contour lines where indicated.

**14**

If you prefer, you can measure stenosis manually. Click the [Manual Stenosis] button. Click points on opposite sides of the narrowest part of the stenosed artery. The stenosis is measured and indicated onscreen.

**15**

Click the [Manual Ref.] button. Click points on opposite sides of the part of the artery that you consider to be un-stenosed. The reference distance is measured and indicated onscreen. The percent stenosis is also calculated and displayed.



7.3 Left Ventricular Analysis

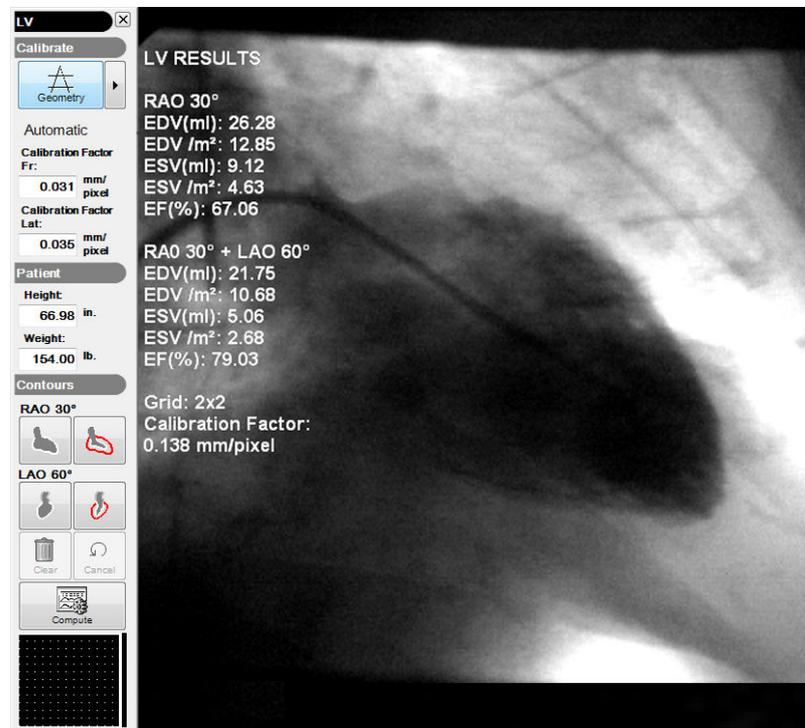
The left ventricular analysis feature enables you to calculate left ventricular volume and analyze the regional and global wall motion with the Modified Centerline method. These values are determined starting with a right oblique anterior projection at 30 degrees, a left oblique anterior projection at 60 degrees, and their spatial combination.

NOTE For optimal Left Ventricular analysis, object (both the heart and the calibration device) should be positioned at the center of the image. In other words, object should be positioned at ISO center.

To perform left ventricular analysis, follow this procedure:

- 1 Display a study containing both a calibration reference image and other images showing the left ventricle in its various states.
- 2 Click [Funct], [LV].
- 3 The LV toolbar is displayed. Calibration and analysis information is superimposed over the image. (Analysis information is displayed depends on the setting.)

▶▶ Reference See "Display Tab" P.123.



4 If needed, pan (right-click drag) the image so that the area of interest is centered in the Image Viewer window. You can also pan the image by dragging the pan box at the bottom of the toolbar with either the mouse (left-click drag) or the joystick (hold down button). Drag the pan box in the direction you wish to pan the image.

5 ISO center value is registered for calibration coefficient as a default value. For more detailed analysis result, perform calibration as described in "7.4 Image Calibration Methods" P.84. This determines the mm to pixel ratio of the image.

NOTE If the image has not been calibrated, only the results of the ejection fraction and segmental LV function will be available.

6 In the Contours group of the LV toolbar, click the projection icon that corresponds to the image (the End-of-Diastole image (ED), or the End-of-Systole image (ES) of RAO or LAO projection).



RAO ED



RAO ES



LAO ED



LAO ES

7 Working with only RAO ED and RAO ES projections, two contours can be traced, and if the LAO projection is also used, four contours may be traced.

The selected projection is indicated by the highlighted projection icon on the LV toolbar.

8 Using the mouse, outline the ventricle's contour by clicking multiple points along the ventricular wall. Start contouring from the base of the aorta. It is sufficient to click a few points along the contour by clicking the left mouse button and then the outline curve is automatically created.

9 Move a point by clicking and dragging it to a new position.

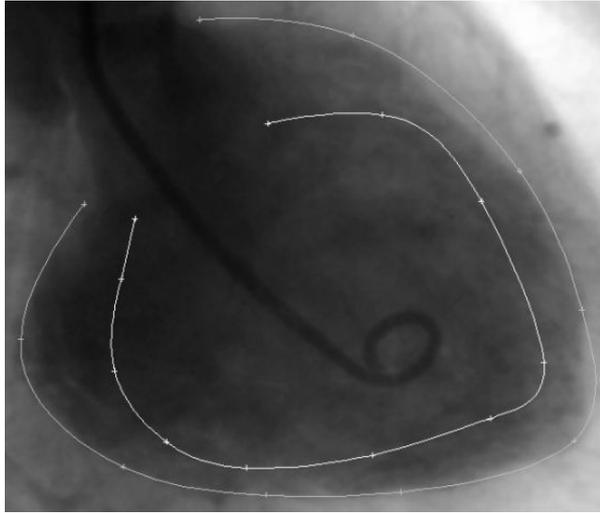
7

10 Delete a point by clicking it with the left and right mouse buttons simultaneously.

11 To erase the entire curve, click [Clear]. Alternatively, to cancel recent changes and restore previous values, click [Cancel].

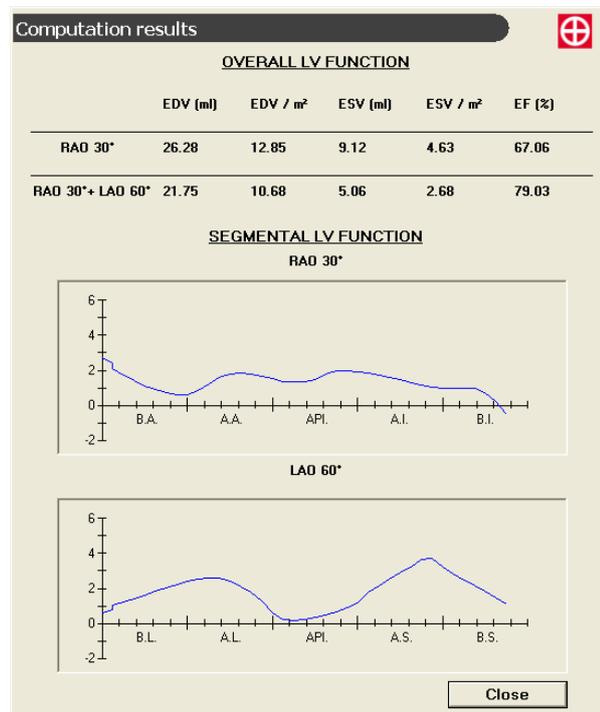
12 Once the contour is defined up to the lower-right aortal base, validate the contour by clicking the icon of the next projection to be drawn. Once validated, an opaque square surrounds the projection icon to indicate that the corresponding contour has been entered and validated.

13 Select the image for ES and define its contour. Here is a sample with the ED and ES contours completed.



14

Click the [Compute] icon. The results of the ventricular analysis are displayed like this:



Abbreviations: BA = Basal Anterior; AA = Apical Anterior; API = Apical; AI = Apical Inferior; BI = Basal Inferior; BL = Basal Lateral; AL = Apical Lateral; AS = Apical Septal; BS = Basal Septal.

CAUTION



Instruction

This analysis is calculated with an approximation formula called "Area Length," so the calculation result includes approximation errors.



Instruction

Analyze both LAO and RAO for high precision analysis. Also, perform either of calibration once.



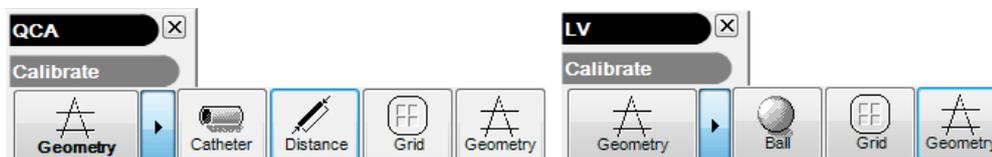
Instruction

Calibrate on either the LAO or RAO image. It is not necessary to calibrate on both. Be sure to adjust the target region to the ISO center and perform LAO and RAO radiography without changing SID. Also, perform either of calibration once.

7

7.4 Image Calibration Methods

Calibration options available for the QCA and LV features are as follows:



NOTE If you choose a different loop after calibrating, a message may be displayed asking if you wish to keep the existing calibration. Keep the existing calibration [ONLY] if you know that the acquisition configuration and C-arm parameters are the same for the different loop.

7.4.1 Using ISO Center Value

ISO center value is used as a default, however, perform calibration by manual if needed.

7.4.2 Using a Catheter (QCA)

To calibrate an image using a catheter, follow this procedure:

- 1 Display an image that contains a [catheter of known diameter].
- 2 On the QCA toolbar, click the arrow button below Calibrate and choose [Catheter]. Then click the [Catheter] button.
- 3 Choose one of the predefined catheter diameter values from the drop-down list or enter the exact value (mm) in the box provided.
- 4 Click the [Catheter] button.
- 5 Click 3 points along the middle of the catheter.

- 6 The calibration factor in mm per pixel is calculated and displayed in the Calibration Factor box. To adjust the outline and improve the mm per pixel accuracy, click any of the three points and drag it while keeping the mouse button pressed.

CAUTION



Instruction

If the target vessel for measurement and geometric expansion of catheter for calibration is different, then the expansion difference causes errors.

7.4.3 Using a Reference Distance (QCA)

 **NOTE** This method is only valid if the object of known dimensions lies in the same plane as the structure to be measured in the image.

To calibrate an image using a reference distance, follow this procedure:

- 1 Display an image that contains an [object of known dimensions].
- 2 On the QCA toolbar, click the arrow button below Calibrate and choose [Distance]. Then click the [Distance] button.
- 3 Enter the known reference distance (mm) in the box provided.
- 4 Click the [Distance] button.
- 5 Click two points on the image to mark the exact starting and ending points of the object of known dimensions. A line segment is drawn between the two points.
- 6 The calibration factor in mm per pixel is calculated and displayed in the Calibration factor box.
- 7 If desired, adjust the line segment as follows:
 - Move the segment on the image by clicking the first point of the segment and dragging it while keeping the mouse button pressed.
 - Stretch or reduce the segment by clicking the last point of the segment and dragging it while keeping the mouse button pressed.

7.4.4 Using a Grid (QCA and LV)

NOTE This method is only valid if the grid of known dimensions lies in the same plane as the structure to be measured in the image.

To calibrate an image using a grid, follow this procedure:

- 1** Display an image that contains a [grid of known dimensions].
- 2** On the toolbar, click the arrow button below Calibrate and choose [Grid]. Then click the [Grid] button.
- 3** Choose a grid from the drop-down list, from 1 mm square up to 7 × 7 mm.
- 4** Click the [Grid] button.
- 5** Click four points on the image to mark the initial position and size of the grid. A grid is drawn over the image. Now position the grid over a corresponding number of grid cells in the image. For example, if you chose a 2 × 2 grid, position the onscreen grid so that it is superimposed over a 2 × 2 grouping of grid cells in the image.
- 6** The calibration factor in mm per pixel is calculated and displayed in the Calibration factor box.

7.4.5 Using a Reference Ball (LV)

To calibrate an image using a reference ball, follow this procedure:

- 1** Display an image that contains a [reference ball of known diameter].
- 2** On the LV toolbar, click the arrow button below Calibrate and choose [Ball]. Then click the [Ball] button.
- 3** Enter the diameter of the ball (mm) in the box provided.
- 4** Click the [Ball] button.
- 5** Click 3 points on the ball circumference. The ball is outlined and the calibration factor in mm per pixel is calculated and displayed in the Calibration Factor box. If desired, adjust the ball outline by clicking and dragging any of the 3 points.

8

DSA Image Adjustment Tools

This chapter describes how to adjust Digital Subtraction Angiography (DSA) images with the tools provided.

8.1 Introduction

Images captured in DSA mode have constant structures of no diagnostic interest virtually removed, enabling enhanced blood-vessel contrast.

Tools are provided to adjust DSA images to ensure the best-possible image quality.

8.2 Adjusting Subtraction Parameters

To modify the subtraction parameters of a loop:

1

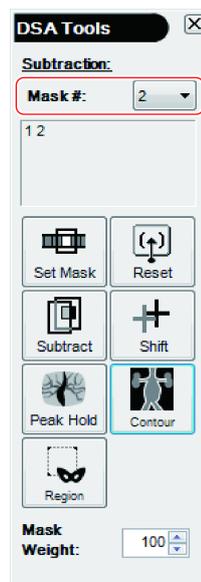
Display the loop.

