

# **XC User Manual**





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Any one of the following iCR products will be referred to as "iCR desktop unit" throughout this document: iCR VERTX™. The iDR-17™ and iDR-51™ will be referred to as the "iDR unit" throughout this document.



# Contact and Product Information

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## Contact Information

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## Information

Please enter the details of the system here:

Serial Number:	
Date Purchased:	
Interface Type:	USB 2.0



# Safety Information

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Read and understand the installation and operating instructions before starting the software.

		
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## Conventions



### Warning:

A WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



### Caution:

A CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



### Note:

A NOTE indicates important information that helps you better utilize your CR Unit and Software.



### Important:

An IMPORTANT indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

## Malfunctioning Equipment

If any iCRco software product shows signs of malfunction, try restarting the computer; if the problem persists or is reproducible discontinue the use of the product immediately and contact Technical Support at 310-921-9559.



# iCRco Warranty

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iCRco, Inc. ("iCRco") values your business and always strives to provide high-quality products and services. All iCRco products are provided with an initial warranty so that the hardware and software are covered from the date of purchase. This limited warranty solely applies to new products manufactured by or for iCRco and originally purchased from iCRco or an authorized dealer of iCRco products for your own use. In addition, an extended warranty is available for most new and recently purchased iCRco products for an additional charge.

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## Software Limited Warranty/Support

iCRco warrants that its QPC XSCAN32, Captera, XC, and/or Clarity PACS software originally provided with any product will substantially conform to iCRco's specifications and that the media, not including hard drives, on which the software is furnished will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date of original shipment from iCRco. iCRco's sole obligation under this warranty is limited to making reasonable efforts to ensure such conformity and to supply the consumer with a corrected version of the software as soon as it is practical after the consumer has notified iCRco of any nonconformity. iCRco does not warrant that the operation of any software will be uninterruptible, glitch- or error-free, or that functions contained in the software will operate in the combinations which may be selected for use by the user or meet the user's requirements. This limited software warranty will be void if the software is modified without the written approval of iCRco or is used outside of the recommended parameters or equipment. iCRco does not provide any warranty or support for any other software.

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## Warranty Product Technical Requirements

iCRco requires that all DR, CR, Scanner, and/or products requiring PCs be fitted and installed with a 1300VA (780W) uninterruptible power supply ("UPS"). iCRco recommends the APC 1300 specification UPS or equivalent. For warranty evaluation and service, iCRco requires the customer to provide an Internet connection (DSL or Dial-up) or the minimum of a phone line accessible by an extension cord to the product enabling iCRco technicians to perform remote diagnostics on installed equipment. In addition, each iCRco product must be installed, maintained, and operated in accordance with the respective product manual. Failure to comply with these requirements will result in a voided warranty claim.

## Requesting Warranty Service

For information on obtaining warranty service, call iCRco's customer support at (310) 921-9559. In order to evaluate a warranty service request, iCRco requires the following information: the iCRco serial number of the product, a detailed description of the problem, customer name and contact information, product location and operating conditions, a copy of the purchase documents, and sufficient information and authorization, including a liability release as to any loss of data (that should always be backed up), software or network injury, or downtime, allowing iCRco technicians remote access to the product. Product may not be returned to iCRco without first obtaining a Return Material Authorization ("RMA") number from iCRco. Prior to providing an RMA, iCRco may require remote access to the product. If iCRco determines that the product may be defective, is under warranty, and necessitates a return to iCRco for service, an RMA number and instructions for return of the product will be given. iCRco is not responsible for any unauthorized returned product, i.e. one for which an RMA number has not been issued by iCRco.

Warranty service requires all authorized returns be shipped to the iCRco factory prepaid and insured. All such authorized returns are the customer's responsibility. For products sold and located within the United States, iCRco will pay for return shipping.

Products being returned are only to be shipped in iCRco approved shipping containers. The original box and packaging materials are approved and should be kept for moving and/or shipping the product. Approved packaging may also be purchased from iCRco for an additional charge. iCRco shall have no liability nor responsibility for warranty service to any product that is not shipped in an iCRco approved shipping container, that is damaged from incorrect packaging, or that is damaged during shipping.

## Additional Warranty Limitations and Extent of Warranty

This warranty does not apply if the product has been damaged by accident, misuse, or abuse. In addition, warranty service does not include the repair of failures or defects caused by: unauthorized attachments to any iCRco product, unsuitable physical or operating environment, maintenance or repair by anyone other than iCRco or the iCRco authorized dealer that sold the product, operation of a product beyond its duty cycle, use of the product outside of its specifications, the use of supplies, parts, materials, software, or interfaces not furnished, authorized, or recommended by iCRco. If the product, including any software has been opened, tampered with, modified, or altered in any way without written authorization by iCRco, the warranty will no longer apply.

This warranty applies only to products manufactured by, or for, iCRco; products can be identified by an "iCRco" serial number as originally affixed to the product. Any modification to the iCRco serial number tag or its attachment to the product shall immediately void the warranty.

This warranty is non-transferable and subsequent owners must contact iCRco to establish if the equipment is eligible for an extended warranty.

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## Revision History

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Revision	Date	Approved by	Comments
A	2012-06-15	MS	Initial release of XC Manual
B	2012-08-01	ES	Updated for XC 1.2
B-02	2012-10-09	KS	Tool and Feature Update
C	2013-02-19	KS	Updated for XC 1.6
D	2013-06-18	KS	Updated for XC 1.8
E	2014-02-24	KS	Updated for XC 1.10
E-02	2014-02-26	KS	Deviation Index Update
E-03	2014-07-30	KS	Tool and Feature Update



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# Chapter 1

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## System Requirements and Initial Configuration

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### XC System Requirements

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#### Minimum Hardware Requirements

- Intel Core i3 CPU or greater
- 4 GB RAM or greater
- 7200 RPM Disk with >500GB

#### Software Requirements

Genuine Microsoft Windows Operating System:

- Windows 7 (32- or 64-bit)
- Windows 8 (32- or 64-bit)

with Microsoft .Net 4.x

### Initial Configuration

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#### Verifying the Region, Locale, Date, and Time

1. Go to **Start > Control Panel > Date and Time**
2. Ensure the date, time, and time zone are accurate for your region.
3. Go to **Start > Control Panel > Region and Language > Location**
4. Ensure the **Current Location** is accurate for your region.

#### Setting the Administrative Account

The first time the application is run you will be prompted to **Create An Administrative Account**. Enter the desired username and password for the Administrative Account. Have the clinical administrator write the Administrative username and password down. Store the password somewhere where it will be safe.

When the administrative account is successfully created, the **Login** dialog will appear. Login with the Administrative Account.



#### Note:

If the Administrative Account is not created, XC will not launch.

#### Verifying the Application is not in Demo Mode

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Device Settings** tab.
3. Under **Demo Settings**, the **Enable Demo CR** button should be set to **Off**.

4. Select the **Close and Accept** button to confirm changes.

### Setting the Scan Resolution



#### Note:

If your facility is mandated by law to acquire with a specific resolution, then disregard the information in this section. These instructions are not a mandate to acquire at a specific resolution.

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Device Settings** tab.
3. Select the desired device.
4. Select the desired cassette size.
5. For general radiography, scan resolution of 155 microns and 200 microns are the recommended setting.
6. Click **Close and Accept** to save the changes.

### Setting the Appropriate Language

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Settings** tab.
3. Under **Language** select the desired language.
4. Select the **Close and Accept** button to confirm changes.

### Setting the Imaging Domain

The Imaging Domain determines the default anatomy available for selection. The default can be toggled at scan time by clicking the imaging domain button on the Anatomy Selection screen. For example, if the site does mammography, the Mammography imaging domain needs to be set.

This setting can only be modified by the Administrative Account.

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Admin > Settings** tab.
3. Under **Imaging Domain** select the correct domain from the drop-down menu.
4. Select the **Close and Accept** button to confirm changes.

### Setting the Processing Parameters Library

The processing parameters library enable different groups of processing presets. This setting generally does not need to be changed. Altering the settings can result in poor image processing.

This setting can only be modified by the Administrative Account. To evaluate or adjust the Processing Parameters, see Section [Processing Parameter Evaluation](#) on page 92 for more information.

To set the new library:

1. Click the **Configuration** button on the Patient Worklist screen.
2. On the **Admin > Settings** tab under **Imaging Domain**, click the **Launch Applications Interface** button.  
The Applications Interface will open.
3. Click the down arrow of the **Library File** combo box.
4. Select the name of the new file.
5. Click the **Save Repository To Disk** button.
6. Close the Applications Interface.
7. Select the **Close and Accept** button to confirm the changes.

### Setting up DICOM Targets

1. Click the **Configuration** button on the Patient Worklist screen.

2. Select the **DICOM** tab.
3. Add a DICOM target by clicking the **Add New AET** button.
4. Enter or choose the following information on the Add DICOM AET screen:

Field	Value
Target Name	What you want to call it
Target AET Title	Applications Entity Title of the target application
IP Address	The IP Address of the target application
TCP Port	The DICOM receive port of the target application. 104 is the default port.
Modality	The DICOM tag the sending images should be identified as.
Target Type	The annotation type the sending images contains. Graphics Object is the newest, followed by Overlay, then Embed. If you can't see annotations at the target application, change this setting.
For Processing	Enable if the target application is going to do image processing. For example, a dedicated Mammographic CAD application. This sends the image from XC without processing it.
XScan QPC	Enable only if sending to the QPC XSCAN32 application.

5. Select the **Finish** button.
6. Click the **Close and Accept** button to confirm the changes.

### Setting Auto-Send Targets

The auto-send targets feature will DICOM Send an image to a predefined target. Enable the feature as follows:

1. Create a DICOM target as covered in [Setting up DICOM Targets](#) on page 18.
2. Click the **Configuration** button on the Patient Worklist screen.
3. Select the **DICOM** tab.
4. Select the **Auto Send Targets** tab.
5. Select the target(s) the user would like to automatically send their images to by placing a check mark in the check box.
6. Select the **Close and Accept** button to confirm changes.

When the **Accept and Send** button is clicked at the Image widow, the image will send to the specified targets.

### Setting Worklist Targets

If you need XC to query a DICOM modality worklist, the feature can be enabled as follows:

1. Create a DICOM target as covered in [Setting up DICOM Targets](#) on page 18.
2. Click the **Configuration** button on the Patient Worklist screen.
3. Select the **DICOM** tab.
4. Select the **Worklist Inputs** tab.
5. Select the target(s) whose DICOM MWL the user would like to query.
6. Select the interval for the automatic query and any desired search constraints.
7. Select the **Close and Accept** button to confirm changes.

### Setting the Institution Address

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select **Defaults** tab.
3. Enter the address in the **Institution Address** field.
4. Click **Close and Accept** to save the changes.

### Setting the Default Referring Physician

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select **Defaults** tab.
3. In the Referring Physician box, click **Add**.
4. Enter the Referring Physician's name, then click **Finish**.
5. Put a check in the box next to the default Referring Physician's name, then click **Set**.

The default Referring Physician is set.

6. Click **Close and Accept** to save the changes.

### Setting the Institution Name

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select **Defaults** tab.
3. In the Institution box, click **Add**.
4. Enter the Institution name, then click **Finish**.
5. Put a check in the box next to the default Institution name, then click **Set**.

The default Institution name is set.

6. Click **Close and Accept** to save the changes.

### OPTIONAL: Enable the X-ray Generator Interface

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select **Device Settings** tab, then **X-Ray Tubes** tab.
3. Select the correct X-ray generator from the drop down list labeled **Attached X-ray Tube**.
4. Select the **Close and Accept** button to confirm changes.

### OPTIONAL: Disabling Log-In Requirement



#### Note:

Disabling the log-in should only be performed if specifically required by the site administrator.

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Admin** tab, then the **Users** tab.
3. Under **Require Login** select the **Off** button.
4. Select the **Close and Accept** button to confirm the changes.



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# Chapter 2

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## Launching, Logging In and Out, and Quitting

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### User Manual

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This manual covers information related to the XC software.

For information regarding a specific product, please read that product's user manual.

### Logging In (Administrator Account)

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After running the Installer, the User should double-click on the XC short-cut on the desktop to open XC.



**Note:**

The first User account created is the administrator account. The administrator account is able to access the program configuration dialog, create new Users, grant User privileges, and quit the application. For more information, see the Section [Configuration](#) on page 75

### Logging In

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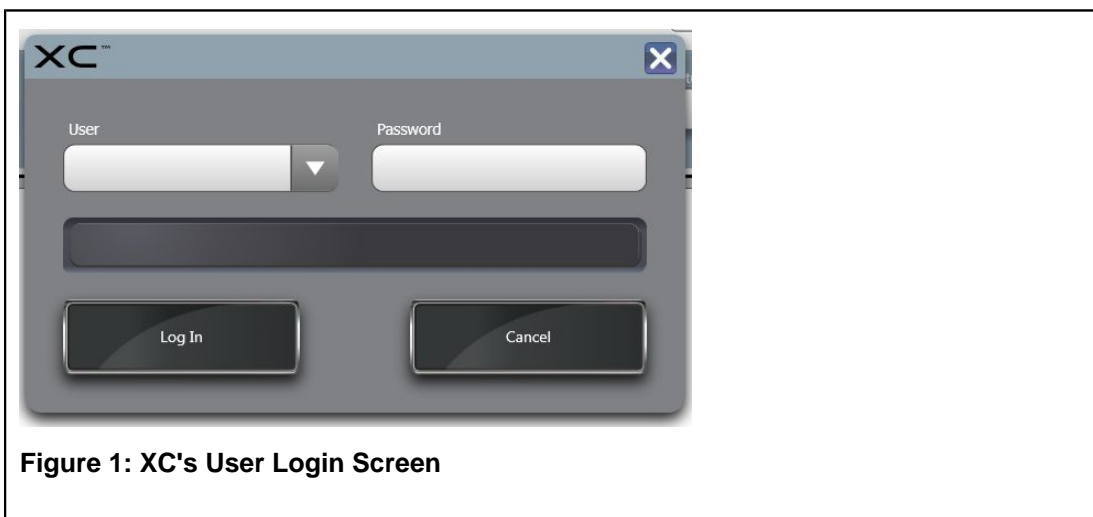
1. In the **User Login** dialog, enter a User name and password.