2

Click [Funct], [DSA] on the side menu.

3

The DSA Tools bar is displayed with the frame numbers of the mask frames shown in the [Mask #] box. The default number of consecutive frames used to create the mask (defined in Rad program definition) is shown in the [Mask #] selection box.



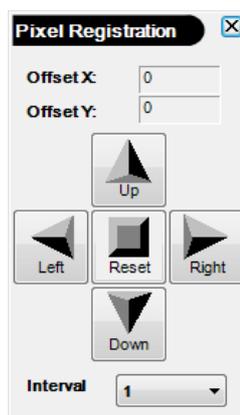
4

To change from the automatically-selected mask frames, pause on the image frame to be used as the first frame for the new mask and click the [Set Mask] button on the DSA Tools bar. This frame and the appropriate number (defined in Rad program definition) of additional consecutive frames are used as the mask.

- 5 To change the number of additional consecutive frames used to create the mask, select a different value from the [Mask #] drop-down list of the DSA Tools bar.
- 6 To change the Mask Weight, use the [Mask Weight] button to change the value (0~100 %).
- 7 If necessary, display the image in subtracted mode and use the side menu buttons to adjust the gray scale.
- 8 For DSA images, subtraction mode is the default. To review images in non-subtraction mode, click the [Subtract] button on the DSA Tools bar to deselect it (no longer appears pushed in). Click [Subtract] again to return to subtracted mode.

8.3 Reregistration

If necessary, use the Pixel Registration tool to reposition the image mask.



- 1 Click the [Shift] button on the DSA Tools bar.
- 2 Move the image along any of the four-axis by clicking the appropriate arrow button on the Pixel Registration tool bar.
- 3 If it is desired to move less than one pixel per click, select a different interval increment from the [Interval] drop-down list on the Pixel Registration tool bar.
- 4 To reposition the mask to the initial position (0,0), click [Reset] on the Pixel Registration tool bar.

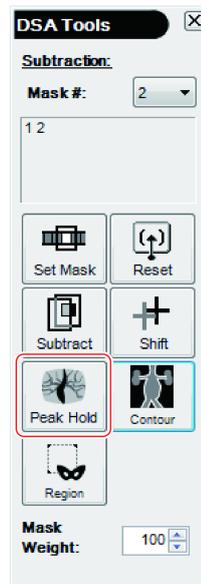
8.4 Peak Hold

NOTE Cannot use Mask Weight in combination with Peak Hold.

Create peak hold image.

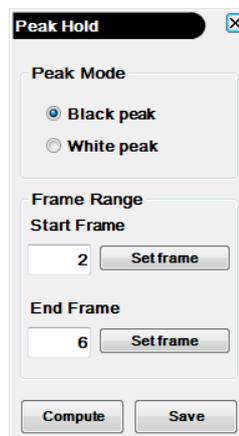
1

Click [Peak Hold] button on the DSA Tools bar and the peak hold will automatically apply to displaying image. The peak hold setting is that peak mode is black and the frame range is currently selected frame to the last frame.



2

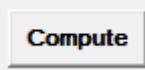
In case of that adjustment of peak hold image is necessary, use the peak hold dialog and set as follows:



- Select either of black or white peak.
- Frame range applying peak hold (Display Start frame and click [Set Frame] button. And then display End frame and click [Set Frame] button.

3

Click [Compute] button to recreate the peak hold image.

A rectangular button with a light gray background and a thin black border. The word "Compute" is centered on the button in a black, sans-serif font.**4**

Click [Save] button to save the created peak hold image as a still image.

A rectangular button with a light gray background and a thin black border. The word "Save" is centered on the button in a black, sans-serif font.

8.5 Adjusting Shutters

Shutters completely block out image edges. Use shutters to hide distracting portions of an image, so that you can focus on areas of interest.

Combined circular and rectangular shutters are always adjustable. Shutter positioning and sizing information is retained individually for each loop.

To move the shutter edges, position the mouse pointer at the edge of the image and find the shutters which are displayed as a white rectangle. Use the left mouse button to resize the shutters by dragging a shutter edge inwards to make the visible image area smaller or outwards to make it larger.

The four sides of the rectangular shutters can be individually dragged to their desired position. The image shows through the inner area of the rectangular shutters.

9

Mini Viewer

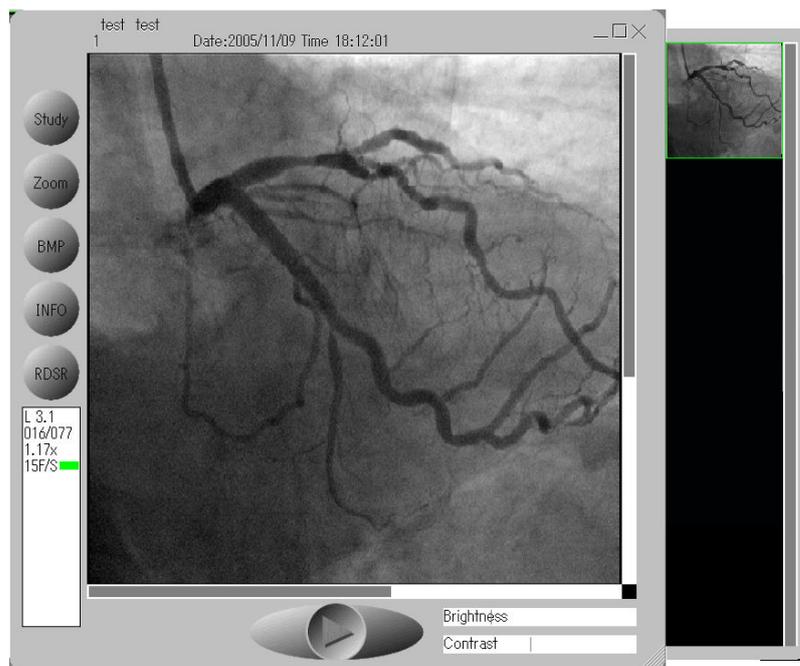
This chapter describes how to use the Mini Viewer to display images and loops on other computers.

9.1 The Mini Viewer

When writing a DICOM CD, the Mini Viewer application (EIVIEWER.exe) is included with the images files on the DICOM CD. The Mini Viewer can be used to view loops and images on any Windows computer.

9.1.1 The Mini Viewer Window

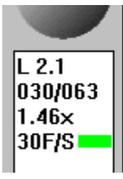
When you launch the Mini Viewer (double-click EIVIEWER.exe), the first image loops is displayed like this:



The following information is displayed at the edges of the window:

Location	Description
Top	Patient name and study information.
Right	Image Selector, with image icons.
Bottom	Playback / Pause button and Brightness / Contrast adjustment buttons.
Left	Function buttons.

Each element of the Mini Viewer window is described as follows:

No.	Button / GUI	Name	Function
1		Playback/Pause	Click once to start playback and again to pause.
2		Study	Display the list of studies from which you can select one to review.
3		Zoom	Click [Zoom] once to zoom in so that full image area is filled with the image. To zoom back out, click [Zoom] again.
4		BMP	Save the displayed image (pause loop first) in a Windows BMP (bitmap) image file.
5		Info	Display version information (About tab) and Help information (Help tab).
6		RDSR	Click to check the description of RDSR. ▶▶ Reference See "5.2.4 Displaying RDSR" P.35.
7		Brightness / Contrast	With the mouse, drag the slider (vertical line) to the right to increase Brightness / Contrast, or to the left to decrease it.
8		Maximize	Click the small square in the upper-right window corner to maximize a window. Left-click anywhere in the MiniViewer to switch back to normal size.
9		Window size	You can make the Mini Viewer window larger by dragging the size handle down and to the right, or reduce its size by dragging the handle upward and to the left.
10		L n.n	Series number. Loop number
		nnn/nnn	Frame number / total number of frames
		n.nnx	Zoom level, 1.00 = 100 %, 1.50 = 150 % of original size.
		nnF/S or Pause	Playback speed in frames per second, or "Pause".
11		Image Selector	Click the icon of the desired loop or Scroll the Image Selector up or down by dragging the scroll bar with the mouse.
12		Exit Mini Viewer	Click the [x] in the upper-right corner to close the Mini Viewer.

9.1.2 Keyboard Operation

The keyboard arrow keys can be used to control playback. Press Left / Right to move to the previous / next loop image within the selected loop. Press Up / Down to move to the previous / next loop. Press the space bar to switch between playback and pause.

9.1.3 Limitations

NOTE Biomedical signals such as ECG curves and parameters such as FOV and SID, are not displayed by the Mini Viewer.

9.1.4 Install DirectX 11

The Mini Viewer requires at least DirectX 11.

NOTE

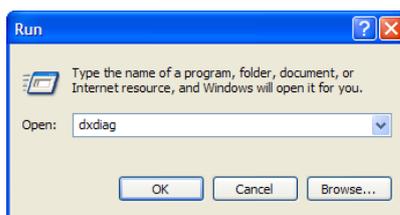
- Do not attempt to install DirectX 11 or use the Mini Viewer on a Review Station computer. It is intended only for use on other Windows computers.
- Consult Microsoft documentation for full installation instructions. The information provided here is in summary form.

■ Check Current Version

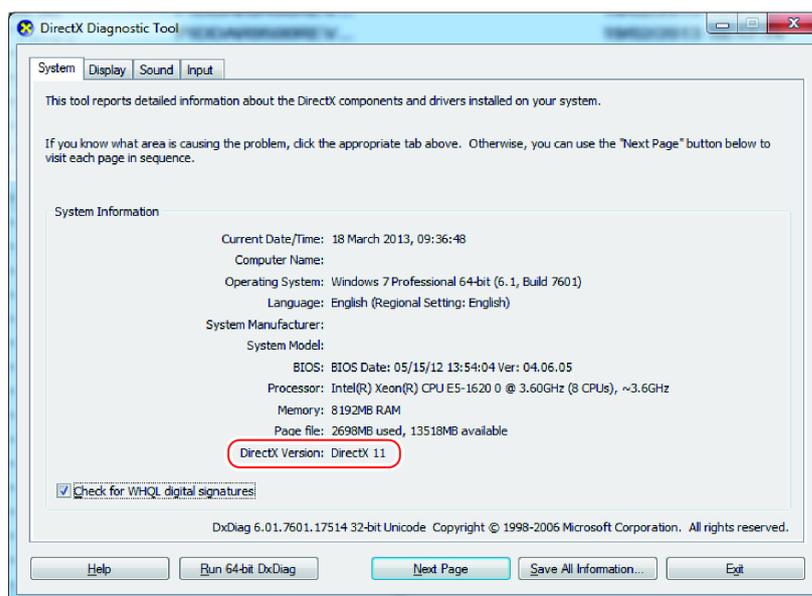
First if at least DirectX 11 is already installed:

1 On the Windows XP (Windows 2000 or Windows7) Start menu, choose [Run].

2 Enter "dxdiag" and click [OK].



The DirectX Diagnostic Tool appears. Check the DirectX version item near the bottom (marked with a dashed box in the image below):



■ Installing DirectX 11

If you do not have at least DirectX 11, follow the Microsoft instructions on how to get and install it at:

<http://www.microsoft.com/en-us/download/details.aspx?id=35>

⚠ CAUTION



Instruction

Please note that we assume no responsibility for any problems encountered as a result of installing DirectX.

10 Administration

This chapter describes how to administer the system.

10.1 Introduction

Administration mode enables you to fully configure the product and access individual network servers and CD/DVD drives.

10.2 Switching Modes

You switch between User and Administration mode by logging in to your operating system with a user name that is configured in Review Station to have the desired user type, either user or administrator.

10.2.1 Switch to Administration Mode

Follow this procedure to switch from User mode to Administration mode:

- 1 Execute the shutdown procedure as described in ["3.2 Shutdown" P.12](#).
- 2 Execute the startup procedure as described in ["3.1 Startup" P.11](#). During Windows startup, hold down the keyboard [Shift] key to force display of the Windows login prompt.
- 3 Log in with an administrator user name. Double-click the DAR-9500f icon on the desktop to start the software. The GUI starts in Administration mode.



Now, when you click the [Options] button in the Image Viewer window, you will be able to configure any option.

10.2.2 Switch to User Mode

To switch back to User mode, follow this procedure:

- 1 Execute the shutdown procedure as described in "3.2 Shutdown" P.12.
- 2 Execute the startup procedure as described "3.1 Startup" P.11. Windows automatically logs in as user and the GUI starts in User mode.

10

10.3 Viewing User Type

Regular users of Review Station should log in to the operating system with a user name that has been configured in Review Station to have a user type of [USER]. Normally, automatic login to User mode is performed. Only the system administrator should log in with a Review Station user type of [SUPER].