**Note:**

Alternatively, the User may select from a drop-down list of previously entered User names by clicking the drop-down menu on the right-hand side of the User name text field.

2. Click **Log In** to log in.



## Logging Out, Quitting, and Worklist Commands

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The user can log out of XC from the Worklist screen by clicking the **Log Out** button.



The user can quit XC from the Worklist screen by clicking the **Quit** button.



The user can launch the default web browser from the Worklist screen by clicking the **Web Browser** button.



The user can condition (deep erase) a loaded cassette from the Worklist screen by clicking the **Condition** button.



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# Chapter

# 3

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## Acquiring an Image

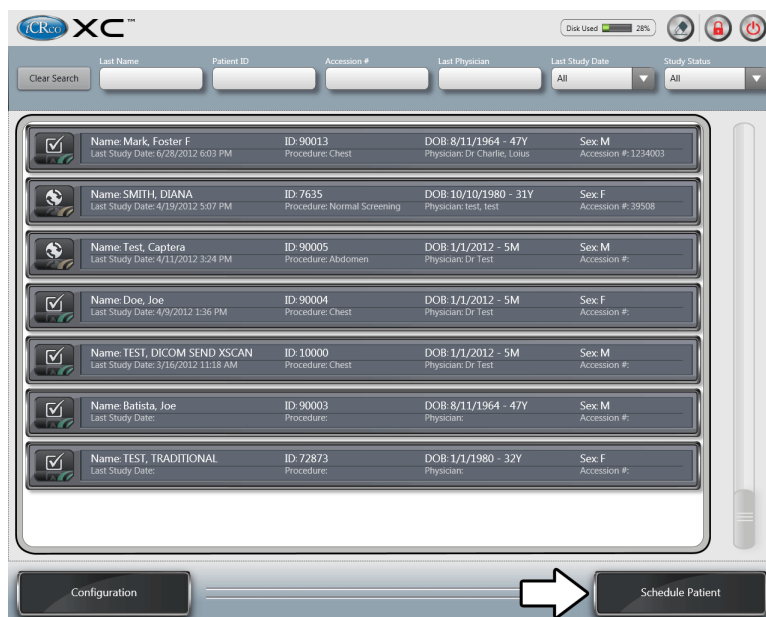
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### Manual Imaging Workflow

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The following steps represent a generalized workflow and are meant to walk the user through using XC. Every workflow varies in process.

1. In the **Patient List** window, click **Schedule Patient**.



2. Enter the patient and study information, then click **Finish and Scan**.



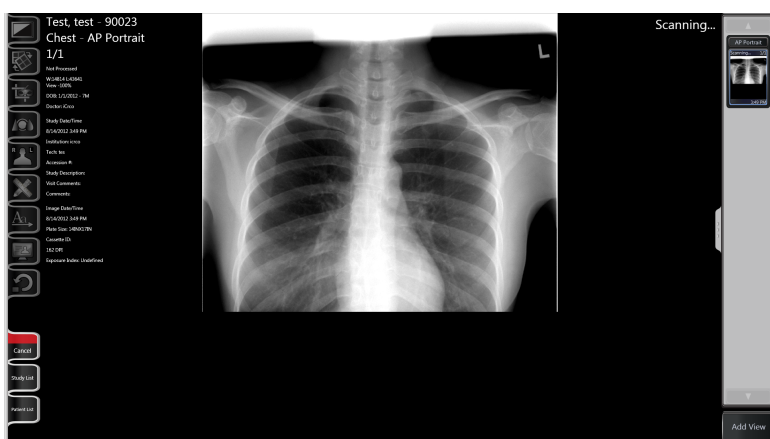
#### Note:

Before you can proceed to the next step, you must input the Patient ID, Last Name, Birth Date, Referring Physician, and Institution. If you are limited in time, you can check the Reconcile Later box, which will only require you to input the Patient ID and Last Name.

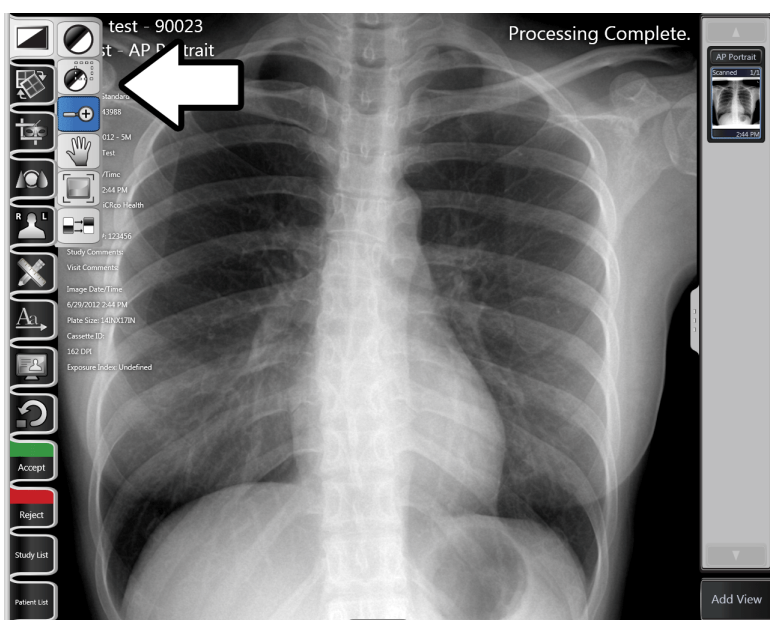
3. Select the region (and if necessary, laterality) of the anatomy by clicking on the appropriate body region, then select the anatomy and view by clicking on the appropriate buttons.

4. After selecting the view, the Scan window opens. Click the desired plate size button to initiate a scan.

5. As the image is acquired, it will be displayed in the **Image Display** window.



6. When the image is finished scanning, make the desired manipulations and annotations. All XC manipulation and annotation tools are selected in the Tools Menu Bar on the left side of the **Image Display** window. The Window/Level, Zoom, Pan, Zoom, and Crop tools are shown in the graphic below.

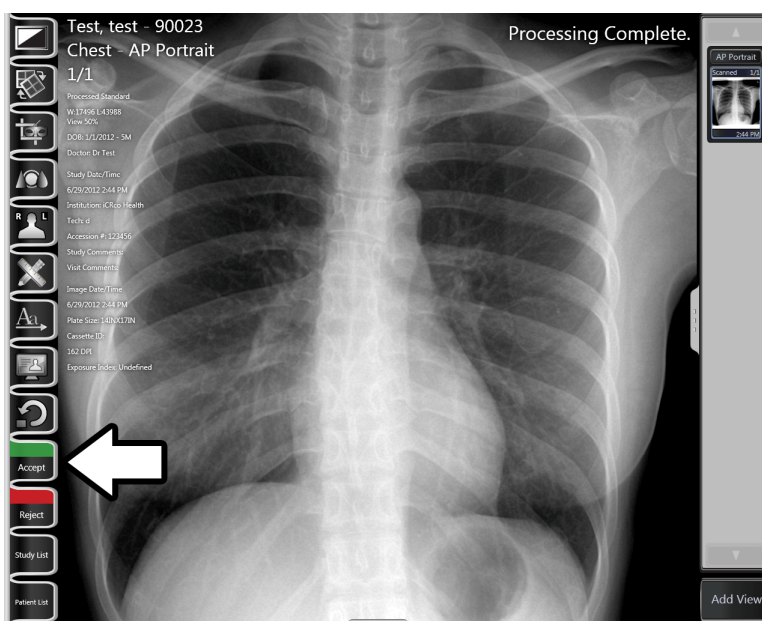


7. When the User is finished manipulating the image, click the **Accept and Send** button in the lower, left-hand corner of the **Image Display** window. When the **Accept and Send** button is clicked, it will save the current image manipulations and DICOM Send the image.



**Note:**

If DICOM auto-send is not enabled, the "Accept and Send" button will read "Accept." The Accept button will save current manipulations to the image, but will not DICOM Send.



8. OPTIONAL: To add another View to the study, click **Add View**.

## Procedure-based Imaging Workflow

The Imaging Procedure Type provides the user with a template for ordering a sequence of scans for a particular study. The user is allowed to create their own Imaging Procedure Type in which they can specify the ordering sequence of each scan and the scan parameters.

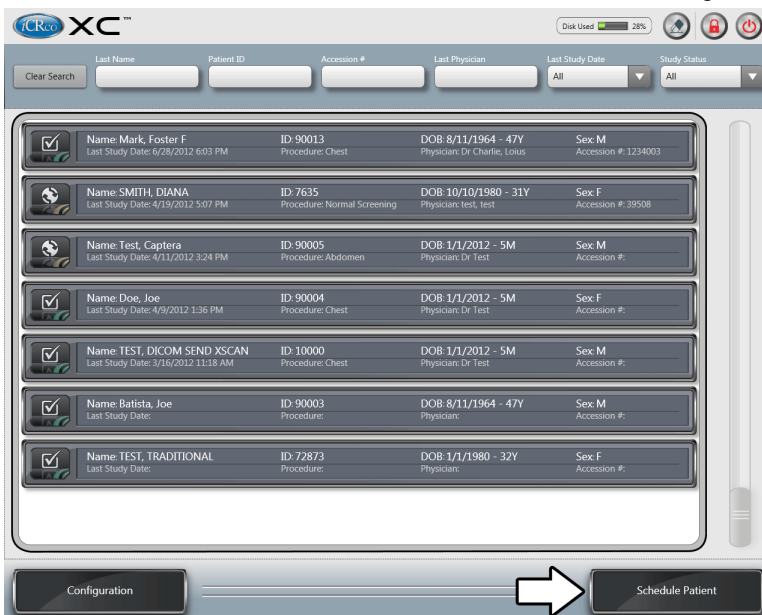


### Note:

For North American users, XC provides the user with a default set of Imaging Procedure Type that is associated with its respective CPT code.

Acquiring an Image for Imaging Procedure for a new patient.

1. In the Patient List Window click the Schedule Patient. This will open the Schedule Patient Window.



2. Enter the patient information in the Patient Info box.

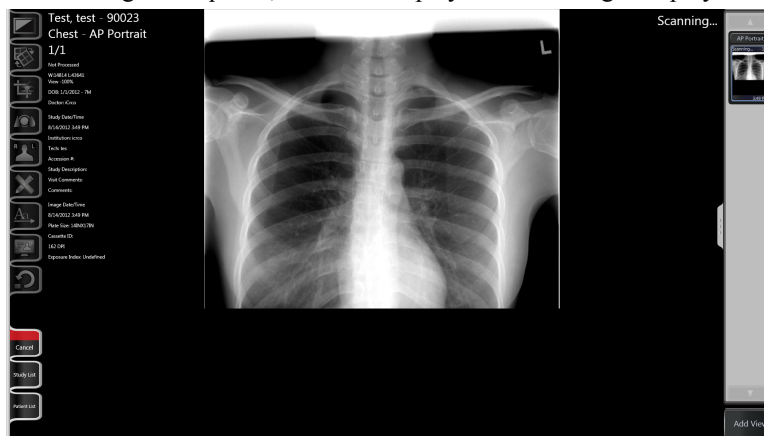
Click **Procedure**, then select the desired procedure.

Click **Finish and Scan**. The Scan dialog will open.

3. If necessary, select the laterality.

Click the cassette size button to initiate a scan.

4. As the image is acquired, it will be displayed in the Image Display window.



5. If it is a multi-view procedure, select the next procedure from the thumbnail. The Image Procedure is completed when all the scans are acquired.

### Acquiring an Image for Imaging Procedure for existing patient.

1. In the Patient List Window open the desired patient's Patient Information Bar. This will open the Study Information Window.
2. Create a new study by clicking the Schedule New Study button.
3. Enter the patient information on the Schedule New Study Window. Click the box called **Procedure**, a drop-down menu will show up and select the desired procedure.
4. Then click the Finish and Scan button. This will open the Studies window.
5. In the Study Information Window the Study Thumbnail Gallery is preloaded with a series of scan orders and each thumbnail displays information of the anatomy view.
6. Click on the thumbnail and this will open the Scanner Option window
7. Select an appropriate cassette size for acquiring an image.
8. As the image is acquired, it will be displayed in the Image Display window.
9. Imaging Procedure is completed when all the scans are acquired.

## Patient Information Reconciliation Imaging Workflow

The Patient Information Reconciliation feature allows the user to enter patient demographic information after all of the images have been obtained.

In particular, this feature is useful for handling unidentified or emergency patients.