Follow this procedure to view user types:

- 1 Run Review Station in Administration mode as described above in "10.2.1 Switch to Administration Mode" P.96. Click [Options] on the side menu. The tabbed Configuration dialog box appears. Click the [Database] tab. It looks like this:



- 2 In the upper-right corner, click [User Table]. The User dialog box appears like this:



! CAUTION



Prohibition

Do not change the User Type settings. Otherwise, service personnel will not be able to perform system maintenance or the system may not operate properly.

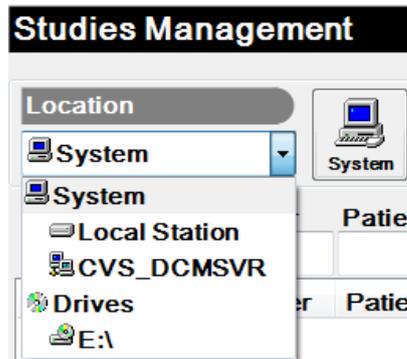
10.4 Location Box Enhanced Functionality

In Administration mode, the Location box becomes a drop-down list enabling you to individually choose servers or CD/DVD drives.

Follow this procedure:

1

Click the arrow at the right edge of the Location box to see the drop-down list. It looks like this:

**2**

Click any one server (or CD/DVD drive) and then enter search criteria and click [Search]. Only the selected server or CD/DVD drive is searched and then all matching studies are displayed.

10.5 Working with LUT Profiles

10.5.1 Introduction

Images are acquired with 12 bits (4096 levels) of grayscale, manipulated as 32-bit data, and then displayed or printed as 8-bit data (256 levels of grayscale).

The many gray levels in the image data must be mapped to fewer gray levels for display and printing. By default, a linear mapping scheme is used. However, since most display monitors and printers do not display or print gray levels in a linear manner, custom display and printer profiles can be created to match the non-linear device characteristics. Furthermore, due to differences in lighting, personal preference, and perception, display monitors sometimes need additional adjustment beyond basic linearization.

In Review Station, mapping profiles are defined independently for monitor and printer via what is called a lookup table (LUT).

Printer linearization and display adjustment profile LUTs are defined graphically via a simple curve editor. The curve is converted into a lookup table (LUT) that is applied to the image data at display and print time.

NOTE Display monitor linearization profiles are defined at installation time according to the DICOM part 14 Grayscale Standard Display Function. For details, see "[10.6 DICOM Monitor linearization](#)" P.105.

10.5.2 LUT Profile Definition

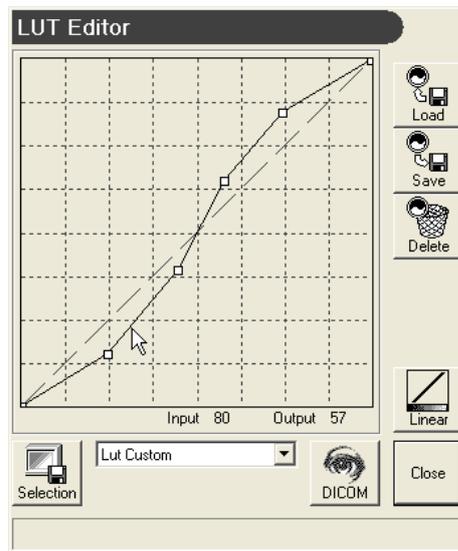
To define either printer linearization or display adjustment LUT profiles, follow this procedure:

- 1 If you are not already in Administration mode, switch to it now as described in "[10.2.1 Switch to Administration Mode](#)" P.96.
- 2 Display a reference image, preferably one featuring all possible gray levels.
- 3 Click [LUT] on the side menu. The LUT fly-out menu appears.



4

Click the [Others] button. The LUT Editor dialog box appears.



The curve portion of the LUT editor dialog box, defines the profile graphically as follows:

- The permanent dashed line from the lower-left corner to the upper-right corner represents the input data with a value of 0 to 255. With a linear profile, the output is the same as the input.
- The curve that you draw defines what the output value will be, also in the range 0 to 255. Points above the default dashed line will cause the output to be brighter (higher number) than the input. Conversely, points below the dashed line will cause the output to be darker (lower number) than the input. Whenever the pointer is in the graph area, both the input and output values are shown for the pointer position. In this example, we see that a gray input value of 80 is darkened to a gray output value of 57.
- This sample graph increases contrast as follows. It causes gray levels below middle gray (center of graph) to be made darker (added points are below the dashed line) and gray levels above middle gray to be made lighter (added points are above the dashed line). Note also how that the pure black (0) and pure white (255) inputs are output unaltered as 0 and 255 respectively, because the curve starts and ends on the default linear center line.

5

In the drop-down list to the right of the Selection button, choose either [Lut Custom] to define a display profile or [Lut Print] to define a printer profile.



6

If an existing curve is similar to the curve you wish to define, click [Load] and choose it as your new curve starting point.

7

In the curve portion of the LUT editor dialog box, define your curve by clicking points in the graph area. Connecting lines are drawn automatically from the curve box corners and between the points. Reposition a point by dragging it. Delete a point by clicking it with the left and right mouse buttons pressed simultaneously.

For display profiles, the image appearance changes as you shape the curve. For all profile types, the input and output values are updated as you move the pointer.

8

When satisfied with the curve, click [Save], enter a meaningful name (up to 50 characters), and click [Save].

9

To delete a profile, click [Delete] and then the profile name.



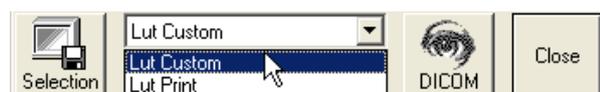
NOTE You may find it convenient to create several profiles and then see how various images display or print with the profiles applied to them.

10.5.3 Assigning Display Adjustment LUT Profiles

Once you have defined a display adjustment LUT profile, you can assign it to one of 10 positions in the profile list as follows:

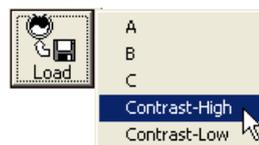
1

In the drop-down list to the right of the Selection button, choose [Lut Custom].



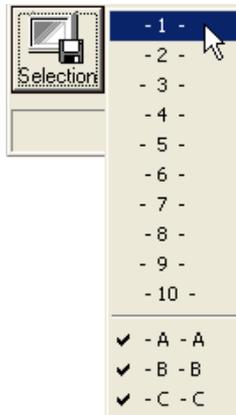
2

Click [Load] and then the profile that you wish to assign.

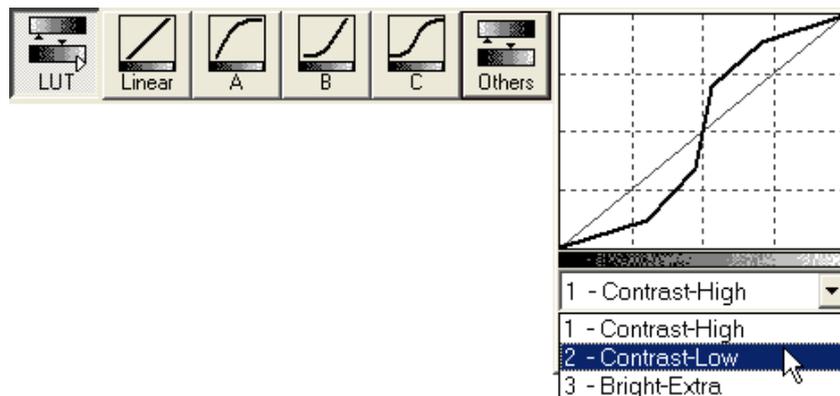


3

Click [Selection] and then click the position in the list to which you wish to assign this profile.



When in User mode, the assignments that you make here are shown as choices on the [LUT], [Others] list.

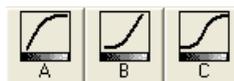


4

To delete an assignment, click [Selection] and then the assignment that you wish to delete. Assignments have a check mark to their left.



NOTE It is OK to adjust the three predefined profiles A, B, and C, however, do not change the shape of these curves so much that they no longer resemble the shapes shown on the buttons.



10.5.4 Assigning Printer LUT Profiles

Once you have defined a printer LUT profile, you can assign it to one of 10 positions in the print profile list as follows:

- 1 In the drop-down list to the right of the Selection button, choose [Lut Print].



- 2 Click [Load] and then the profile that you wish to assign.



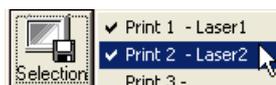
- 3 Click [Selection] and choose the position in the list to which you wish to assign this profile.



The assignments that you make here are shown as choices in the LUT list of the print windows.

▶▶ Reference See the next section "[10.5.5 Setting the Default Printer LUT Profile](#)" P.104.

- 4 To delete an assignment, click [Selection] and then the assignment that you wish to delete. Assignments have a check mark to their left.



10.5.5 Setting the Default Printer LUT Profile

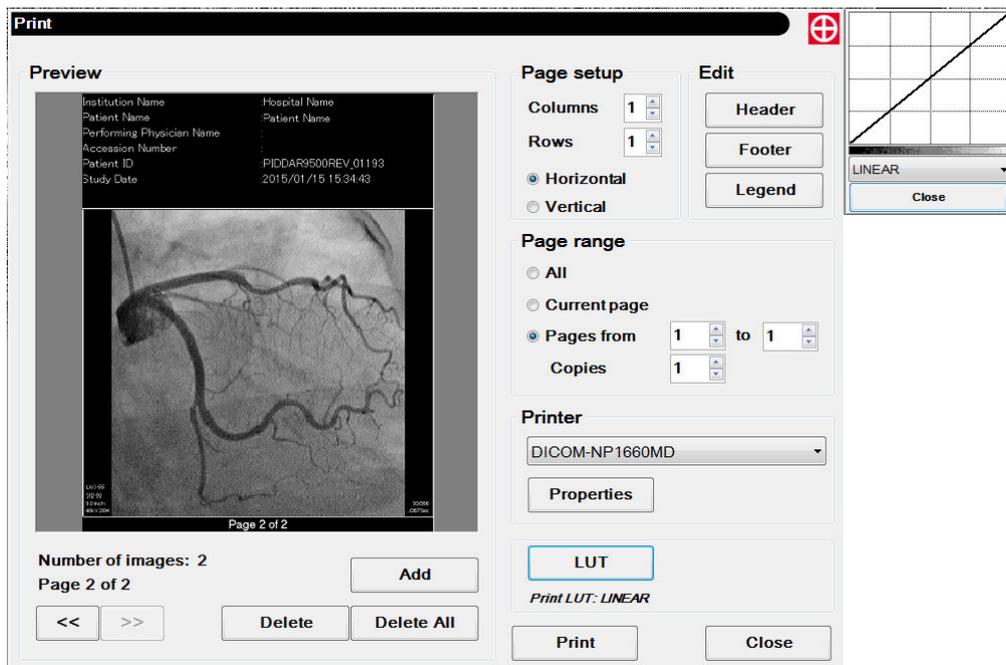
To set the default printer LUT profile, follow this procedure:

1 If you are not already in Administration mode, switch to it now as described in "10.2.1 Switch to Administration Mode" P.96.

2 Click [Print] on the side menu.



3 The print window appears. Click the [LUT] button. A small profile selection box appears at the upper-right corner of the print window.



4 Choose the desired default profile from the drop-down list. The chosen profile name appears near the LUT button. If desired, click [Close] to close the drop-down list.

5 To test the selected profile, click [Add] to add the current image to the print list with the selected profile applied. You can preview and print the same image with several different profiles applied and then choose the best one as the default. When finished, click [Close] to close the print window.

10.6 DICOM Monitor linearization

NOTE This section gives basic information on how to perform DICOM monitor linearization using the tool available on the LUT Editor dialog box. You must provide your own photometer and are encouraged to consult the DICOM PS3.14 standard.

Typically performed by the installer, the monitor can be linearized with a photometer and the provided test pattern. Luminance readings can be taken from the monitor for the full range of the video adapter Discreet Data Levels (DDLs). The readings can then be entered in a grid to compute the characteristic display curve LUT for the monitor.

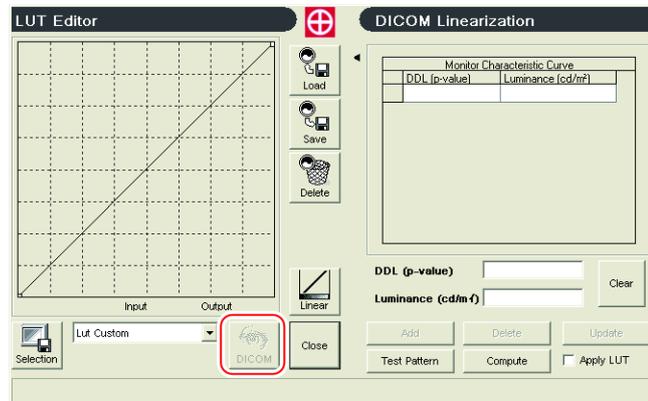
Luminance is defined as the luminous intensity per unit area projected in a given direction, measured in candela per square meter (cd/m^2). The luminance generated by an emissive display system may be measured with a photometer.

DDL (Discreet Data Level) is defined as a digital value, typically in the range 0 to 255 (0 = darkest, 255 = lightest) (for each of the 3 colors red, green, and blue) sent to the video adapter to produce luminance levels on the monitor.

Follow this procedure to perform DICOM monitor linearization. (Recommended photometer: Seimens, SMfit ACT Calibration)

- 1** Log in to the Review Station system as administrator.
- 2** Load an image or loop that contains as many gray levels as possible.
- 3** Wait for the monitor to warm up for at least 10 minutes.
- 4** Set the room lighting to a normal level.

- 5** Choose [Lut], [Others], and then click the [DICOM] button in the lower-right corner of the LUT Editor. The LUT Editor dialog box expands to the right with the DICOM Linearization panel.



NOTE (Unless otherwise stated, all the following button references are for the DICOM Linearization panel.)

- 6** Use the [Delete] button to delete any existing values in the Monitor Characteristic Curve grid.

- 7** Click the [Test Pattern] button.

The test pattern is displayed with a 20 % gray background and a square (defaults to white) in the middle.

- 8** If not already set to 255, adjust the DDL value of the square to 255 (100 %) by pressing and holding the right-arrow key.

- 9** Using the Brightness/Contrast controls of the monitor set the Brightness and Contrast so that the white square in the middle is the brightest white possible without making the background gray (20 % gray) too light.

- 10** Place the photometer on the center of the monitor, over the white square.

- 11** With the DDL value at 255 (100 %), record the luminance value reported by the photometer.

- 12** Decrease the DDL value by pressing the left-arrow key until a change in luminance is detected.

- 13** Record the DDL value and luminance.

14 Repeat this process until you have at least three DDL/Luminance pairs. Normally, at least ten pairs are needed for good curve definition. The readings should be spaced over the entire 0-255 DDL range.

15 Enter the largest DDL value and its corresponding Luminance value in the two boxes below the grid and click [Add]. If, before clicking [Add] you wish to clear both entry boxes, click [Clear].

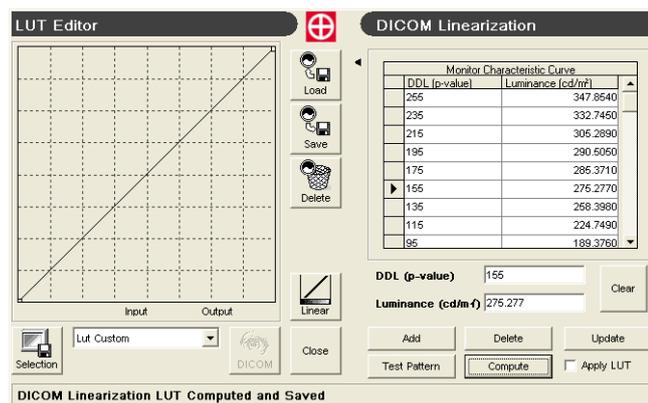
16 Add all other DDL/Luminance pairs in descending-DDL order.

NOTE The luminance value entered MUST BE less than or equal to the Luminance value entered for any larger DDL. For example, if you add DDL/Luminance pair 215/305.2890, the Luminance value for DDL 214 must be no more than 305.2890.

17 To change a value in an existing row, click the row (an arrow appears at the left edge), make your changes in the two boxes below the grid, and then click [Update].

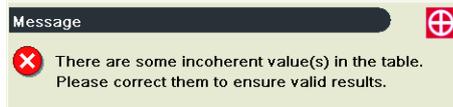
18 To delete a row from the grid, click the row (an arrow appears at the left edge) and then click [Delete].

19 Once you are satisfied with your list of DDL/Luminance pairs, click [Compute]. The display characteristic curve is calculated and saved as a LUT. A message to this effect is displayed.



20

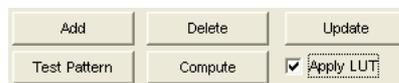
If there are problems with your DDL/Luminance pairs, an error message indicating that incoherent values were encountered is displayed.



If this happens, adjust the values so that the rule described in step 16 above is respected and click [Compute] again.

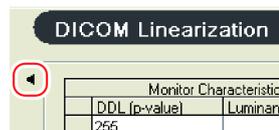
21

To apply your new display linearization LUT, click [Apply LUT] so that the check mark appears. The visual effects are immediate. This LUT will remain in effect for all future image viewing on this monitor as long as Apply LUT remains checked.



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To close the DICOM Linearization panel of the LUT Editor, click the arrow at the upper-left edge of the Monitor Characteristic Curve grid.



NOTE If the monitor or video adapter is replaced (even with the same model) redo the DICOM monitor linearization.

10.7 Options Configuration

10.7.1 Introduction

Although the Installation personnel perform the initial configuration according to your institution's specifications, you can further adjust the configuration as needed.

Configuration is performed via the [Options] tab in the Studies Management window and the [Options] button on the side menu.

10

10.7.2 Options Tab

Three basic configuration items are available on the [Options] tab of the Studies Management window. Click the [Options] tab to reveal its three check boxes which are defined as follows:



Check Box	Description
Automatic Refresh (with adjustable minutes value)	When checked (a check mark appears in the check box), the Study List is automatically refreshed (redrawn) on the screen, showing any new studies that have arrived since the last refresh or other status changes. The refresh interval in minutes, is entered in the combo box to the right of [Automatic Refresh]. Permissible values are 1 to 120 minutes with a default of 30.
"All Time" study query	When ["All Time" study query] is checked, the default Date search criteria automatically entered in the Date box is changed from today's date to [All Time], meaning all studies in the Study List.
Search by keywords	Normally, with [Search by keyword] unchecked, search criteria matching is only performed at the beginning of the searched text so that with the Patient Name criteria set to "rog", only last names beginning with "rog" such as "Rogers" and "Roget" would be found. Names such as "Smith Roger" would not be found. With [Search by keyword] checked, search criteria matching is performed throughout the searched text so that with the same Patient Name criteria of "rog", all patient names with the three letters (in sequence) anywhere in the searched text would be found, including names such as "Smith Roger."

10.7.3 Configuration Dialog Box

To display the Configuration dialog box, click [Options] on the side menu. The tabbed Configuration dialog box appears with the System tab initially displayed:

CAUTION



Prohibition

In the option description tables appearing throughout this section, do not modify items with an "X" mark in the [Mod] column. The system might not operate properly if such items are modified. Items marked "OK" can be modified according to supplied information.



NOTE

If you only see the Menus, Visualization, and Messages tabs, you are still in User mode. If you are not already in Administration mode, switch to it now as described in "[10.2.1 Switch to Administration Mode](#)" P.96.

■ System Tab

[System] options are configured as follows:

Item	Description	Mod
System Information		
Computer Name	The name of this computer configured in Windows.	×
Institution Name	Administrator-defined institution name set according to your needs. (Up to 64 characters (no backslash "\"), 35 recommended maximum.) You must shut down and restart the system after changing this item.	○
Institution Address	Administrator-defined institution address set according to your needs.	○
Department Name	Administrator-defined department name set according to your needs. (Up to 64 characters (no backslash "\").) You must shut down and restart the system after changing this item.	○
Station Name	Administrator-defined station name. The name entered here appears in the Origin column of the Studies Management window. (Up to 16 characters: alpha, number, hyphen "-", underscore "_", period ".", apostrophe "'").	○
Machine Serial Number	A number (should be unique for this type of system) that identifies this computer and is used in creation of the Study Unique ID. The software must be restarted after changing this option so it automatically exits. (Up to 13 digit number with forced leading zeros if fewer than 13 digits.)	×
DICOM AE Title	The DICOM device name of the computer. The default is auto-generated from the Machine Serial Number. (Up to 16 characters: alpha, number, underscore "_", period ".").	×
Implementation UID	Fixed tags appearing in the DICOM files produced by this product.	×
Information Version	Version information is displayed.	×

Item	Description	Mod
Link		
Link Mode	Always not applicable.	
Linked Station	Not applicable.	

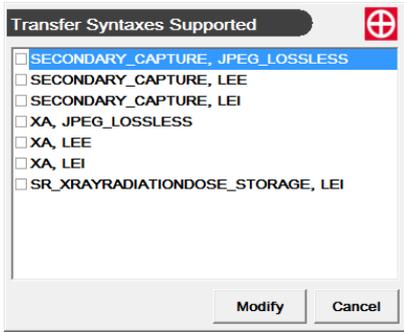
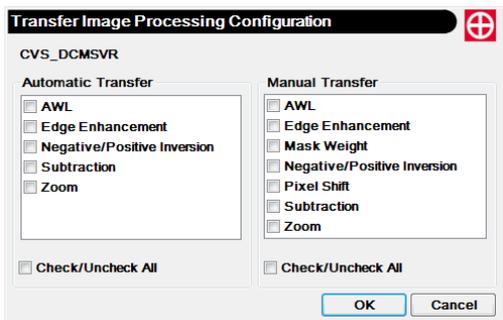
■ DICOM Hosts Tab

The [DICOM Hosts] tab defines DICOM devices with which this Review Station can communicate.

Its options are defined as follows.

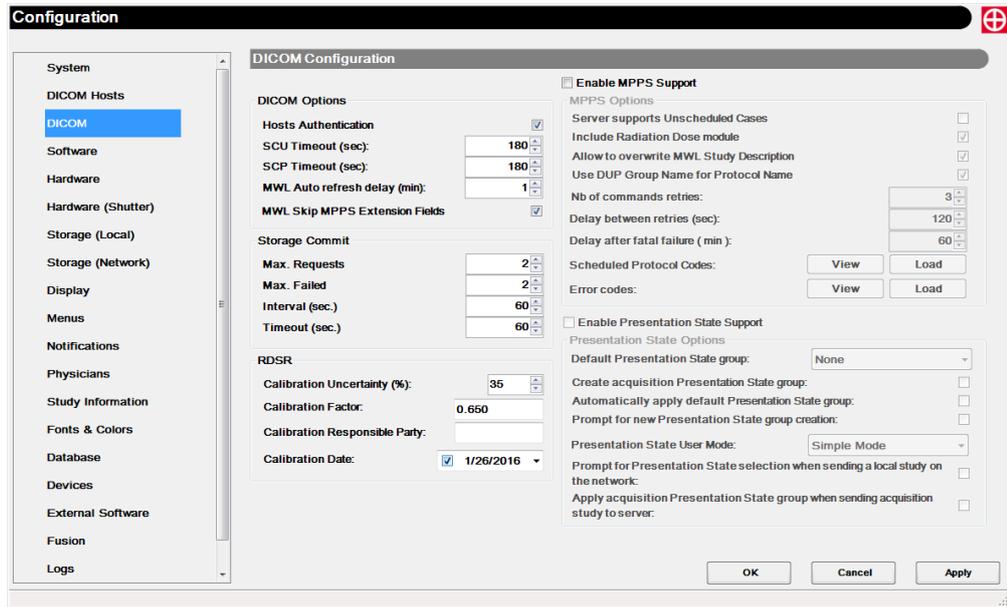
Item	Description	Mod
Information		
AE Title	The DICOM device name of the station. (Up to 16 characters.) To enter a new host, Click [New] and fill in the information.	<input type="radio"/>
Echo	To verify that the connection to a DICOM device such as a server is valid, choose the name in the drop-down list below the Echo button and optionally check [Ping]. Click [Echo] to perform the test. If [Ping] is selected, the device is first pinged, and then the DICOM echo is performed. As appropriate, success or failure messages are displayed.	<input type="radio"/>
Host	The TCP/IP protocol host name or IP address of the DICOM device. (Up to 64 characters.)	<input type="radio"/>
Alias	Alias for Host. When using the [Send] feature on the [Studies Management] window, this name appears in the [Destination] list. Also, when in Administration mode, this name appears in the [Location] drop-down list. Do not enter more than 11 characters.	<input type="radio"/>
Port	The port number used by the DICOM device. Most DICOM devices default to port 104. (0 to 65535.)	<input type="radio"/>
Packet Size	The maximum packet size supported by the DICOM device. The default of 99280 is usually acceptable. (10000 to 1000000 (one million).)	<input type="radio"/>
File Packets Grouping	Defines how many packets should be grouped together for socket-level communications (1 to 5). The default of 2 is usually acceptable.	<input type="radio"/>
UID / PSW / DSN	Unused except for external studies.	<input type="radio"/>

Item	Description	Mod
DICOM Host		
Yes / No	Indicates whether it is a DICOM host or not.	<input type="radio"/>
Host Type		
Modality Worklist Server	Not applicable.	
Printer	The device is a DICOM networked printer.	<input type="radio"/>
Other	The DICOM device is a server or destination station.	<input type="radio"/>
Capabilities		
Store	The DICOM device can store (archive) DICOM data.	<input type="radio"/>
Move	The DICOM device can be asked to transmit DICOM data to other devices (third-party move).	<input type="radio"/>
Storage Commit	The DICOM device is a server to support the storage commit and ensures that the server appropriately receives data.	<input type="radio"/>
Query	When [DICOM Host] is [Yes], the default, and [Query] is checked, the DICOM device is a server that supports standard DICOM queries. When [DICOM Host] is [No], and [Query] is checked, the DICOM device is a server that supports SQL queries.	<input type="radio"/>
Relational	The DICOM device is a server that supports relational query types. When not selected, only hierarchical queries are supported.	<input type="radio"/>
PPS Manager	Not applicable.	
Security TLS	Not applicable.	