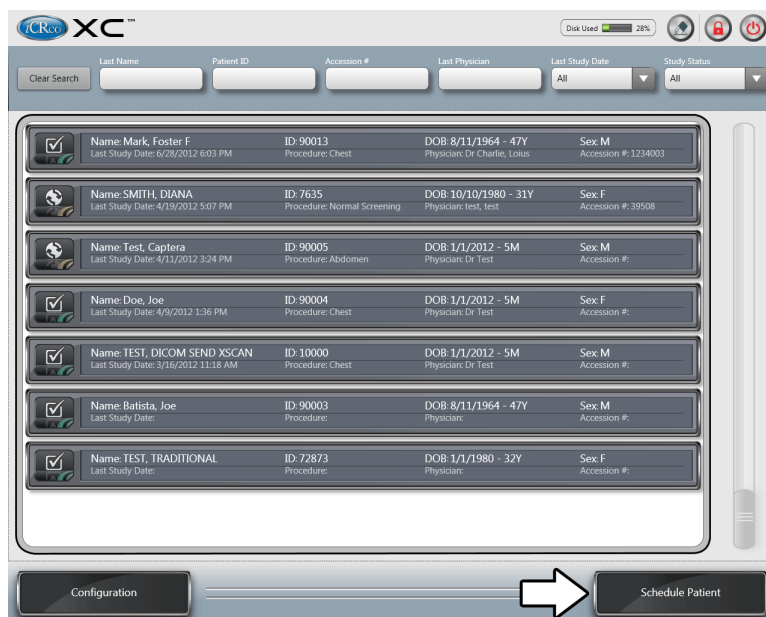


### Note:

The Patient Information Reconciliation feature works as an extension of the general imaging workflow or the procedure-based imaging workflow.

The following steps represent a generalize workflow on how the user can utilize the Patient Information Reconciliation feature for acquiring an image for an unidentified patient.

1. In the **Patient List** window, click **Schedule Patient**.



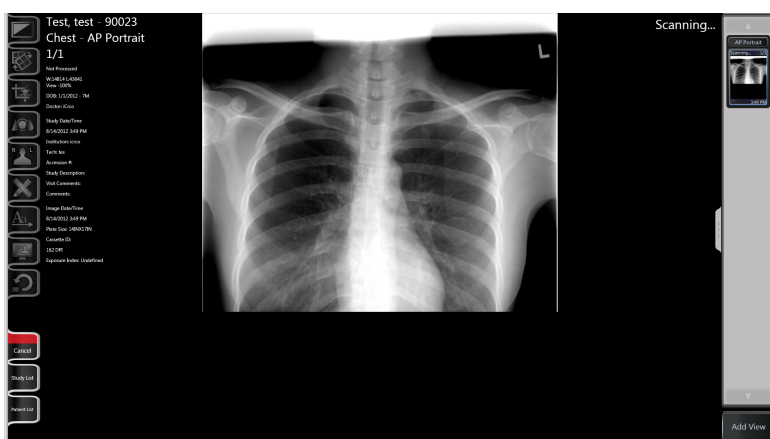
2. Enter known patient and study information, then check the **Reconcile Button** checkbox. Click **Finish and Scan**.



3. Select the region (and if necessary, laterality) of the anatomy by clicking on the appropriate body region, then select the anatomy and view by clicking on the appropriate buttons.

4. After selecting the view, the Scan window opens. Click the desired plate size button to initiate a scan.

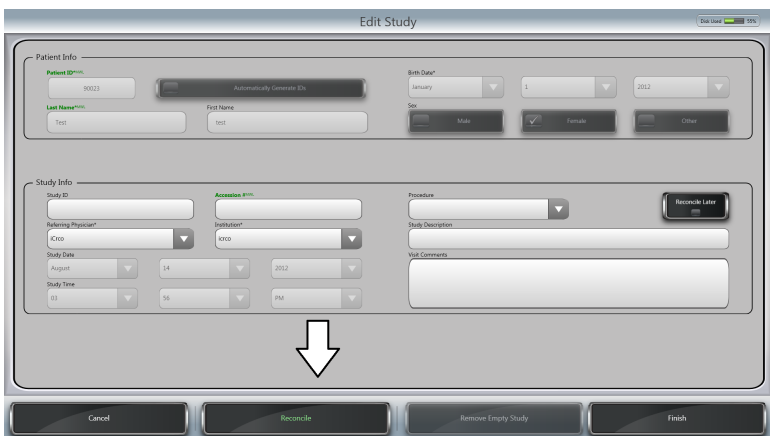
5. As the image is acquired, it will be displayed in the **Image Display** window.



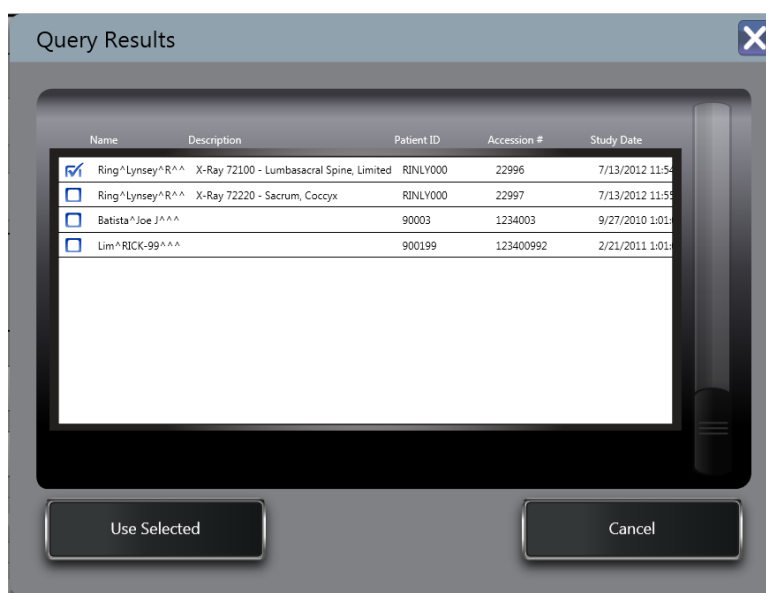
6. To reconcile the study, go to the **Study Information** window and click the **Study Information Bar**.



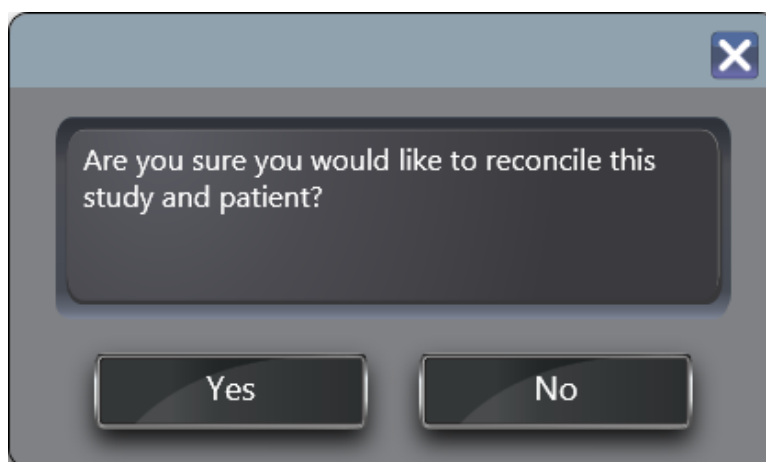
7. If the study was marked for **Reconcile Later**, a button labeled **Reconcile** will appear. Click the **Reconcile** button.



8. A worklist query dialog box will be displayed. Select the desired entry and click the **Use Selected** to confirm a selection.



9. A confirmation dialog will appear. Click **Yes** to complete the reconciliation procedure.



10. XC will automatically update the displayed study and patient information and the workflow is completed.

## Auto Scan Workflow

The following steps represent a generalized workflow utilizing the Auto Scan functionality.

To set XC to Auto Scan mode, see Section [Auto Scan Mode](#) on page 83



### Note:

Auto Scan mode can only be used with Chrome and Chrome Duo units.

1. In the **Patient List** window, click **Schedule Patient**.

Disc Used 28%

Clear Search

Last Name Patient ID Accession # Last Physician Last Study Date Study Status

<input checked="" type="checkbox"/>	Name: Mark, Foster F Last Study Date: 6/28/2012 6:03 PM	ID: 90013 Procedure: Chest	DOB: 8/11/1964 - 47Y Physician: Dr. Charlie, Lotus	Sex: M Accession #: 1234003
<input checked="" type="checkbox"/>	Name: SMITH, DIANA Last Study Date: 4/15/2012 5:07 PM	ID: 7635 Procedure: Normal Screening	DOB: 10/10/1980 - 31Y Physician: test, test	Sex: F Accession #: 39508
<input checked="" type="checkbox"/>	Name: Test, Captera Last Study Date: 4/11/2012 3:24 PM	ID: 90005 Procedure: Abdomen	DOB: 1/1/2012 - 5M Physician: Dr. Test	Sex: M Accession #:
<input checked="" type="checkbox"/>	Name: Doe, Joe Last Study Date: 4/9/2012 1:36 PM	ID: 90004 Procedure: Chest	DOB: 1/1/2012 - 5M Physician: Dr. Test	Sex: F Accession #:
<input checked="" type="checkbox"/>	Name: TEST, DICOM SEND XSCAN Last Study Date: 3/16/2012 11:18 AM	ID: 10000 Procedure: Chest	DOB: 1/1/2012 - 5M Physician: Dr. Test	Sex: M Accession #:
<input checked="" type="checkbox"/>	Name: Batista, Joe Last Study Date:	ID: 90003 Procedure:	DOB: 8/11/1964 - 47Y Physician:	Sex: M Accession #:
<input checked="" type="checkbox"/>	Name: TEST, TRADITIONAL Last Study Date:	ID: 72873 Procedure:	DOB: 1/1/1980 - 32Y Physician:	Sex: F Accession #:

Configuration Schedule Patient

- Enter the patient and study information, then click **Finish**.

Schedule Patient

Disc Used 47%

Patient Info

Last Name First Name Birth Date Sex

Study Info

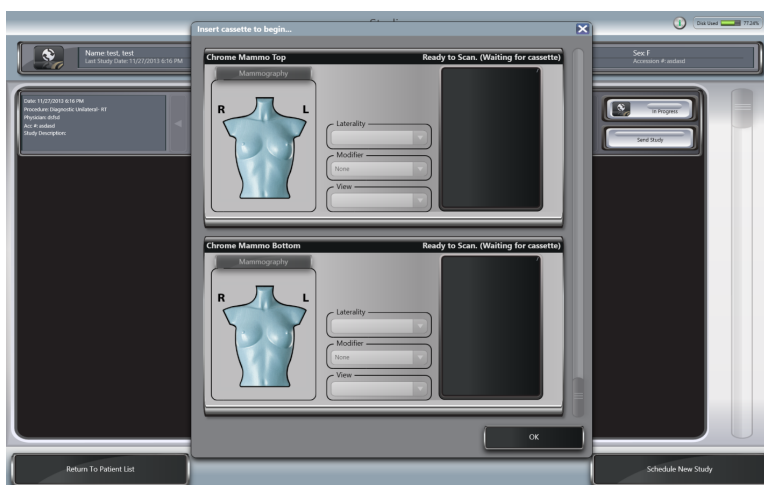
Study ID Referring Physician Institution Study Date Study Time SSN Procedure Study Description Visit Comments

Cancel Query Worklist Finish Finish And Scan

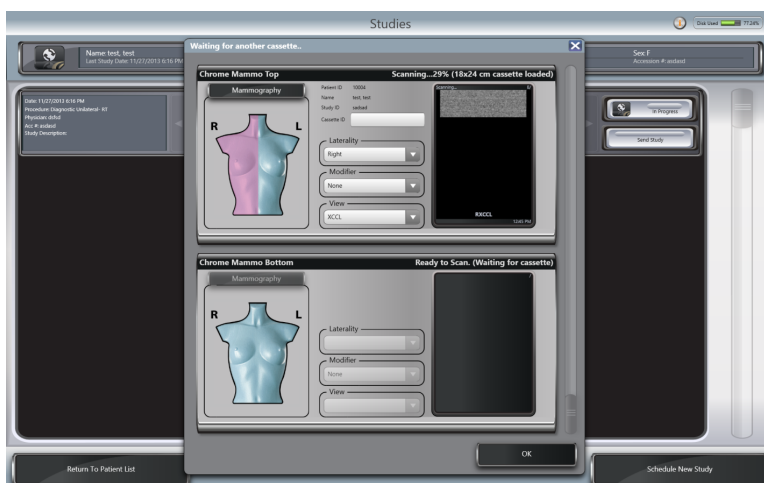
- Select the scheduled study. This will bring up the Study Overview.
- Insert a cassette into a bay. This will bring up the **Device Overview** dialog. The scan unit will begin scanning the cassette.





**Note:** Clicking the **Add View** button will also bring up the **Device Overview** dialog.

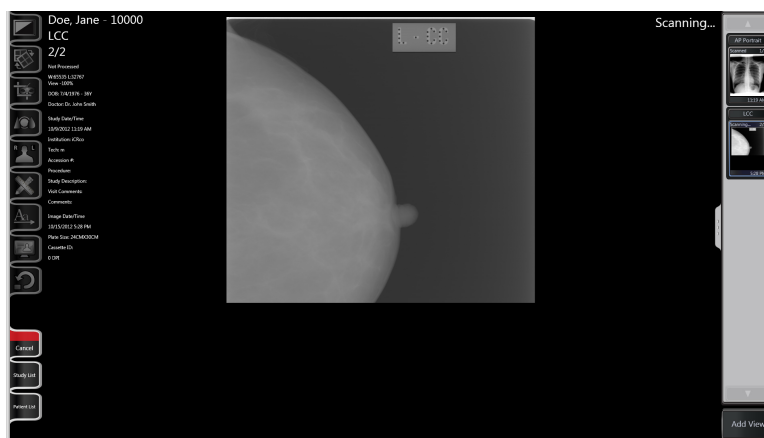


5. The **Device Overview** informs you of the status of the bay(s). While the cassette is scanning, select the anatomy, laterality, and view of the image being scanned.