Item	Description	Mod
<p>Transfer Syntaxes (Available only for hosts with Store capability.)</p>	<p>Decide which transfer syntaxes to send to the host. Click [Transfer Syntaxes]. The [Transfer Syntaxes Supported] dialog box appears.</p>  <p>There are three syntax groups, XA for loops, SECONDARY for still images (Reference and Annotation), and SR for RDSR. Within each group, there are two uncompressed syntaxes, LEI for little endian implicit, and LEE for little endian explicit, plus a JPEG syntax. Select all desired syntaxes in both the XA and SECONDARY groups (check marks appear). Then, with the mouse, drag all selected syntaxes into the desired priority order (highest priority at top). Before the [Send] operation begins, all selected XA and Secondary syntaxes (that correspond to what was selected in the [Studies Management] window) are proposed to the host. Then, within each group (XA and Secondary), the highest-priority syntax that is accepted by the host, that is already in the cache, is used for the transfer. Even if it is not selected, an implied LEI selection (lowest priority) always exists. If one of the selected syntaxes is also the native syntax (typically Lossless) then it is given priority over all other selected syntaxes. If the host rejects all proposed syntaxes, then LEI is used. If in the unusual circumstance, LEI is rejected, an error occurs and nothing is sent. If no syntaxes are selected, then whatever was selected in the [Studies Management] window (first priority) plus LEI are proposed to the host. If the [Studies Management] selection is rejected, LEI is used.</p>	<p>○</p>
<p>Processing</p>	<p>Set image processing when transfer the image. Click [Processing] to display [Transfer Image Processing Configuration] window is displayed. Select an appropriate image processing and click [OK].</p> 	<p>○</p>

■ DICOM Tab

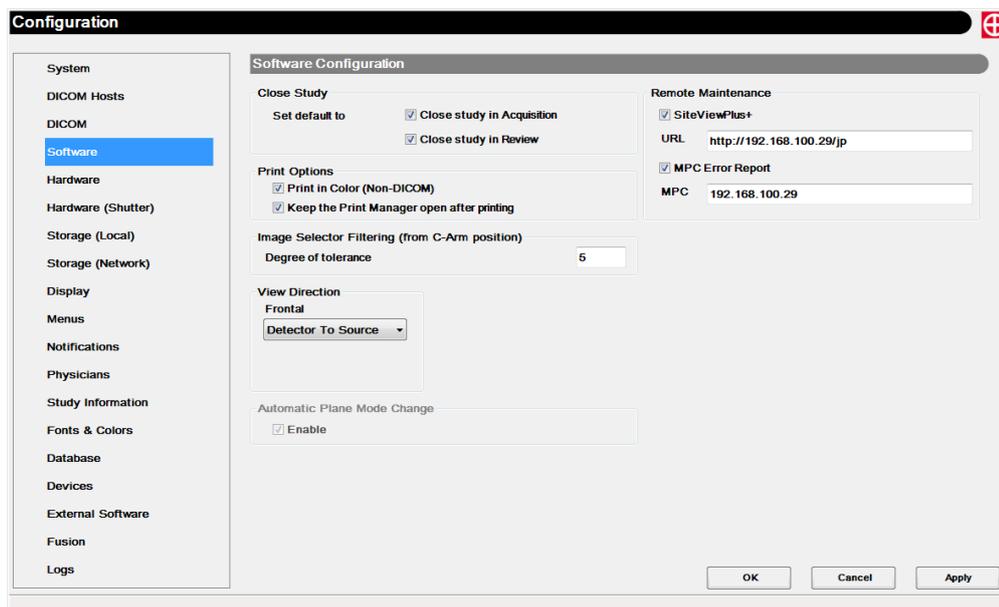
[DICOM] options are configured as follows.



Item	Description	Mod
DICOM Options		
Hosts Authentication	Causes this computer to use DICOM host authentication when communicating with any DICOM device.	×
SCU Timeout	Defines the maximum number of seconds to wait for an answer while acting as an SCU. If communication is not successful within this maximum, an error will occur.	×
SCP Timeout	Defines the maximum number of seconds to wait for an answer while acting as an SCP. If communication is not successful within this maximum, an error will occur.	×
MWL Auto refresh delay (mm)	Not applicable.	
MWL Skip MPPS Extension Fields	Not applicable.	
Storage Commit		
RDSR	Not applicable.	
MPPS Options	Not applicable.	
Presentation State Options	Not applicable.	

■ Software Tab

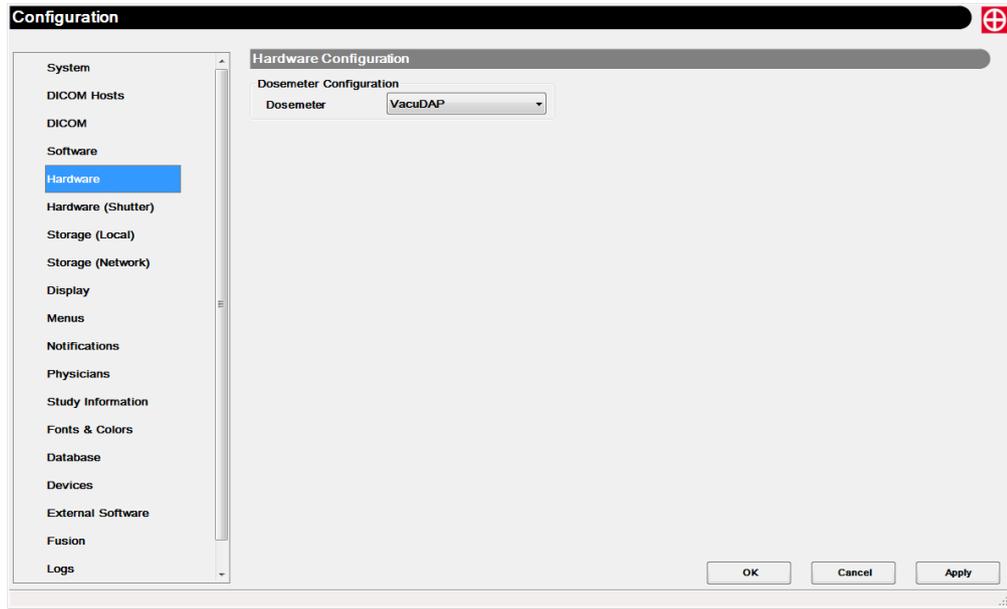
[Software] options are configured as follows.



Item	Description	Mod
Close Study	Not applicable.	
Print Options	<p>Check [Print in Color] so that color elements will be printed on non-DICOM printers that support color such as laser and ink jet.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>NOTE If you print an image that has already been saved in DICOM format, colors will appear as shades of gray.</p> </div> <p>To keep the print manager open after printing, check [Keep the Print Manager open after printing].</p>	×
Image Selector Filtering (from C-Arm position)	Not applicable.	
View Direction	Not applicable.	
Automatic Plane Mode Change	Not applicable.	
Remote Maintenance		
SiteViewPlus+	Not applicable.	×
MPC Error Report	Set IP address of MPC.	×

■ Hardware Tab

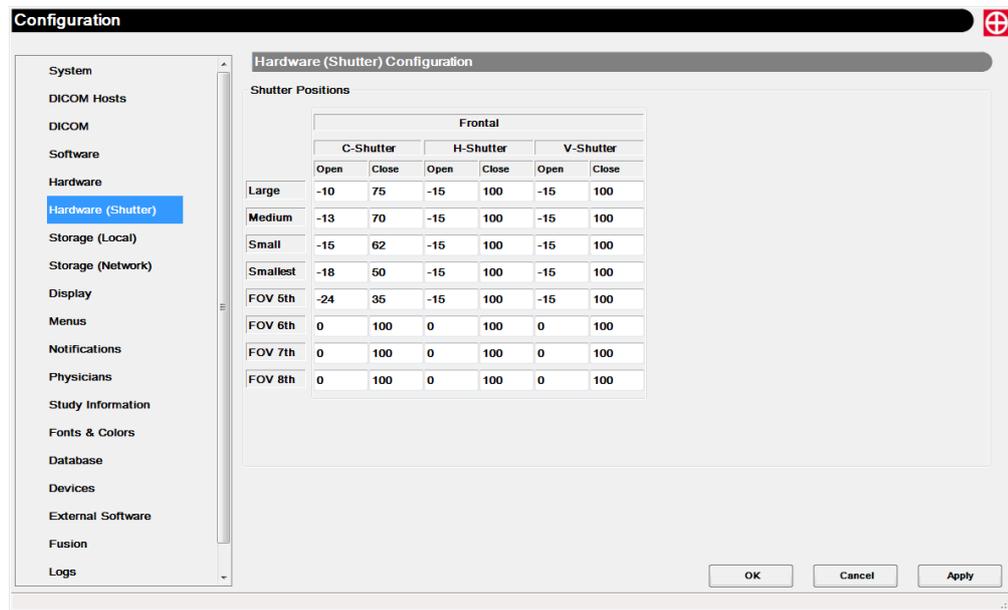
[Hardware] options are configured as follows.



Item	Description	Mod
Dose Meter Configuration	Not applicable.	

■ Hardware (Shutter) Tab

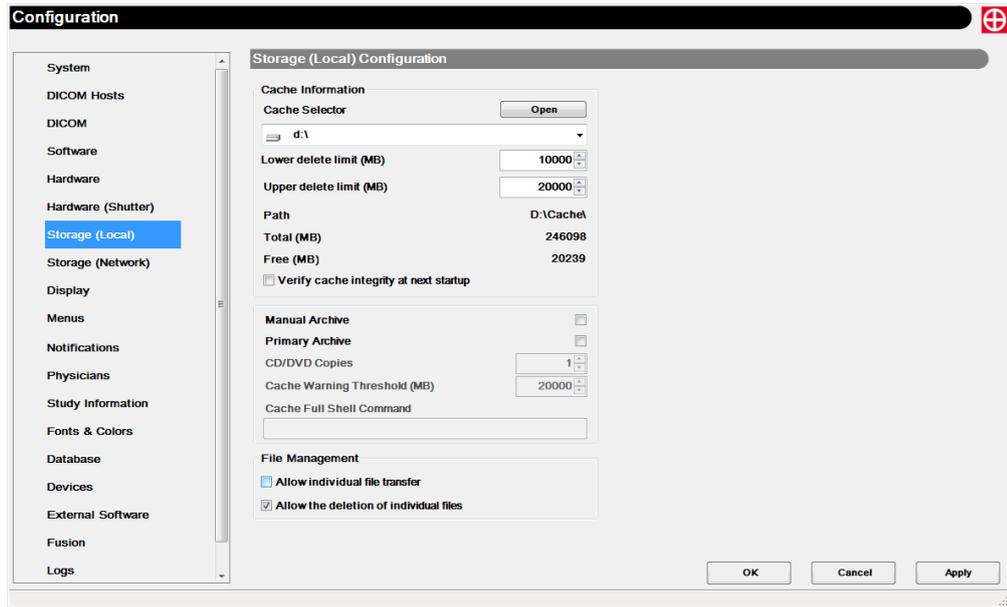
[Hardware (Shutter)] options are configured as follows.



Item	Description	Mod
Shutter Positions	Not applicable.	

■ Storage (Local) Tab

[Storage (Local)] options are configured as follows.