 **Note:** If the scan unit has two bays, it's possible to scan two cassettes at the same time. To start a second scan using the other bay, insert the cassette into the available bay. Select the image information while the cassette is scanning.

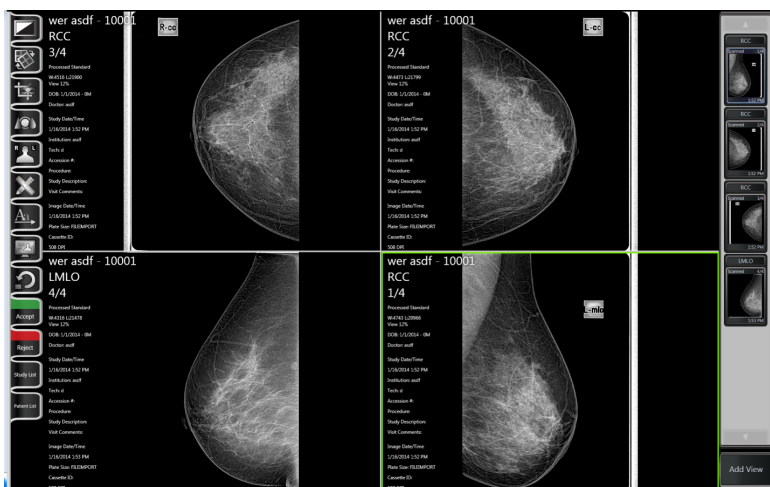
 **Note:** Click the image being scanned to view the image in the **Image Display** window.



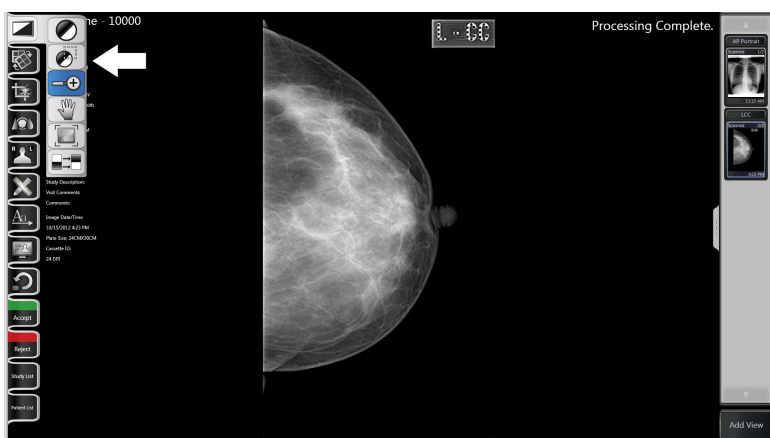
- Click **OK** to close the **Device Overview** dialog. The **Image Display** window will appear, showing all of the acquired images.



**Note:** The images will automatically arrange themselves, displaying a maximum of four images at the same time.



- When the image(s) is finished scanning, make the desired manipulations and annotations. All XC manipulation and annotation tools are selected in the Tools Menu Bar on the left side of the **Image Display** window. The Window/Level, Zoom, Pan, and Crop tools are shown in the graphic below.



- When finished manipulating the image, click the **Accept and Send** button in the lower, left-hand corner of the **Image Display** window. When the **Accept and Send** button is clicked, it will save the current image manipulations and DICOM Send the image.



**Note:**

If DICOM auto-send is not enabled, the "Accept and Send" button will read "Accept." The Accept button will save current manipulations to the image, but will not DICOM Send.



## Barcode Scan Workflow

The following steps represent a generalized workflow utilizing the Barcode Scan functionality.

To set XC to Barcode Scan mode, see Section [Barcode Scan Mode](#) on page 83



### Note:

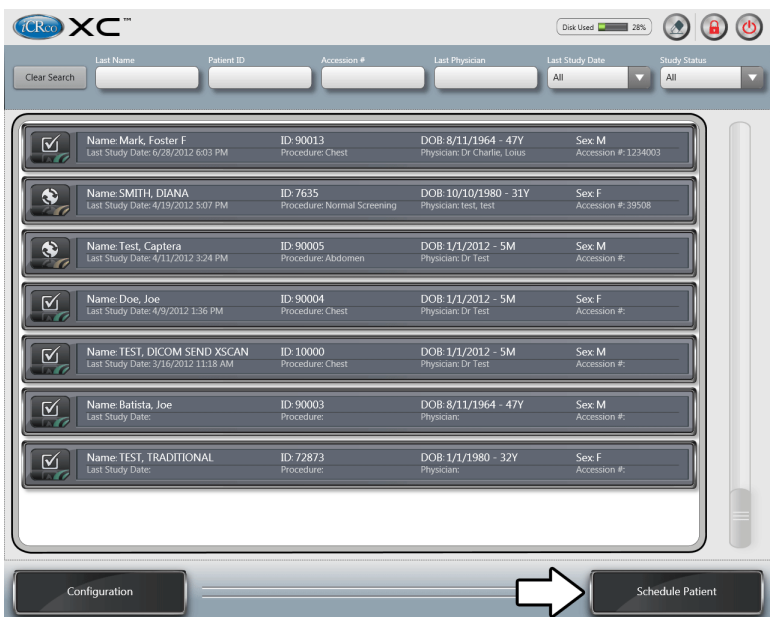
Barcode Mode requires a handheld barcode reader.



### Note:

Barcode Scan mode can only be used with Chrome and Chrome Duo units.

1. In Barcode mode, cassette barcodes must first be registered to XC before they can be scanned. This usually occurs prior to exposure, but can be done at any point before image acquisition.
2. To register a cassette, go to the **Patient List** window, and click **Schedule Patient**.



3. Enter the patient and study information, then click **Finish**.

4. Select the scheduled study. This will bring up the Study Overview.
5. Click the **Cassette registration** button to open the **Cassette registration** window.

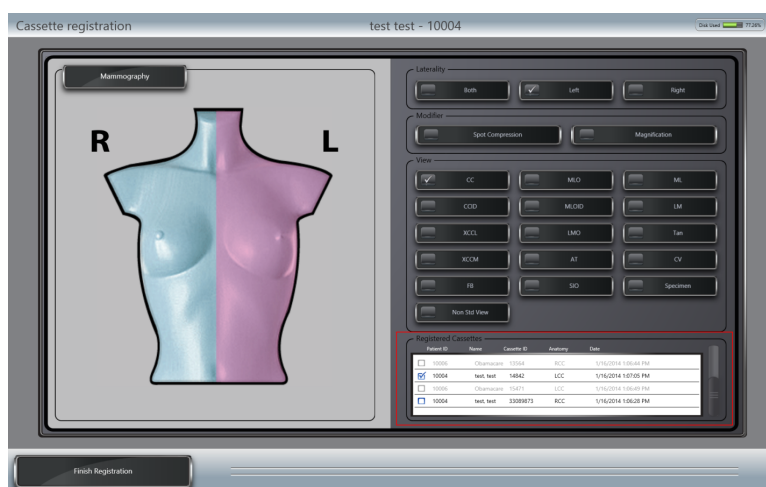
6. Select the region of the anatomy by clicking on the appropriate body region, then select the laterality and view.

Report ID	Name	Cassette ID	Anatomy	Date
10004	Obese	10004	RCC	1/16/2014 1:00:00 PM
10004	Test Test	10004	LCC	1/16/2014 1:01:00 PM
10004	Obese	10004	LCC	1/16/2014 1:02:00 PM
10004	Test Test	10004	RCC	1/16/2014 1:03:00 PM



**Note:** The **Cassette registration** window will list all cassettes that are currently registered.





7. Using a barcode reader, scan the cassette's barcode. This will register the cassette to the selected patient and anatomy. When a cassette is successfully registered, it will appear in the registered cassette list.



**Note:** To register another cassette, select the anatomy, laterality, and view, and then scan the cassette's barcode.



**Note:** If you register a cassette that's already registered, XC will ask if you want to re-register the cassette.



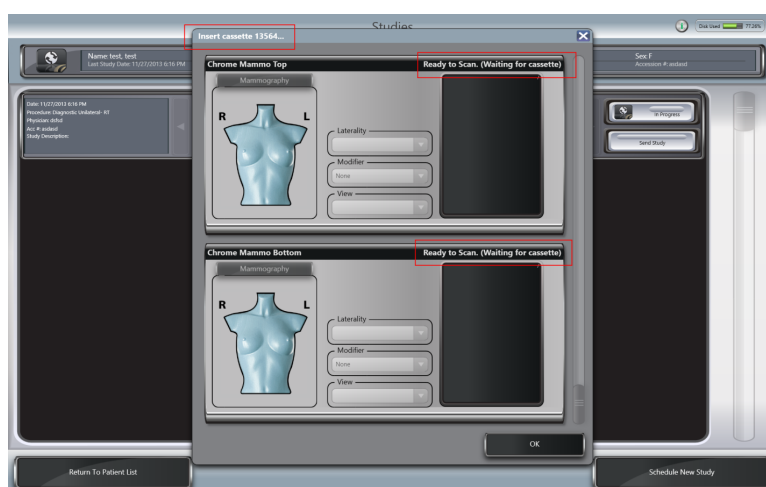
**Note:** Selecting a registered cassette in the list will highlight the selected anatomy on the screen. Cassettes registered to different patients will be greyed out and inaccessible.

8. When finished registering cassettes, click the **Finish Registration** button.



**Note:** Images cannot be scanned while in the **Cassette registration** window.

9. After the registered cassette(s) has been exposed, scan the cassette's barcode. XC will notify you that it's **"Ready to Scan"**.



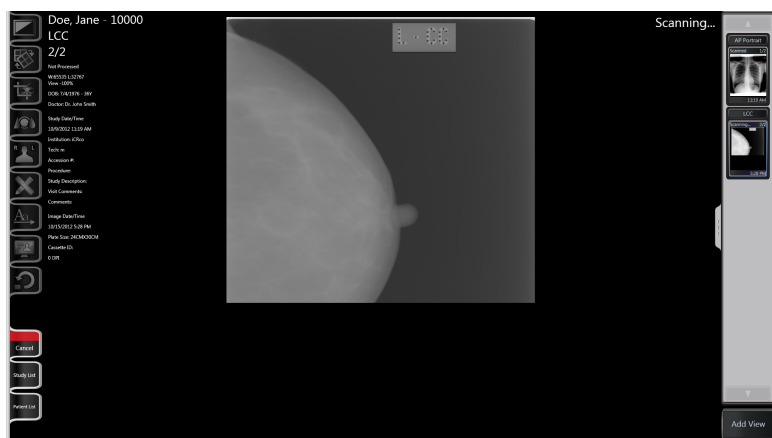
10. Insert the cassette into the bay to begin image acquisition.



**Note:** If the scan unit has two bays, it's possible to scan two cassettes at the same time. To start a second scan using the other bay, scan the barcode of another cassette, and then insert the cassette into the available bay.



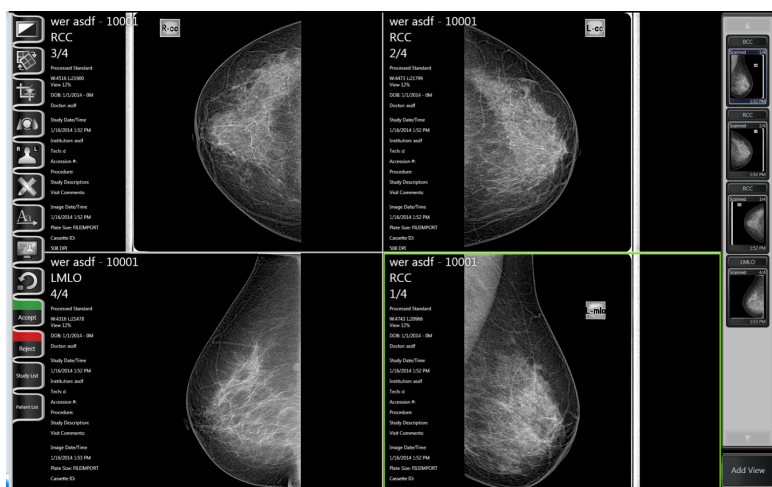
**Note:** Click the image being scanned to view the image in the **Image Display** window.



11. Click **OK** to close the **Device Overview** dialog. The **Image Display** window will appear, showing all of the acquired images.



**Note:** The images will automatically arrange themselves, displaying a maximum of four images at the same time.







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# Chapter

# 4

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## Tools and Processing

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### Image Manipulation Tools

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All XC image processing, manipulation, and annotation tools are selected in the Tools Menu Bar on the left side of the **Image Display** window.

#### Window/Level



The Window/Level tool allows the User to adjust the brightness and contrast of the image. To use the Window/Level tool, first select it from the pop-up menu on the left-hand side of the screen. Then move the mouse over the image. Moving the mouse vertically while holding down the mouse button will adjust the brightness, while moving the mouse horizontally will adjust the contrast.

The default mode is Sigmoid mode. It is possible to switch between the two Window/Level modes. Click the Linear

icon  to activate Linear mode and click the Sigmoid icon  to activate Sigmoid mode.

#### Note:



Use Linear mode for Image Quality and Quality Control Testing. Use Sigmoid mode to adjust the study to a film-like appearance.

#### Smart Box Window/Level



The Smart Box Window/Level tool allows the User to automatically adjust the brightness and contrast of the image with a user-selectable box. The optimal window/level settings will be determined by the user-defined selection. To use the Smart Box Window/Level tool, first select it from the pop-up menu on the left-hand side of the screen. Then mouse click and drag until the Smart Box is the desired size. Upon releasing the mouse button, the Window/Level setting will be automatically calculated. The User may resize the box at any time by selecting the Smart Box by one of the corners, and dragging to the desired size. The User may also move the Smart Box around the image to yield different Window/Level settings by clicking and dragging from the middle of the Smart Box. To hide the Smart Box and apply the settings, click the Smart Box button in the tool bar. The User may re-draw the Smart Box at any time by deselecting then re-initiating the tool.

## Zoom



The Zoom tool allows the User to alter the on-screen magnification level of the image. To use the Zoom tool, first select it from the pop-up menu on the left-hand side of the screen. Then move the mouse cursor over the image and move towards the top of the image to increase the zoom level, or towards the bottom of the image to decrease the zoom level.

## Synchronized Zoom



The Synchronized Zoom tool allows the User to match magnification levels when viewing multiple images side by side in multi-tile mode. In multi-tile mode, the currently selected image in the group is highlighted. When you select this tool, all other images will magnify to the same level of magnification as the highlighted image. Additionally, when this tool is selected, any magnification changes on the highlighted image will also modify the magnification level of all other images.

## Pan



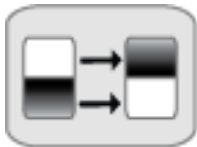
The Pan tool allows the User to move the image to different positions on the screen. To use the Pan tool, first select it from the pop-up menu on the left-hand side of the screen. Then click and drag the image until the desired region is visible.

## Magnify



The Magnify tool provides a small window that displays a region of the image at increased magnification. To use the Magnify tool, first select it from the pop-up menu on the left-hand side of the screen. Move the mouse over the desired region of interest, then click and hold the mouse button, and the region of interest will be magnified. While holding the mouse button, the User may drag the magnified box to different areas of the image.

## Image Invert



The Invert Image tool allows the User to transpose the image data (invert black/white). To use the Image Invert tool, first select it from the pop-up menu on the left-hand side of the screen. Then click the Image Invert button. The image data will be inverted.

### Rotate Clockwise and Counter-Clockwise



The Rotate tools allow the User to rotate the image in 90° increments. To use the Rotate tools, first open the pop-up menu on the left-hand side of the screen. Then click either Rotate Clockwise or Rotate Counter-Clockwise until the desired rotation is achieved. A single mouse click on the Clockwise or Counter-clockwise button will rotate the image 90°.

### Flip Vertical and Horizontal



The Flip tools allow the User to invert the image, either horizontally or vertically. To use the Flip tools, first open the pop-up menu on the left-hand side of the screen. Then click either Flip Vertical or Flip Horizontal until the desired orientation is achieved.

### Crop



The Crop tool allows the User to discard unwanted information around the edges of the image (usually collimation). When the crop is confirmed, the image is copied, then cropped, resulting in the new, cropped image. Additionally, the image can be reprocessed after being cropped.



#### Note:

Mammography images cannot be cropped.

To use the Crop tool:

1. Select the Crop tool from the menu on the left-hand side of the screen.
2. Click, hold, and drag the box to the desired size.
3. Click the **Confirm** button to apply the crop.

The image is cropped.

### Predefined Crop



The Predefined Crop tool allows the user to discard unwanted information around the edges of the image, similar to the Crop tool. Selecting the tool allows you to select a specified crop size entered into the scan software beforehand. This will create a crop box that can be dragged and repositioned. When satisfied with the crop position, the user can select Confirm. The user also has the option of reprocessing the image after it is cropped.




#### Note:

The user can set crop sizes in Configuration. See [Predefined Crop Boxes](#) on page 84.






## Image Masking Tool



The Image Masking tool allows the User to hide any collimation or undesired artifacts around an image without discarding image data.

 **Note:** The way the mask is embedded in the DICOM file depends on the **Target Type** setting **Edit AET** screen located at **Configuration > DICOM**. If the mask does not show up when sending to PACS, adjust this setting.

1. Select the Masking tool from the pop-menu on the left-hand side of the screen.

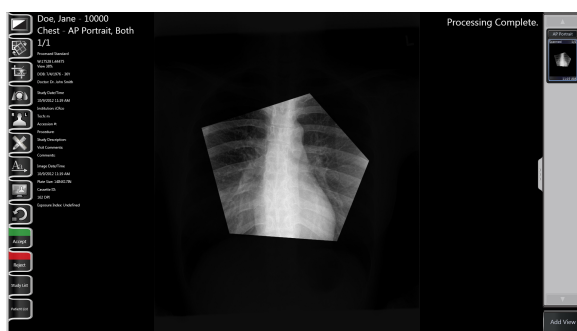
There is the option to select one masking box , two masking boxes , three masking boxes , polygon masking , or auto masking .

2. Click and drag the Masking Box to the desired size.

Upon releasing the mouse button, the outer portion of the Masking Box is masked out.

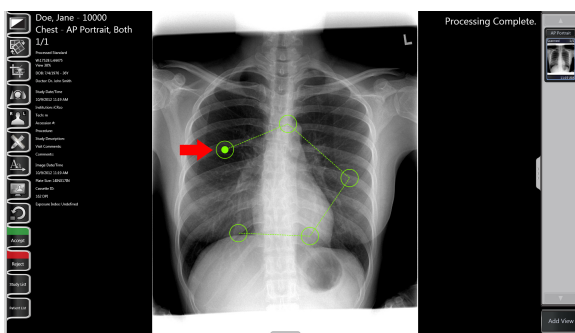


3. The Polygon Masking tool allows the User to create a custom-shaped mask rather than the standard box-shape.



To use the tool, the User simply clicks sequentially the corners of the polygon the User wishes to create. Additionally, the User can change the placement of a corner by holding and dragging it. To finish the shape, the User should click on the original starting point.





4. The Auto Masking tool will attempt to create a custom-shaped mask around an object in the study. If the mask is not satisfactory, click the Auto Masking icon to remove it.

To hide the Masking Box, click the Forbidden Mask button in the tool bar.

To remove a mask, click the **Reset** button.

### Image Stitching



See Section [Image Stitching](#) on page 53


### ICE2 Processing



The ICE2 Processing allows the User to apply different image enhancements to the image.

By default, every image receives Standard processing . If the Standard processing is not adequate, the User may reprocess the image to suit their needs.

The Soft process  will yield a more "film-like" image, i.e., finer tonal gradation with less sharpness, while the

Sharp process  will yield an image with more contrast and greater edge sharpness.

To use ICE2 Processing, first open the pop-up menu on the left-hand side of the screen. Then click the desired processing button. Depending on the computer speed, the process may take a minute. The progress is shown in the image thumbnail on the right-hand side of the screen (while the image is being processed, it will say "processing" in the lower, left-hand corner of the image thumbnail).

### No Skin Line Detection Processing



The No Skin Line Detection Processing allows the user process mammography images without skin line detection. The tool is available only when a mammography image is displayed in the Image Display Window. To use No Skin Line Detection Processing, first open the pop-up menu on the left-hand side of the screen. Then click the shaded breast button. Depending on the computer speed, the process may take a minute. The progress is shown in the image thumbnail on the right-hand side of the screen (while the image is being processed, it will say ``processing" in the lower, left-hand corner of the image thumbnail).

### Horizontal Grid Line Removal



If a grid has been used in the horizontal orientation, click **Horizontal Grid Line Removal** to run the grid line removal processing.

### Vertical Grid Line Removal



If a grid has been used in the vertical orientation, click **Vertical Grid Line Removal** to run the grid line removal processing.

### CR Markers



CR Markers allow the User to place an **L** or **R** marker on the image to indicate the laterality. To use a CR Marker, first open its pop-up menu from the left-hand side of the screen. Then click where the marker should be. There are three different sizes of marker. The User may toggle through the size by clicking on the marker again. At any time, the User may click, hold, and drag to reposition the marker.

### Measurement



The Measurement tool allows the User to draw a line with a linear measurement on the image. To use the Measurement tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the measurement line to the desired length and position. Release the mouse button when the measurement line is sufficient. The measurement will appear next to the line.

## True Size Calibration Tool



The True Size Calibration Tool allows the user to calibrate image measurements based on an object of known size in the image.

To use the True Size Calibration Tool:

1. Place an object of known size at the level of the anatomy for calibration.
2. Expose the cassette and scan the image.
3. Select the True Size Calibration Tool from the tool from the pop-up menu.
4. Click, hold, and drag out the line over the object of known size.

The Calibration dialog box will appear.

5. Enter the size of the known object in the Calibration Value input field, then click **Confirm** button.

All measurements on the image will be calibrated to the true size.

## Angle



The Angle tool allows the User to draw an angle with the interior measurement on the image. To use the Angle tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the first leg of the angle to the desired length and position. Release the mouse when the first leg is sufficient. Click the mouse again at the point where the second leg of the angle should end. The second leg of the angle will be drawn and the measurement displayed at the vertex. At any time, the User may click the end of either leg or the vertex and readjust the position of the angle.

## Cobb Angle



The Cobb Angle tool allows the User to draw a Cobb Angle with an angle measurement on the image. To use the Cobb Angle tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the first line of the Cobb Angle to the desired length and position. Release the mouse button when the length and position are sufficient. For the second line of the Cobb Angle, click, hold and drag out the line. Release the mouse button when the length and position is sufficient. At any time, the User may click the end of either line and readjust the position of the angle.

## Center Point



The Center Point tool allows the User to define two points on the image, with a third point the center mark. To use the Center Point tool, first select it from the pop-up menu on the left-hand side of the screen. Click once where the first

point should be and once where the second point should be. A third point will appear marking the center point on the line. At any time, the User may select either end point and readjust the position.

### Heart to Lung Ratio



The Heart to Lung Ratio tool allows the User to measure the heart to lung ratio on an image. To use the Heart to Lung Ratio tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the first line of the Heart to Lung Ratio to the desired length and position. Release the mouse button when the length and position are sufficient. For the second line of the Heart to Lung Ratio, click, hold and drag out the line. Release the mouse button when the length and position is sufficient. At any time, the User may click the end of either line and readjust the position.

### Vertebral Heart Score (VHS)



The Vertebral Heart Score is a heart ratio utilized for veterinary applications. To determine the ratio:

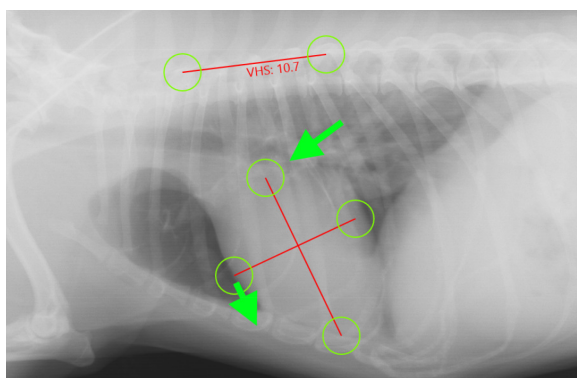
1. Select the VHS tool from the pop-up menu on the left-hand side of the screen.
2. Click, hold, and drag out the first line along the short axis of the heart.
3. Click, hold, and drag out the second line along the long axis of the heart.



**Note:**

If preferred, it is possible to mark the long axis, and then the short axis.

4. Click, hold, and drag out the third line along five (5) of the vertebrae.
5. If needed, adjust the lines by clicking and holding the end of a line and dragging the end to the desired location.



6. The VHS measurement (calculated from the three lines) will appear underneath the vertebrae line.



**Note:**

This tool is only available in Veterinary mode.

## Units of Measurement



The Units of Measurement allow the User to toggle the displayed unit of measurement between inches, millimeters, and pixels. To change the unit of measurement, open the pop-up menu on the left-hand side of the screen. Then click the desired unit of measurement. The unit of measurement will change to reflect the selection.

## Erase Annotations



The Erase Annotation tool allows the User to erase a single annotation at a time. To erase an annotation, first select it, then click **Erase Selected** button from the pop-up menu on the left-hand side of the screen.

## Erase All Annotations



The Erase All Annotations tool allows the User to erase all annotations made on an image. To erase all annotations, click **Erase Selected** button from the pop-up menu on the left-hand side of the screen.

## Arrow



The Arrow tool allows the User to draw an arrow on the image. To use the Arrow tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the arrow to the desired length and position. Release the mouse button when the arrow is sufficient.

## Text Annotation



The Text Annotation tool allows the User to write text on an image. To use the Text Annotation tool, first select it from the pop-up menu on the left-hand side of the screen. Then click in the where the text should appear on the image and enter the desired text. Press the Enter key to finalize the entered text.

### Pre-defined Text Annotation



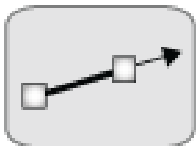
The Pre-defined Text Annotation tool allows the User to apply pre-set text to the image. To use the Pre-defined Text Annotation tool, select it from the pop-up menu on the left-hand side of the screen, then select the desired pre-defined text. Click in the desired location on the image, and the pre-defined text will be applied.

### Line



The Line tool allows the User to draw a line on the image. To use the Line tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the line to the desired length and position. Release the mouse button when the line is sufficient.

### Extended Line



The Extended Line tool allows the User to draw a line on the image that extends all the way through the image. To use the Extended Line tool, first select it from the pop-up menu on the left-hand side of the screen. Then click, hold, and drag out the line to the desired position. Release the mouse button when the line is sufficient. A line will be drawn all the way through the image.