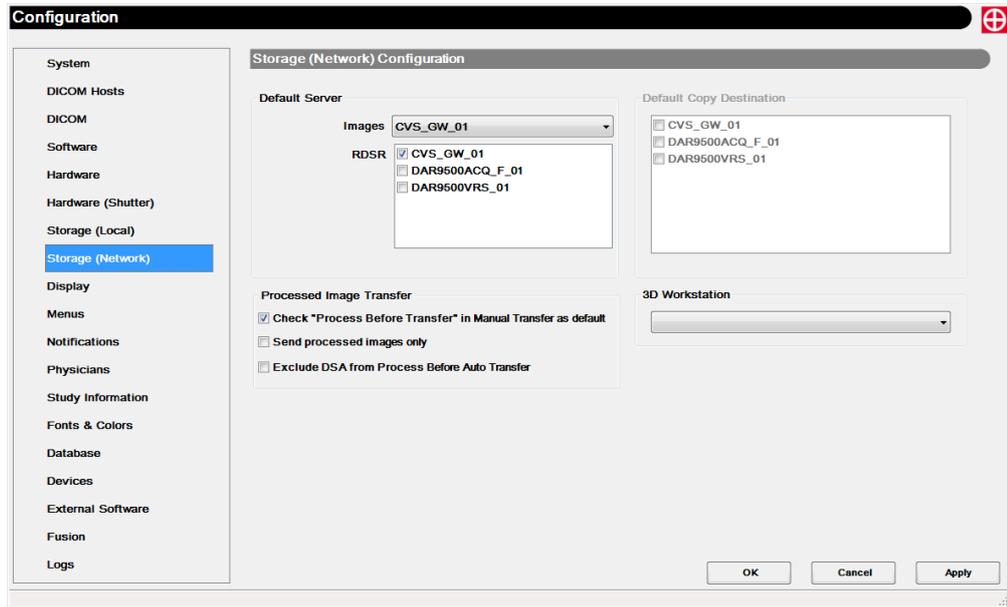


Item	Description	Mod
Cache Information		
Cache Information	Hard disk space is used for both data cache (folder \Cache) and network ache (\Cache\NetCache). Incorrect cache settings can cause unexpected system behavior so DO NOT modify items in this box.	×
Open	Open cache folder.	×
Cache Selector	Choose the letter of the hard drive on which the two cache folders will reside. olders [\Cache] and [\Cache\NetCache]. are automatically created on the hosen drive.	×
Lower and Upper delete limit	[Upper delete limit] defines the minimum amount of space you want to keep ree on your Cache drive. Whenever free space drops below this threshold, nprotected studies are deleted. Both these values are expressed in MB, where 1 MB equals 1024 × 1024 or 1,048,576 bytes. For each GB of cache space, enter 1024 MB. For example, or 50 GB, enter 51200 MB (50*1024) The difference between [Upper delete limit] and [Lower delete limit] should e a little larger than the largest study that you ever expect to create. Here re guidelines for setting the [Upper delete limit] assuming the following: <ul style="list-style-type: none"> • MS = Maximum size of one study (e.g., 2000 MB) • MN = Maximum space consumed in NetCache (e.g., 3000 MB) • DF = Desired free space remaining with full cache (e.g., 5000 MB) [Upper delete limit] is calculated as MS+MN+DF, or 10000 MB. 	×
Cache Integrity	(Usually not used) When an error occurs, such as disable to delete the image, in the image storage folder, check [Verify cache integrity at next startup] and reboot the ystem. After rebooting, the system will try to solve the error.	×
Primary Archive	Not applicable.	

Item	Description	Mod
File Management	(Reference monitor only) When checked, enables [Allow individual file transfer] or [Allow the deletion of individual files] function.	<input type="radio"/>

■ Storage (Network) Tab

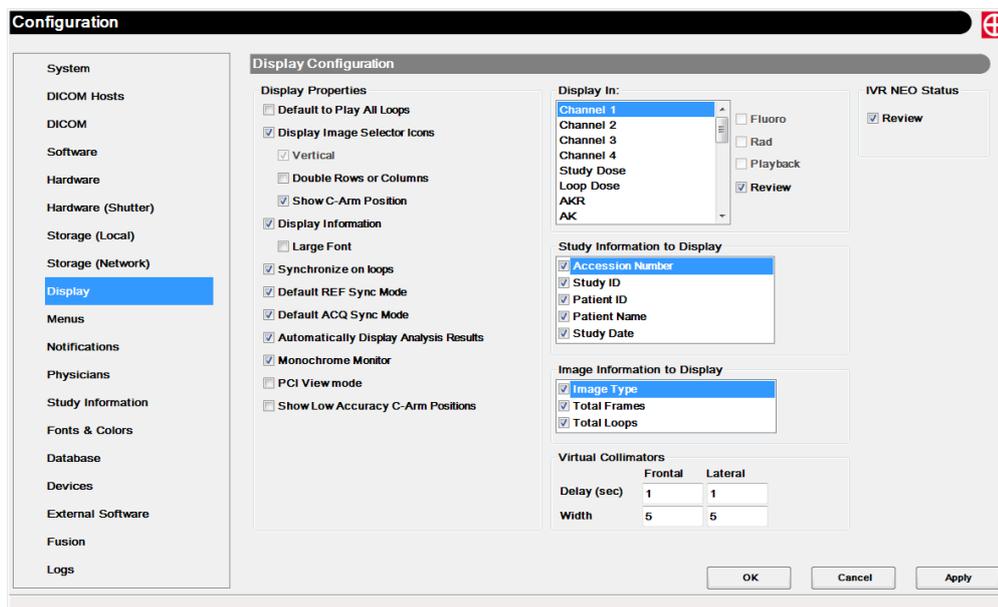
[Storage (Network)] options are configured as follows.



Item	Description	Mod
Default Server		
Image	Normally, leave blank. However, if transfer the newly-created image on eview Station automatically to the optional server, select the destination server.	○
RDSR	Do not check all the check boxes.	×
3D Workstation		
3D Workstation	Make sure to leave blank.	×
Processed Before Transfer		
Check "Process Before Transfer" in Manual Transfer as default	Transfer the image after processing when sending individually.	
Send processed images only	Not Applicable.	×
Exclude DSA from Process Before Auto Transfer	Not Applicable.	×

■ Display Tab

[Display] options are configured as follows.

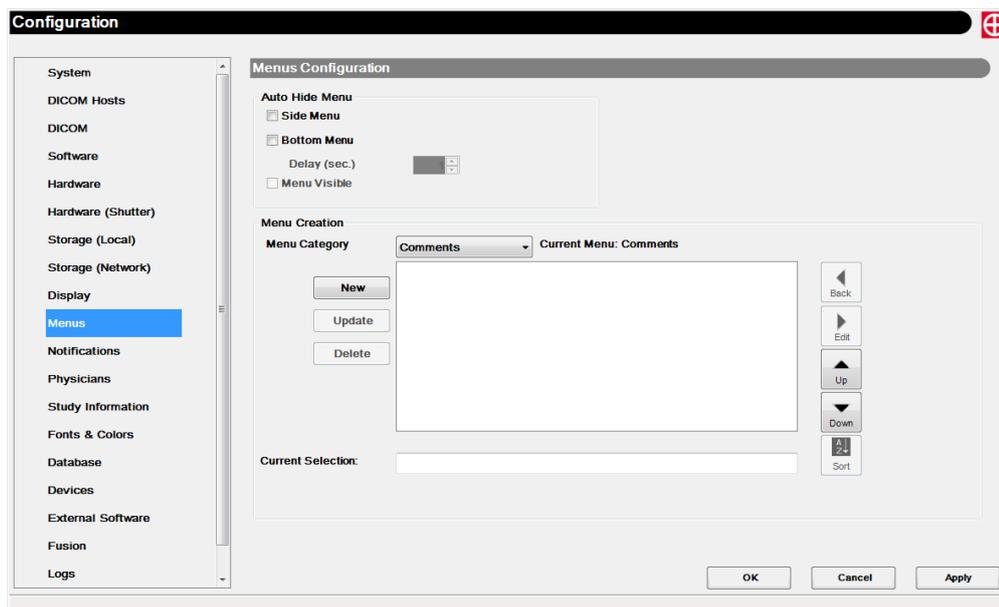


Item	Description	Mod
Display Properties		
Default to Play All Loops	Causes loops to be played back one after the other instead of just playing the selected loop continuously.	○
Display Image-Selector Icons	Causes the Image-Selector icons to be displayed on the monitor right edge, either in a single column, the default, or in a double column when [Double Rows or Columns] is checked. Leave [Vertical] checked. C-arm position is displayed on the image selector when [Show C-arm Position] is checked.	×
Display Information	Displays the study information line at the top left of the Image Viewer window, optionally in a [Large Font].	○
Synchronize on Loops	Not Applicable.	×
Default REF Sync Mode	Not Applicable.	×
Default ACQ Sync Mode	Not Applicable.	×
Automatically Display Analysis	Analysis result is displayed on the window during QCA/LV analysis.	○
Monochrome Monitor	Not Applicable.	×
PCI View mode	Not Applicable.	×
Show Low Accuracy C-Arm Position	Acquisition with Precession and Pendulum C-arm motion can also save angle information for each frame. However, there is an error up to 3 degrees between them.	○
Virtual Collimators	Not Applicable.	

Item	Description	Mod
Display In		
Display In	Choose a parameter in the list and then check [Review] to make this parameter visible.Rad: Not applicable. When selecting [Study Dose], only "Displayed" check box will appear.	<input type="radio"/>
Study Information Display		
Accession Number	Displays at the very top of Study Information on the image viewer.	<input type="radio"/>
Study ID	Displays at the very top of Study Information on the image viewer.	<input type="radio"/>
Patient ID	Displays at the very top of Study Information on the image viewer.	<input type="radio"/>
Patient Name	Displays at the very top of Study Information on the image viewer.	<input type="radio"/>
Study Date	Displays at the very top of Study Information on the image viewer.	<input type="radio"/>
Image Information to Display		
Image Type	Displays at the very top of Image Information on the image viewer.	<input type="radio"/>
Total Frames	Displays at the very top of Image Information on the image viewer.	<input type="radio"/>
Total Loops	Displays at the very top of Image Information on the image viewer.	<input type="radio"/>
IVR NEO Status	Not applicable.	

■ Menu Tab

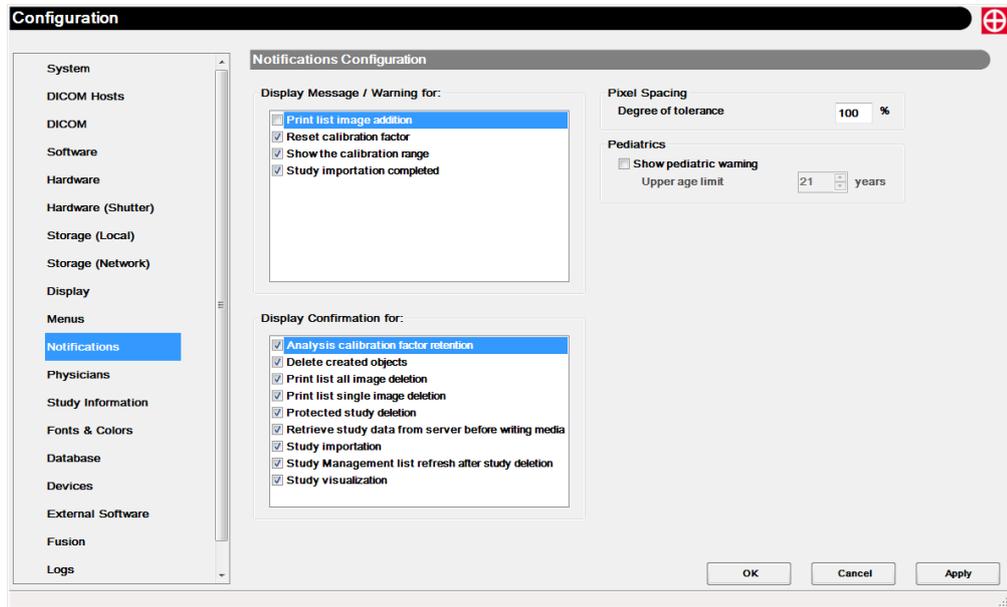
[Menus] options are configured as follows.



Item	Description	Mod
Auto Hide Menu		
Side Menu	Causes the side menu at the left edge of the Image Viewer window to be automatically hidden after [Delay (sec.)] seconds (1 to 10) without mouse activity. Moving the mouse to the left screen edge restores both the side menu and bottom status bar.	<input type="radio"/>
Bottom Menu	Causes the Cine Control / Status bar along the bottom of the Image Viewer window to be automatically hidden after [Delay (sec.)] seconds (1 to 10) without mouse activity. Moving the mouse to the bottom screen edge, restores only the bottom status bar.	<input type="radio"/>
Menu Visible	Causes a thin gray bar to be shown in place of the hidden side menu and / or bottom status bar, indicating where you can move the pointer to restore the hidden elements.	<input type="radio"/>
Menu Creation	Not Applicable.	

■ Notifications Tab

[Notifications] tab options are configured as follows. Select the messages that you wish to have shown in prompt boxes. If you do not select a message, the user can rely on equivalent messages displayed in the status bar.