### Hide/Show Annotations



The Hide/Show Annotations tool allows the User to show or hide the annotations for the current image. To use the Hide/Show Annotations tool, first open the pop-up menu on the left-hand side of the screen. Then click the Hide/Show Annotations button to hide or show the annotations on the current image.



#### Note:

If annotations are hidden, no new annotations can be made on the image. To make a new annotation, make sure the annotations are not hidden.

### Information Overlay



The Overlay tool allows the User to show/hide the patient information associated with the image currently being viewed. To use the Overlay tool, first open the pop-up menu on the left-hand side of the screen. Then click the Overlay button until the desired amount of patient information is displayed on screen.

### Reset Image

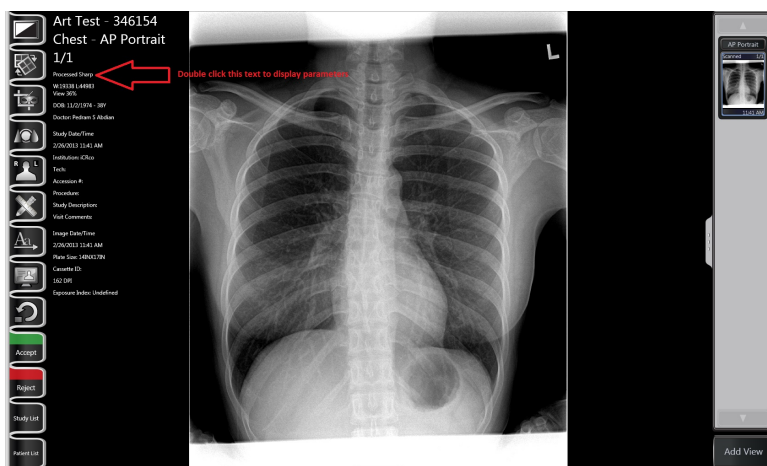


The Reset Image tool allows the User to remove any Window/Level, magnification, and rotation from the image. To use the Reset Image Tool, left mouse click the button in the pop-up menu on the left-hand side of the screen.

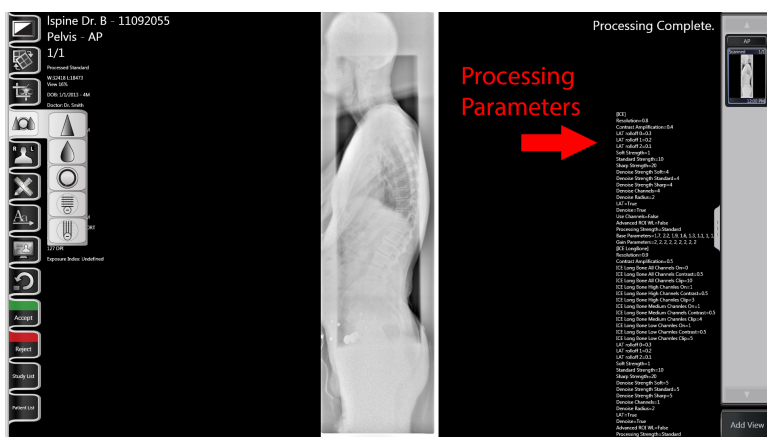
## Processing Parameters

The Processing Parameters are various selected settings used for image processing.

To view the processing parameters of a specific image, double click on the white, study description text located to the right of the image tools.



This will display the processing parameters, which will appear on the right side of the screen.

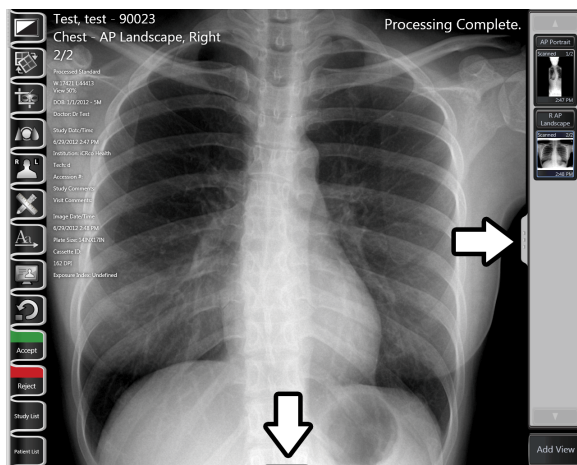


To modify the Processing Parameters, see Section [Processing Parameter Evaluation](#) on page 92.

## Multi-Tile Mode for Side by Side Image Acquisition and Comparison

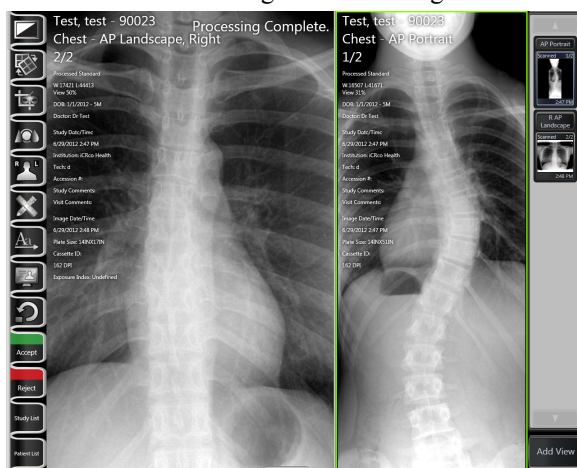
XC employs a feature called multi-tile display which allows the user to perform side by side image acquisition and comparison. The multi-tile display is available in the Image Display Window.

- To activate a 2 x 1 multi-tile display, drag one of the gray buttons located on the edge of the image thumbnail gallery to the center of the screen.



Similarly, to activate a 2x2 multi-tile display, drag both buttons to the center of the Image Display Window.

- To resize the multi tile window, click on the horizontal line or vertical line seen on the Image Display Window and drag to the desired position.
- To perform image acquisition, select one of the multi-tile window and the window border will turn green. Click the Add View button to perform image acquisition for the selected window.
- To display an image, select one of the multi-tile window and the window border will turn green. Then, click on the desired image from the image thumbnail gallery to load the image onto the window.



### Note:

If XC is connected to two scanners, the user can select another multi-tile window and successionaly perform side by side image acquisition.

## Multi-Touch Gestures

For touch screen interface users, XC employs multi-touch gestures to ease the user in navigating through the software and perform actions.



The available multi-touch gestures for XC include: One Finger Tap Two Finger Swipe Two Finger Rotate Two Finger Pinch and Stretch Three Finger Drag



**Note:**

The user must have a touch screen with multi-touch gesture support in order to utilize this feature.

### One Finger Tap

A one finger tap is used to select an object similar to how the user uses the mouse to click on an object.

### One Finger Scroll

A one finger scroll is used to scroll through the patient's list or study list in the Patient List Window or Study List Window.

A scroll is a vertical movement.

### Two Finger Swipe

A two finger swipe is used in the Image Display Window to navigate previous or next image in a series.

A swipe is a horizontal movement.

### Two Finger Rotate

A two finger rotate is used in the Image Display Window to rotate an image clockwise or anti clockwise.

### Two Finger Pinch and Stretch

A two finger pinch and stretch is used in the Image Display Window to zoom in or out on an image.

### Three Finger Drag

A three finger drag is used in the Image Display Window to pan an image.

## Image Stitching

---

The stitching operation allows you to stitch two images together vertically. You can stitch together more images by repeating the process.



**Note:**

Before stitching, acquire the two images to be stitched together. One of the acquired images will be the top portion of the stitched image and the other will be the bottom portion.

1. Open the Study in XC.
2. Load the two images in the viewing window by dragging and dropping them in the window. Place the images in the appropriate display region.



**Note:**

You can adjust the grid positions by dragging the grip handle tabs found at the right edge and bottom of the screen.



3. Click on the “Crop and Mask” icon (3rd from top) from the main menu, and then click the stitch icon. The stitching tool dialog box will appear.

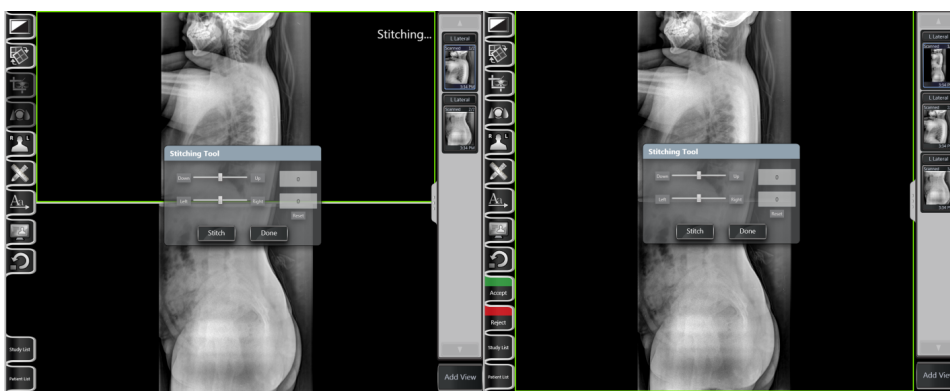


**Note:**

If the dialog box does not appear, you will need to go back to Step 1 and load the images in the correct positions.



4. Click the **Stitch** button. The images software will stitch the images together.



5. If the images are not aligned properly, use the **Stitching Tool Coordinate System** to adjust the stitching location.



**Note:**

To adjust the stitching location, use the four directional buttons (Down, Up, Left, Right) to shift the image. Alternatively, adjusting the sliders or entering coordinates in the text fields will move the image.

When the image has been shifted to the desired location, click **Stitch** to redo the image stitching.



**Note:**

It is possible to move the **Stitching Tool Coordinate System** window.



**Note:**

**Do Not** click **Done** until you are satisfied with the stitching location.

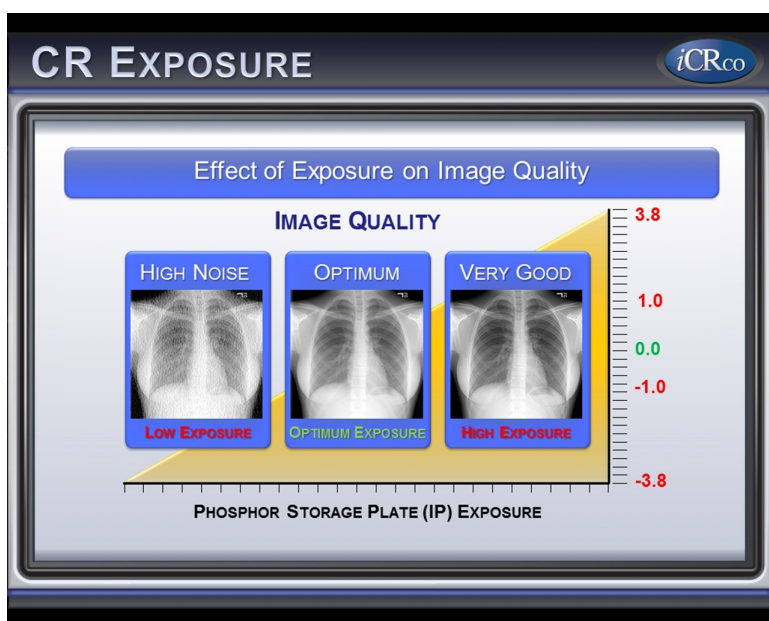
6. Click **Done** to finalize the image stitching.

## Exposure Index

Since light or dark images (optical density) are no longer a factor with CR, users are often unsure of exactly what exposure factors to use. The calibration of a good exposure index can clear that confusion by indicating when optimal energy (exposure) is acquired by the IP (Imaging Phosphorus Plate). The iCRco Exposure Index is a user friendly guide to help users develop a working technique chart that is specific to the output of the x-ray machine.

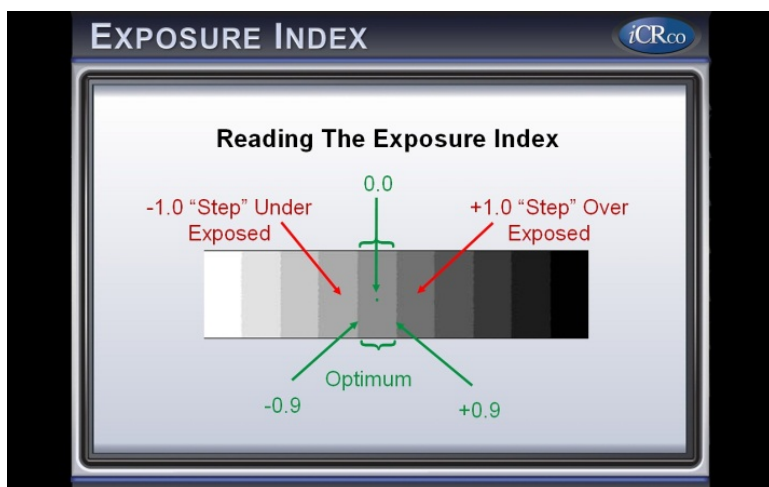
### How It Works

The iCRco Exposure Index is a pre-determined, factory calibrated energy level “sweet spot” that is a compromise between signal (exposure factors) and noise (image grain); in other words, the greater the signal the lesser the noise and vice versa. Hence, observing the exposure index allows the user to work to an ALARA (as low as reasonably achievable) exposure requirement while keeping image noise to a tolerable level.



### Reading the Exposure Index

The exposure index is documented in the Patient Information Overlay as a positive or negative number that is red if it is over the value of 1.0 (positive or negative), and green if it is within 0.0 to 0.9 (positive or negative).



### Adjusting Exposures Based On the Exposure Index Data

Users should consider the exposure index value equivalent to steps in conventional film density or a percentage of exposure technique values. For example; a value of 1.5 is equal to +1.5 steps in conventional film density or 150% more than the ALARA optimal exposure energy for CR. Conversely, a value of -1.5 is equal to -1.5 steps in conventional film density or 150% less than optimal exposure energy for CR. Exposure Index values of 0 to +/- 0.9 are within the target range for energy (exposure) to the IP.

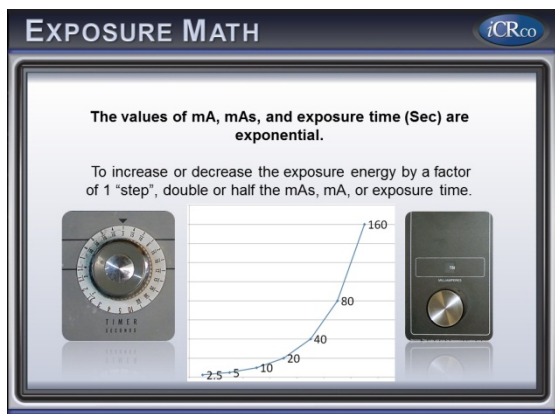


#### Note:

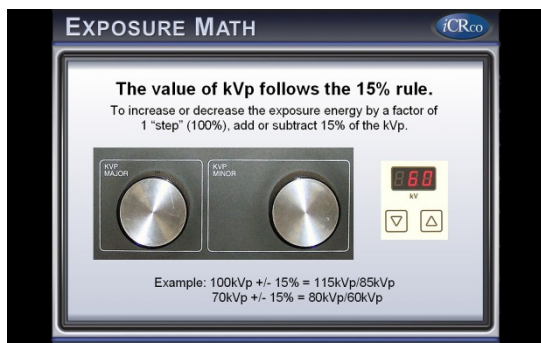
As indicated above, the ALARA requirement does allow for some image noise to maintain minimal exposure values; therefore, users will note decreased noise levels in the positive ranges of the exposure index (0.3 to 0.9) while avoiding the pit falls of "Dose Creep" that is often associated with CR and DR. Conversely, users will note increasing levels of image noise in the lower (negative) ranges of the Exposure Index values (-0.3 to -0.9).

## A Word on Exposure Math

The values of mAs, mA and exposure time are exponential, for example; to increase or decrease the exposure energy by an Exposure Index factor of 1 (100%), double or half the mAs, mA or exposure time.



The values of kVp follow the 15% rule. In other words, to double or half the exposure energy with kVp, add or subtract 15% of the total kVp. For example; to increase or decrease the exposure energy by an Exposure Index factor of 1 (100%), add or subtract 15% of the kVp: 100kVp -15% = 85kVp, 60kVp +15% = 69kVp.



## Deviation Index

The Deviation Index is used specifically for mammography. To follow ACR guidelines, MQSA guidelines, and ALARA, optimal image quality and limited exposure is required for all mammography images.

The Deviation Index provides a reference to the user on the acceptability of the imaging plate dose in relation to the type of exposure. Like the Exposure Index, the Deviation Index can help a user develop a technique chart for the user's X-ray machine.

### How It Works

The Deviation Index is a predetermined, factory-calibrated, energy-level "sweet spot" based on the exposure of an ACR MAPP phantom that results in optimal image quality that passes testing at the lowest possible dose.

### Reading the Deviation Index

The Readout of the Deviation Index serves as an image quality metric; generally, a positive value indicates over-exposure, while a negative value indicates under-exposure.



#### Note:

If exposing a breast that is larger or smaller than a 4.0-4.2 cm breast, positive and negative values may not correspond to over-exposure and under-exposure, respectively.

A site is required to develop its own technique chart upon installation of the system so that a user can reference the expected DI value for various dose readings.

Below is an example of a Technique Chart.



**Note:**

The example chart and data should not be used for clinical interpretation.

**Table 1: Example Technique Chart**

Breast Thickness	Composition	Target	Filter	kVp	Density	Optimal DI Readout
< 3 cm	50/50	Mo	Mo	26	-2	-1
3-5 cm	50/50	Mo	Mo	28	-1	0
5-7 cm	50/50	Mo	Rh	29	0	2
> 7 cm	50/50	Mo	Rh	30	1	3

The installation site can determine how precise the thickness, composition, and exposure settings should be in the Technique Chart.

The user should check the Optimal DI Readout for all clinical exposures.

A DI is considered acceptable if it is within one step of the Optimal DI Readout. For example, if XC outputs a DI value of 4 for a 5-7 cm breast at 29 kVp and the Optimal DI Readout value is 2, then the plate was over-exposed since the DI value is two steps away from the Optimal DI Readout value.

### Adjusting Exposure Based On the Deviation Index Data

Deviation Index =  $10 * \log_{10}(\text{Measured Dose} / \text{Expected Dose})$

Each +1 increment of the Deviation Index indicates a 25 percent increase in dose, while each -1 increment indicates a 20 percent decrease in dose.

#### For Example:

Let's say the Expected Dose is 20 mR. An exposure gives us a plate dose of 40 mR and a DI readout of 3.

If a DI of 4 is needed:

1. Increase the exposure by 25 percent ( $40 * 0.25 + 40 = 50$  mR total)

If a DI of 2 is needed:

1. Decrease the exposure by 20 percent ( $40 - 40 * 0.2 = 32$  mR total)

If a DI of 0 is needed, the calculations will need to be performed one step at a time:

1. Decrease the exposure by 20 percent ( $40 - 40 * 0.2 = 32$  mR) (DI of 2)
2. Decrease the Step 1 exposure by 20 percent ( $32 - 32 * 0.2 = 25.6$  mR) (DI of 1)
3. Decrease the Step 2 exposure by 20 percent ( $25.6 - 25.6 * 0.2 = 20.48$  mR) (DI of 0)

### A Word on Exposure Math

It's possible to adjust the level of exposure delivered to the plate by modifying the kVp, mAs, or exposure time.

Increasing the mAs by 25 percent will also increase the exposure level by 25 percent.

Increasing the kVp by 15 percent will increase the exposure level by 100 percent (this is known as the 15 Percent Rule). Increasing the kVp by 3.75 percent will increase the exposure level by 25 percent and decreasing the kVp by 3 percent will decrease the exposure level by 20 percent.



## Advanced DICOM Printer

### Selecting Studies for Printing

1. In order to launch Print Tool. Select a patient from the worklist.
2. On the **Studies** screen, click **Send Study > Print Study > Send Images to Print Tool** button. The Print tool will be launched.

Alternatively, it is possible to print using a paper printer by selecting the **Paper Print** button in the **Print Study** tab.

### Drag and Drop Images


To drag images into the print region hold the left mouse button down on one of the image icons on the right hand side and drag it into the preview window. A dragging cursor will appear  as the user drags the image from the image icon window to the preview window. If the user is out of the accepted region for dropping, a cursor  will appear letting the user know that this is not a correct region to drop the image into.

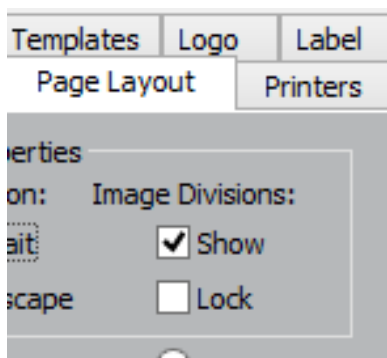


### Split the Preview Window into Regions

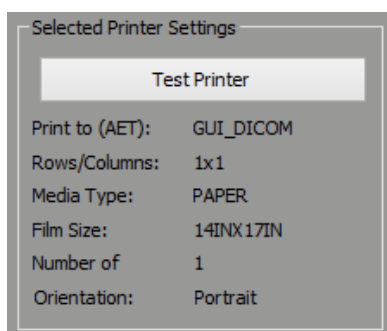
To split the preview window the user needs to first select the region to split. For example, if there are currently no divisions in the preview window then click anywhere in the preview window and a green line will appear around the window. This will enable the image division buttons. Alternatively, the user can press **Shift+right mouse click** inside the preview window region to split it. A pop-up menu will appear with these division buttons (as the image to the right shows).



Select one of the image division buttons and the preview window will be divided into regions. To split one of these regions again select the specified region and again select one of the image division buttons. The user can drag and drop images at any stage. If the user has an image in the region that is desired, the interface will automatically move the image into the split regions. To remove a division, click in the region that has been split and click on the no-division  button.

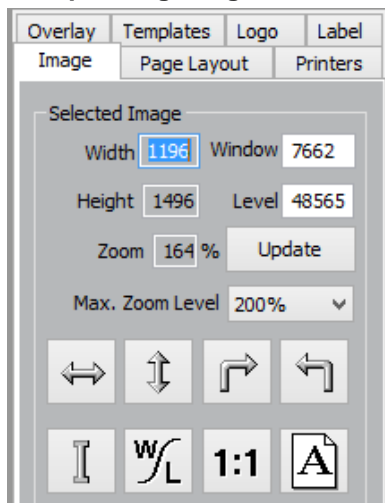


The user can show and hide the image divisions by clicking on the **Page Layout** tab, then click **Show and Lock** under **Image Divisions**. The user can view the current print settings by looking at the left hand side of the **Advanced DICOM Printer** dialog. To change these settings, or to view more settings, click on the **Printers** tab.





## Manipulating Image in the Preview Window



The Advanced DICOM Printer allows the user to flip, rotate, zoom, pan, invert and window/level images. To manipulate the images select the image in the preview window (the selection will be shown by the green box surrounding the image).

The user can flip, rotate and invert by using the buttons on the left hand side of the DICOM Printer dialog.

The user can zoom by using the right mouse button on the selected image.

To pan the image use the left mouse button on the selected image.



### Note:

The User can only pan the image when it is zoomed in.

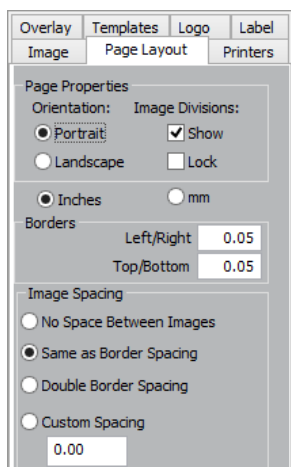
To window/level the user can either use the middle scroll button on the mouse or type the required window/level into the edit boxes on the left hand side of the **Advanced DICOM Printer** dialog. Then press the **Update** button to change the window/level for the image.

The user can also press the **1:1** button to print images at 1:1 resolution.

The user can use the **Orientation** button to change from landscape to portrait view.

## Changing Margins

The margin tab permits the user to specify, in English or metric units, the size of the borders on the printed image. The top and bottom borders on the page can be adjusted independently of the borders for the left and the right hand side of the page.



Additionally, the user has the option to control the internal margins, which define the amount of space left between individual frames on a page with multiple images. Internal margins are defined as multiples of the print page border size.

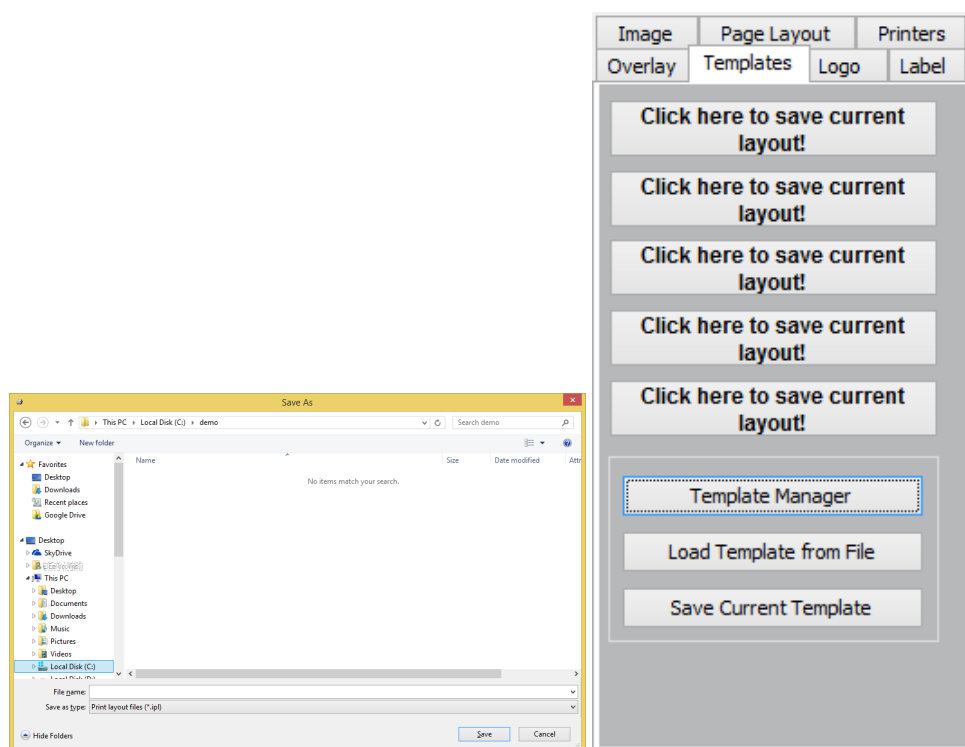
By default, internal margins are the same size as the borders, with image margins on, the left and right hand side of each frame are equal to the left and right hand borders. Margins on the top and bottom of each frame are equal to the top and bottom borders of the printed page.

If the user intends to cut individual frames out of the printed page, it is recommended that internal margins are set to twice that of the page, which will give a uniform border size on the individual image segments. If it is necessary to maximize the amount of space on the printed page, the internal margins can be turned off altogether.