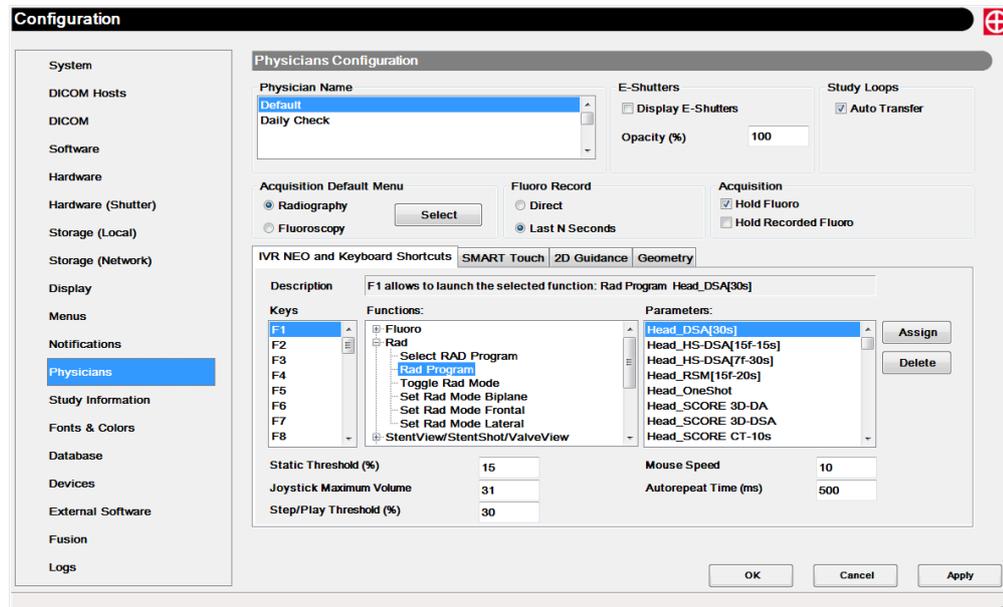


Item	Description	Mod
Pixel Spacing		
Degree of tolerance	Set acceptable value of Pixel Spacing. Setting percentage is the acceptable value for calibration result.	○
Pediatrics	Not Applicable.	

■ Physicians Tab

The [Physicians] tab enables you configure options specific to each performing physician, including the default. Physician options are configured as follows.

IVR NEO and Keyboard Shortcuts:



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Item	Description	Mod
Keyboard Shortcuts	Re-assign the Keyboard Shortcuts Keys F1 to F12.	×
SMART Touch	Not Applicable.	
2D Guidance Configuration	Not Applicable.	
Geometry	Not Applicable.	

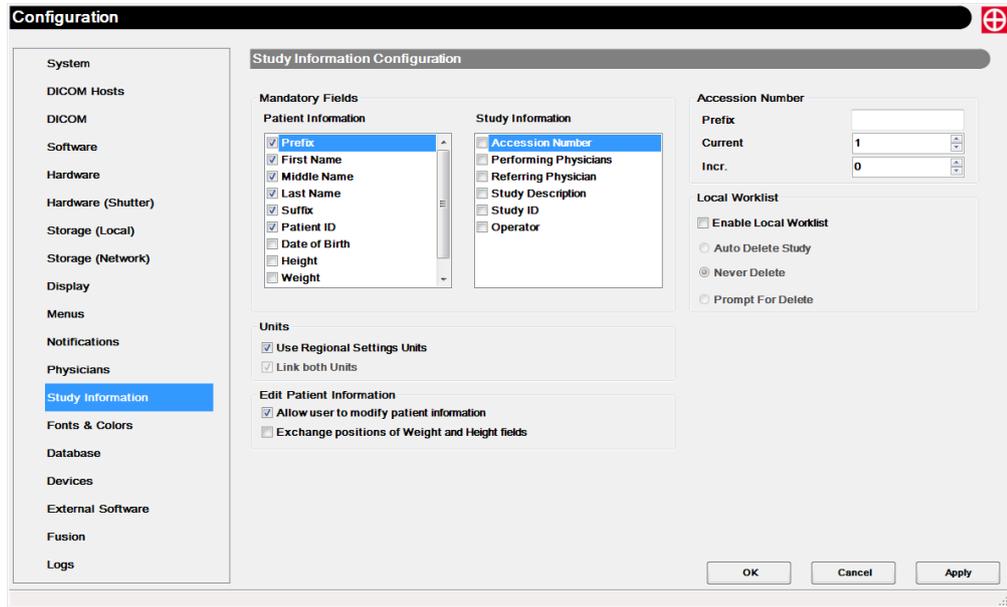
1

Select each key from the Keyboard Shortcuts, select a function and parameter associated with the function (if any) and click [Assign] button. Repeat this process for each F key. To remove the function assigned a key, select the key and click [Delete] button.

NOTE Do not re-assign functions for the B keys.

■ Study Information Tab

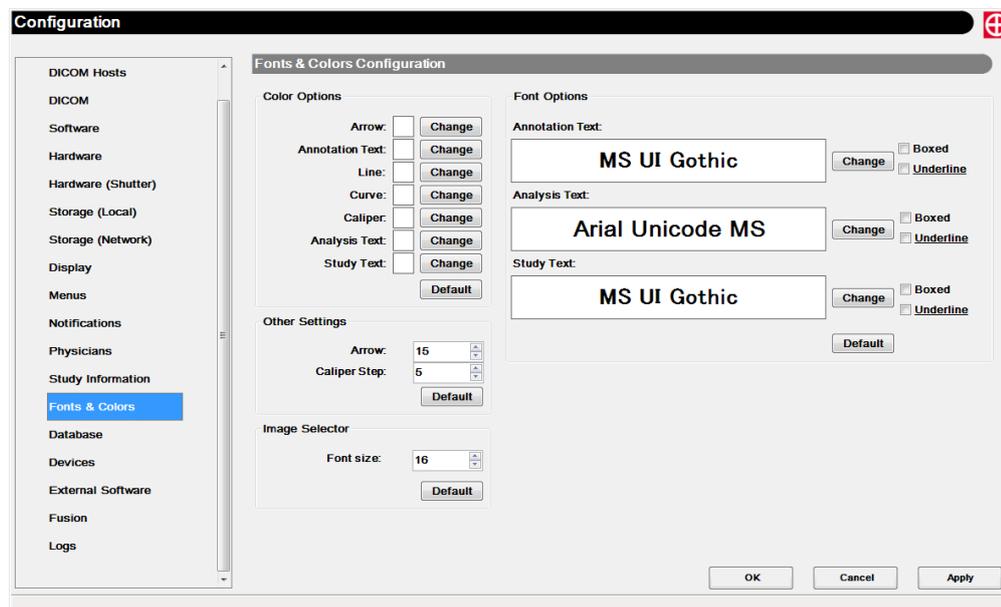
[Study Information] options are configured as follows.



Item	Description	Mod
Mandatory Fields	Not applicable.	
Accession Number	Not applicable.	
Units	Not applicable.	
Edit Patient Information		
Allow user to modify patient information	If check this box, enable to modify study information without input administrator's password.	<input type="radio"/>
Exchange positions of Weight and Height fields	If check this box, show study information in order of "Height" and "Weight".	<input type="radio"/>
Local Worklist	Not Applicable.	

■ Fonts & Colors Tab

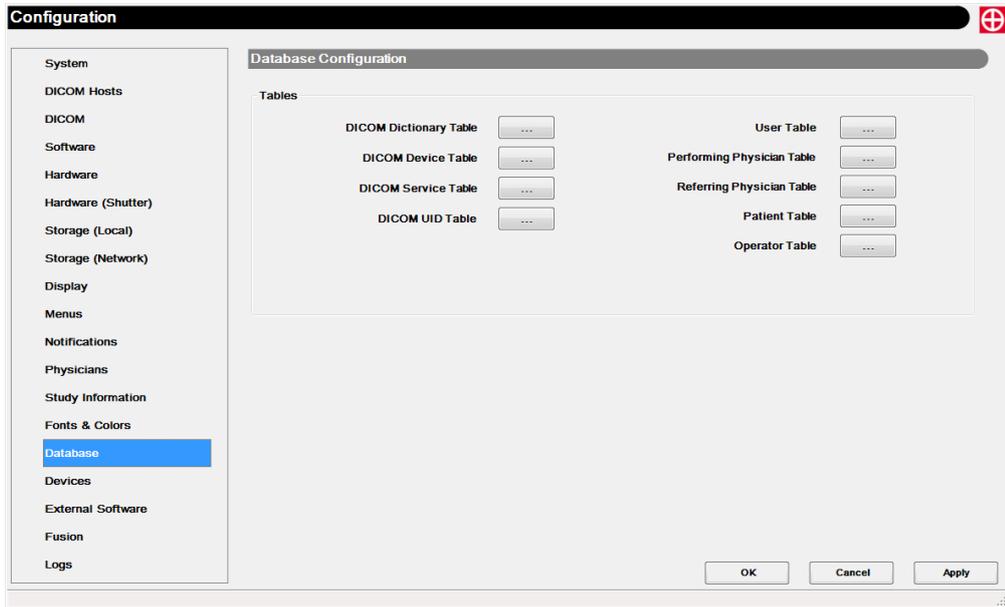
[Fonts & Colors] are configured as follows.



Item	Description	Mod
Color Options		
Arrow	Set the color of [Arrow] for [Annotation].	<input type="radio"/>
Annotation Text	Set the color of [Text] for [Annotation].	<input type="radio"/>
Line	Set the color of [Line] for [Annotation].	<input type="radio"/>
Curve	Set the color of [Curve] for [Annotation].	<input type="radio"/>
Caliper	Set the color of [Caliper] for [Annotation].	<input type="radio"/>
Analysis Text	Set the color of [Text] for QCA/LV.	<input type="radio"/>
Study Text	Set the color of [Text] for [Study] of [Annotation].	<input type="radio"/>
Font Options		
Annotation Text	Set such as the font and font size of [Annotation].	<input type="radio"/>
Analysis Text	Set such as the font and font size of QCA/LV.	<input type="radio"/>
Study Text	Set such as the font and font size of [Study] for [Annotation].	<input type="radio"/>
Other Settings		
Arrow Weight	Set the size of [Arrow] for [Annotation].	<input type="radio"/>
Caliper Step	Set the size of [Caliper] for [Annotation].	<input type="radio"/>
Image Selector		
Font size	Select Font size to set font size of angle information displayed on the image selector.	<input type="radio"/>
Default	Click [Default] to reset font size.	<input type="radio"/>

■ Database Tab

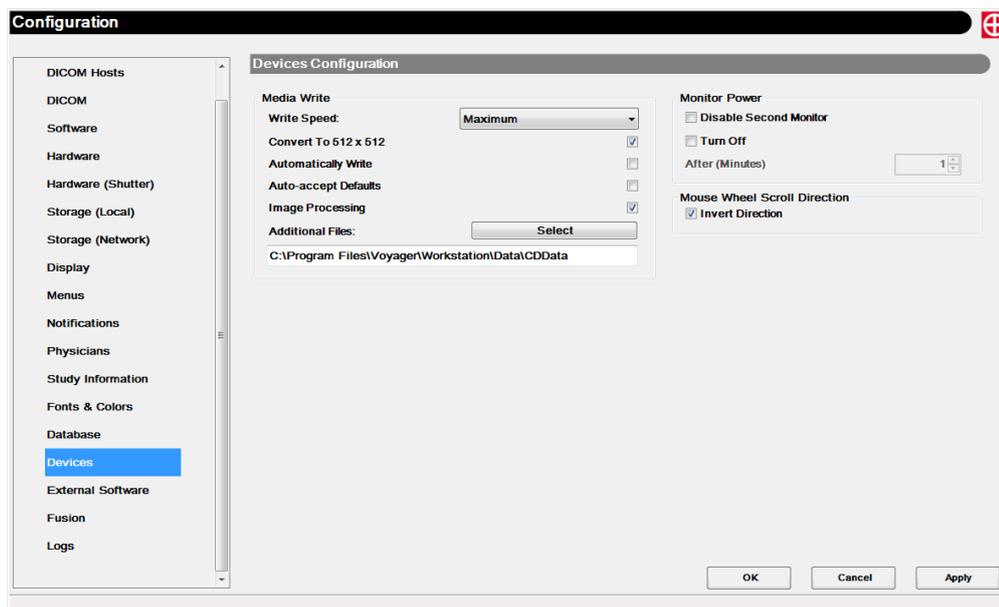
The [Database] tab contains up to eight buttons, one for each table.



Item	Description	Mod																					
DICOM Tables	The four DICOM tables are for DICOM experts only and are to be left as it is.	×																					
User Table	<p>This table enables the administrator to view, add, edit and delete users. On the [Database] tab, click [User Table] to review all users. The table contains several items (columns) per user (row).</p> <div data-bbox="635 1279 1235 1451" data-label="Image"> <table border="1"> <thead> <tr> <th>User Login</th> <th>User Name</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td>Admin</td> <td>admin</td> <td>SUPER</td> </tr> <tr> <td>operator</td> <td>operator</td> <td>USER</td> </tr> <tr> <td>super</td> <td>super</td> <td>SUPER</td> </tr> <tr> <td>serviceapp</td> <td>serviceapp</td> <td>SUPER</td> </tr> <tr> <td>shimadzu</td> <td>shimadzu</td> <td>SUPER</td> </tr> <tr> <td>adminope</td> <td>adminope</td> <td>SUPER/USER</td> </tr> </tbody> </table> </div> <p>To add a user, click [Add] to display the window for entering name. Fill in each item in the row. To edit an item, click it and make the desired changes. To save changes, click a different row or [Add] or [Close]. The [Refresh] button also saves any changes and moves the pointer to the first row. To delete a user, select the user (click anywhere in the row) and click [Delete]. Do not delete standard users such as "super", "operator" and "serviceapp".</p> <p>▶▶ Reference "10.3 Viewing User Type" P.97</p>	User Login	User Name	Type	Admin	admin	SUPER	operator	operator	USER	super	super	SUPER	serviceapp	serviceapp	SUPER	shimadzu	shimadzu	SUPER	adminope	adminope	SUPER/USER	×
User Login	User Name	Type																					
Admin	admin	SUPER																					
operator	operator	USER																					
super	super	SUPER																					
serviceapp	serviceapp	SUPER																					
shimadzu	shimadzu	SUPER																					
adminope	adminope	SUPER/USER																					
Performing, Referring Physicians and Operator Tables	Not applicable.																						
Patient Table	Not applicable.																						

■ Devices Tab

[Devices] options are configured as follows.

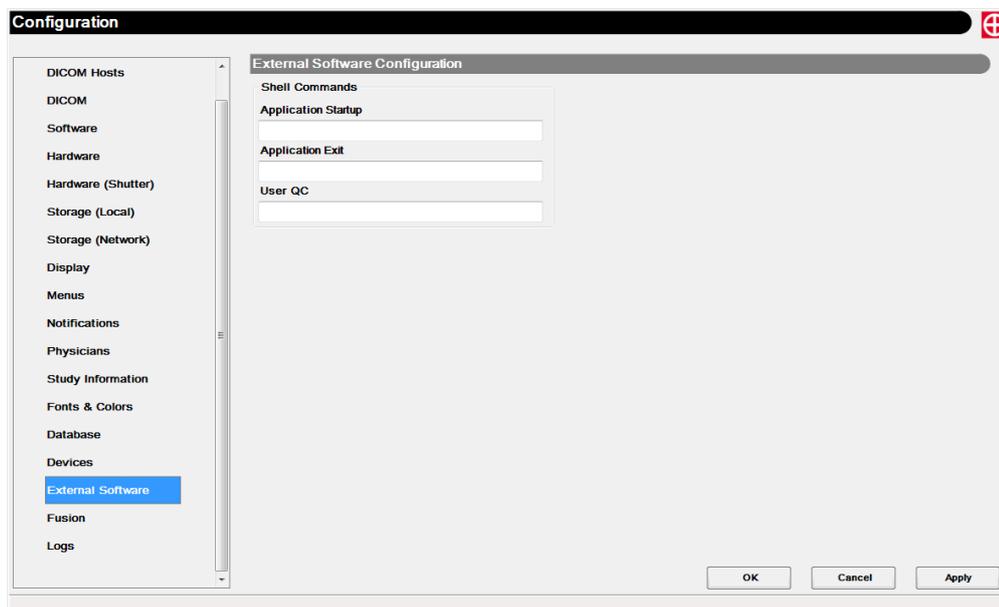


Item	Description	Mod
Media Write		
Write Speed	Choose Maximum to write at the maximum speed supported by the writer and detected media.	×
Convert to 512 × 512	Individually selectable for CD and DVD writers, defines whether studies are converted to a lossless compressed DICOM format (512 × 512 8-bit) before writing to removable media. When either CD or DVD is unchecked, DICOM format (1K × 1K, 12 bit) is written to the media. Large uncompressed Cine (raw) studies may not fit on a single CD so it is recommended to keep CD checked.	○
Automatically Write	Not applicable.	
Auto-accept Defaults	Causes only the prompts related to inserting blank media to be displayed in a pop-up window. All other media writing-related prompts appear in the status bar of the Studies Management and Image Viewer windows. Furthermore, the prompt to select specific series is skipped.	○
Image Processing	(Review only) Causes image processing including DSA subtraction to be applied to the images before writing them to CD/DVD.	○
Additional Files	Enables you to include additional files (such as a player) on the media. Click [Select] and choose a folder that contains the additional files. All files and folders in the selected folder will be written to the root of the media. File names must have the 8.3 format. Folder names must be no more than 8 characters in length.	×

Item	Description	Mod
Monitor Power		
Disable Second Monitor	Not applicable.	×
Turn Off	<p>When this is selected, the [After (Minutes)] value defines how many minutes (1 to 60) must elapse without keyboard or mouse activity, before the monitor screen blanks and switches into its power-save mode. Windows screen saver must be disabled.</p> <div data-bbox="518 533 1348 638" style="border: 1px solid black; padding: 5px;"> <p>NOTE If you select [Turn Off] here, it is not available if study opens for acquisition and review.</p> </div>	○
Mouse Wheel Scroll Direction	<p>Set scroll direction of mouse wheel.</p> <p>When check [Invert Direction] and scroll the mouse wheel to downward to show the next frame.</p>	×

■ External Software Tab

[External Software] options are configured as follows.



Item	Description	Mod
Shell Commands	Enter any shell command (with drive letter and path) that is to be executed before [Application Startup] or after [Application Exit]. For example, "c:\Shutdown.exe" could be entered in [Application Exit] to cause the system to shut down upon exit.	×

■ Fusion Tab

Not applicable for Review Station.

■ Logs Tab

The [Logs] tab enables you to log various events. Do not use this tab to activate logging unless you have been directed to do so by Shimadzu technical support.

11 Troubleshooting

This chapter provides information on what to do if trouble is encountered while using the system.

11.1 Error Messages

If you see one of the following error messages on the system monitor, take the suggested action to resolve the problem:

Message	Action
An error occurred during cache space reservation.	If you operate with CD storage, write any unsaved data to the CD. If not, please contact our service representative.
No available cache.	
Burn Operation Failed.	Insert a blank CD-R and re-execute the operation.
Can not retrieve media information.	Confirm whether the media is inserted properly.
Cannot write DICOMDIR to CD-R (DVD-R). No patient has been added.	Confirm that writable media is inserted.
Character <x>* is not valid.	Try other characters.
Error: Invalid query criteria entered.	Input an appropriate value.
No DICOM media found in drive <x>*.	Insert DICOM media.

* "<x>" represents variable information.

12 Maintenance

This chapter describes how to maintain the system.

12.1 Introduction

Maintenance of the system allows for vivid diagnostic images while assuring safety of the operator and patient.

The system is shipped in optimum condition through quality management and inspections. Regular maintenance is necessary to maintain the condition of the system.

The preventive inspection is classified as follows:

Type		Performer	Maintenance cycle
Daily Maintenance	Startup maintenance	Operator	Daily (before operation)
	Post-operation maintenance	Operator	Daily (after operation)
Periodic Maintenance		Service representative	Every 6 months

12.2 Daily Maintenance

The daily maintenance involves the startup and post-operation maintenance. The daily maintenance allows for longer duration of the product.

Startup maintenance procedures and finishing operations described in this section should be followed.

12.2.1 Startup Maintenance

■ Purpose

The startup inspection prior to operations is necessary for perfect and trouble-free performance.

■ Procedures

Procedures of the startup inspection are described as follows.
The following should be checked visually.

Check point	Procedure
Pinched, twisted, or stripped cables	Adjust
Damage on chassis or cables	Check visually and if something is wrong, contact Shimadzu Service Representative.

Turn the power ON. The following should be checked by sound and smell.

Check point	Procedure
Abnormal sound.	Contact Shimadzu Service Representative
Abnormal smell.	Contact Shimadzu Service Representative

Verify that the system has normally activated.

The startup maintenance is complete.

12.2.2 Finishing operations

This section describes the post-operation maintenance.

■ Post-operation Maintenance

Check the followings when finishing operations.

■ Cleaning

Check point	Procedure
Dust or dirt is not removed.	Remove

12.3 Periodic Maintenance

Periodic maintenance is performed by the Shimadzu Service Representative. This maintenance requires sufficient knowledge of the internal mechanism and is hazardous. The maintenance is performed every 6 months and will be charged after the guarantee expires.

13 DICOM Concepts

This chapter provides basic DICOM conceptual information.

13.1 The DICOM Standard

DICOM is a communications and data encoding standard that provides interoperability between vendors. The DICOM standard specifies how to communicate data between stations rather than the type of data or how it is used.

To further understand DICOM, it is helpful to answer several key questions:

- What is the DICOM standard?

The DICOM (Digital Imaging and Communications in Medicine) standard is a set of rules that allow medical images and associated information to be exchanged between imaging equipment, computers, and hospitals. The standard establishes a common language that permits medical images and information produced on one vendor's machine to be available for use on the digital system of another vendor.

- Who wrote the DICOM Standard?

The DICOM Standard has evolved over the past ten years through meetings between medical imaging company representatives (represented through the National Electrical Manufacturers Association, NEMA) and representatives from major medical societies, including the American College of Cardiology, American College of Radiology, American Society of Echocardiography, European Society of Cardiology, and American Society of Cardiology.

- Is compression of image data part of the standard?

Several compression schemes are defined in DICOM, but are limited by modality (X-ray, CAT, MRI, ultrasound). JPEG (Joint Photographic Experts Group) lossless compression, allows perfect reconstruction of the original image. It is mandated by the standard for cardiac angiography. JPEG lossy compression, which does not support perfect reconstruction, is a currently defined option only for echocardiography interchange; echocardiography also allows lossless data.

- Can the exchange of digital images be standardized?

Concerned about incompatibility, members of the ACC, ASE, ESC and ASNC, working with the ACR-NEMA DICOM Standard committees began in 1992 to work on extensions to the standard to enable exchange of digital X-ray angiographic, echocardiography, and nuclear cardiac images. Each working group has recommended CD-R as an exchange medium because CD-R is non-erasable, sturdy, and easily obtained by both manufacturers and users. This allows each of these imaging modalities to be exchanged either separately or with each other, depending on the particular implementation of the standard.

NOTE Parts of this section are extracted from ACC's printed views on DICOM and the CD-R exchange media standards.

14 Glossary

All information in this glossary is provided in the context of medical imaging and this product.

ACC	The American College of Cardiology.
ACR	The American College of Radiology.
Cache	A special reserved area on a hard disk that the product uses to temporarily store images and information.
Cath	Cardiac Catheterization.
CAU	Cranio-Caudal Projection.
CCD	Charge-coupled device. A light-sensitive semiconductor device used in digital image capture.
CD CD-ROM CD-R	Often used interchangeably, Compact Disc and Compact Disc Read only Memory can only be read and are produced in a pressing plant. Compact Disc Recordable (CD-R) discs can be written to in a computer drive but cannot be erased.
Cine Run (loop)	Video (multi-frame) images captured by medical imaging equipment.
CRA	Caudo-Cranial Projection.
DA	Digital Angiography.
Diastole	The dilation (expansion) of the heart chambers that occurs after contraction. Also referred to as "End Diastolic" state.
DICOM	Digital Imaging and Communication in Medicine, is a set of rules that allow medical images and associated information to be exchanged between imaging equipment, computers, and hospitals.
DSA	Digital Subtraction Angiography. A technique used to virtually remove constant structures of no diagnostic interest, enabling enhanced blood-vessel contrast.
ESC	European Society of Cardiology.
FPD	Flat Panel Detector.
Grayscale (Monochrome)	Black, white, and gray images that can have, for example, 256 unique shades with eight-bit data.
HIS	Hospital information system.
IHE	Integrating the Healthcare Enterprise.
JPEG	Joint Photographic Experts Group, defines a set of standards for compression of still images and video (multi-frame) images.
LAO	Left Anterior Oblique.
Lossless Compression	Digital compression in which data loss never occurs. Original data (image) condition is achieved after decompression.
Lossy Compression	Digital compression which is not fully reversible but typically allows images to retain sufficient detail for analysis.
LUT	Look Up Table (used for brightness / contrast compensation).
LVA	Left Ventricular Analysis.
MR / MRN	Medical Record / Medical Record Number.
NEMA	National Electrical Manufacturers Association.

PPS	Performed Procedure Step.
QCA	Quantitative Coronary Analysis.
RAO	Right Anterior Oblique.
RDSR	DICOM Radiation Dose Structure Report.
RSM-DSA	Real-time Smoothed Mask Digital Subtraction Angiography.
Stenosis	An undesired narrowing of a patient's blood vessel.
Stent	A small tubular medical apparatus permanently inserted in a patient's blood vessel to prevent undesired narrowing.
Systole	The contraction of the heart chambers as blood is pumped into the aorta from the left ventricle and into the lungs from the right ventricle. Also referred to as "End Systolic" state.

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