## Saving and Loading Print Layouts

The **Templates** tab allows the user to save and load pre-defined print layouts. There are five user defined layouts. Set up the layout on the preview window and then select one of the buttons labeled **Click here to save current layout!** The user will be prompted for a title.

To save more layouts click on the **Save Current Template** button. Here the user can set a file name for the Layout.



If only a single procedure was loaded (all of the images are from the same procedure) and a layout was applied to the print of the procedure, then the layout will be saved when the user prints the image.

The next time the user loads this procedure, Print Tool will apply the saved layout.



### Note:

Images will be positioned based on anatomy and laterality.

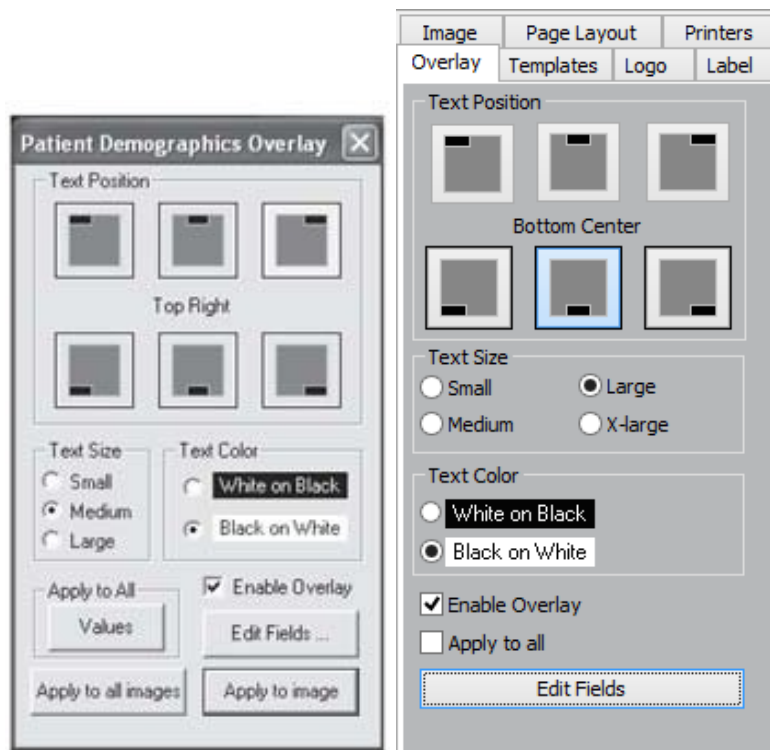
## Adding Patient Demographics

Select the **Overlay** tab to bring up the patient demographic layout options.

From here, the User can select:

- Text position (includes top left, top center, top right, bottom left, bottom center, bottom right),
- Text size (includes: small, medium, large),

- Text color (includes: white on black, black on white).



he user has the option to apply the current settings to every image in the print view or only in the currently selected image via the **Apply to all images** button or the **Apply to image** button.

By selecting the **Enable Overlay** check box the user can turn patient demographics overlay on and off for all images. The user can also edit the fields that are available on patient demographics overlay by clicking on the **Edit Fields** button.

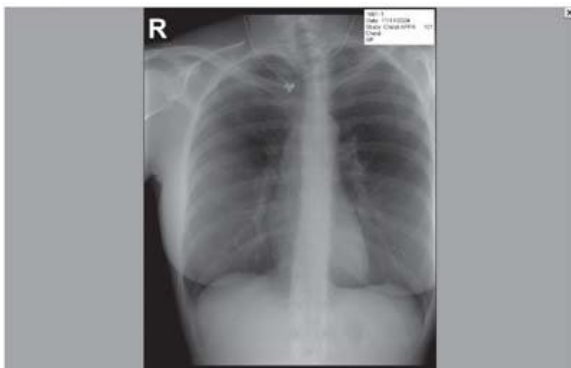
From here, the User can:

- Select a field and determine what kind of a delimiter following the field (includes: none, space, tab, comma, newline, custom).
- Change the position of the fields with the up and down arrows.
- Remove or display a field by selecting the Print Field check.
- Print the title for the field (i.e. the title "Date:" would be printed in front of the date field).

After editing the fields, click the **Done** button.

## Print Preview

To see a print preview, click the **Print Preview** button.

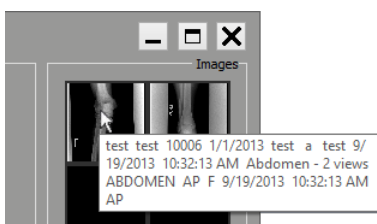


### Printing Images to a DICOM Printer

When the user has finished dragging and dropping the desired images onto the preview window and manipulating size, position and window/level (if necessary), then press the **Print** button in the bottom left hand corner of the **DICOM Printer** dialog. Please ensure all the printer settings are correct first.

### Patient Demographics for Icons

When the cursor is over the icon bank, Advanced DICOM Print will display the demographics for the image.

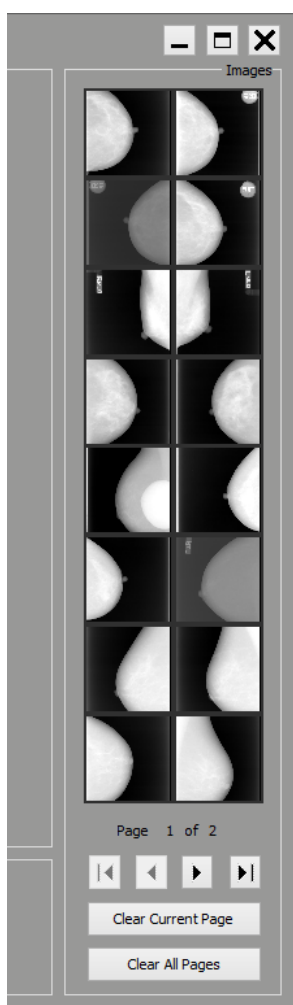


### Multiple Icon Pages

Advanced DICOM Print has an unlimited number of icons that can be loaded. However, the PC's memory is a restriction.

To clear the current page of icons, click on **Clear Current Page** button. To clear all the pages of icons and preview window, click on **Clear All Pages** button.

To move between pages and move to first and last pages click on the arrow buttons.



## Configuring a Printer with the QPC Print Tool

The following section demonstrates how to setup a DICOM film printer with the QPC Print Tool.

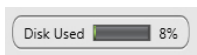
1. Open the QPC Print Tool.
2. On the Printers tab, select the **Settings** button.  
The DICOM Print Settings window will appear.
3. Select the printer make and model from the **Printer** drop-down menu. If the make and model of your printer is not available, select **Standard Printer**.
4. Select the "... " next to AET.  
The Image Targets window will appear.
5. In the Image Targets window, select **Add New**.
6. Enter the target system's AET, IP address, and port number. Ensure the compression is set to "none" and the Target Type is "DICOM".  
Click **OK**.
7. In the Image Targets window, select the target you just created, then select the **OK** button.  
In the DICOM Print Settings window, select the **OK** button.
8. In the Advanced DICOM Printer window, select the **Printer 1** button (or the applicable printer), then select the **Test Printer** button to test the association to the printer.

## Status and Icon Indicators

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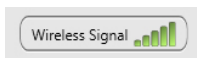
XC has many status icons and status indicators. The following section describes those indicators.

### Hard Disk Indicator



The hard disk indicator shows the user how much disk space has been used. It can be located on the Worklist screen.

### Wireless Indicator



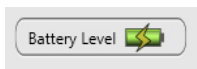
The wireless indicator allows the user to see the strength of the computer's wireless connection. It is positioned on the top right corner of XC's window when the computer is on wireless connection.



#### Note:

The wireless indicator is not displayed in the Image Display window.

### Battery Indicator



The battery indicator currently only shows with the Vmotion hardware is in use. The battery indicator allows the user to see the strength of the computer's battery. It is positioned on the top right corner of XC's window, to the right of the wireless indicator when the computer is powered by battery. When the battery is critically low, the computer will be shutdown.

Note: The battery indicator is not displayed in the Image Display window.

### Patient Status Icons

The Patient Status icons quickly tell the user what phase the patient study is in. The Status icon can be one of

#### 1. Scheduled



#### 2. Stat



#### 3. In Progress



#### 4. Finished



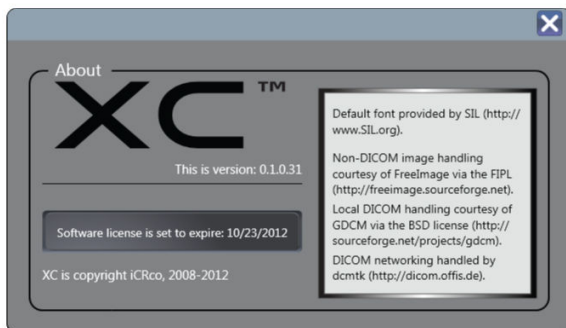
The user may cycle through the available status by clicking the Status button in the Studies window.

## License and Version Information

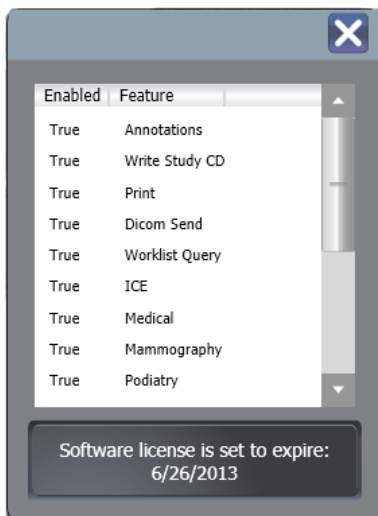
The user can find the XC version number and licensing information by clicking **iCRco**.



The About window will pop-up.



Clicking **License Info** shows what modules are enabled on the USB security dongle.







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# Chapter

# 5

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## Managing Patient Data

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### Creating Patients

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1. From the **Patient List** window, click the **Schedule Patient** button.
2. Fill in the desired patient information.



**Note:**

Required fields are marked with an asterisk (\*). Last Name, First Name, Referring Physician, Patient ID, date of birth, and Institution are required fields.



**Note:**

Fields with green titles can be used as Modality Worklist Query fields. For more information on Modality Worklist Query, see Section [Setting Up Modality Worklist Query](#) on page 90

3. Click the **Finish** button to return to the **Patient List** window, or click the **Finish And Scan** button to begin the process of scanning an image.

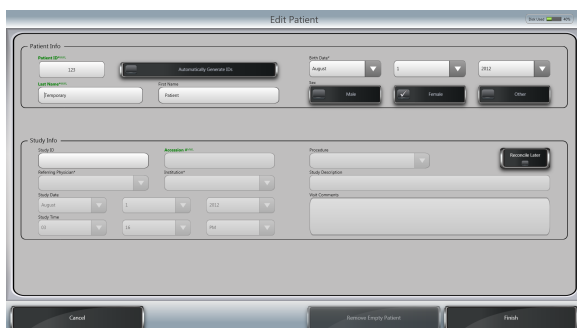
**Figure 2: XC's Patient Data Entry Screen**

## Editing Patient Information

1. Locate the desired patient in the **Patient List** window.
2. Click the desired patient's **Patient Information Bar**.



3. In the **Study Information** window, click the **Patient Information Bar** again.
4. Edit the desired information.



5. Click the **Finish** button to save the changes and return to the **Study Information** window.

## Editing Study Information

1. Locate the desired patient in the **Patient List** window.
2. Click the desired patient's Patient Information Bar.
3. In the **Study Information** window, click the **Study Information Bar**.



4. Edit the desired information.

5. Click the **Finish** button to save the changes and return to the **Study Information** window.

## Exporting Data

1. In the **Patient Information** window, click the desired patient.
2. In the **Study Information** window, locate the study to export.  
Click the **Send Study** button. This will bring up the **Export** window.
3. From the **Export** window, the User may: Export to Disk, Write Study CD, Print Study, or DICOM Send.

### Export to Disk

1. In the **Export** window, click the **Export to Disk** button.
2. Select the drive (USB drive, or other system partition) to export to in the **Select Drive** drop-down menu.
3. Select **DICOM**, **JPEG**, or **TIFF** as the export image format.  
If necessary, select the **Anonymize** button.
4. Select the drive to export to.
5. Click the **OK** button to export the study.

### Write Study CD

1. In the **Export** window, click the **Write Study CD** button.
2. In the **Select Device** drop-down menu, select the CD/DVD drive.
3. Load a CD/DVD into the drive.
4. Click the **BURN** button.
5. Depending on the number of files being exported, the speed of the system, and the speed of the burning device, this operation could take a few minutes. Please be patient while the CD/DVD burns.

### Print Study

1. In the **Export** window, click the **Print Study** button.
2. The print application will open and load the images from the study to print.



#### Note:

See Section [Advanced DICOM Printer](#) on page 59 for more information about the Advanced DICOM Print application.

### DICOM Send

1. In the **Export** window, click the **DICOM Send** tab.

2. Select the check box next the desired AE Title(s).
3. Click the **OK** button to initiate the DICOM send.

## Rejecting an Image

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When an image is unsuitable for a diagnostic reading, the User should reject the image. The image may be rejected for many reasons: patient movement, wrong image in patient folder, operator error, etc.

1. Acquire or open an image.
2. Click "Reject" button at the bottom left hand side.
3. Select the reason for the the rejection and click "Confirm".

The image will be removed from the study and added to the Image Rejection Report in XC and the QC Tool.

## Removing Single Patients

---



### Note:

A patient can only be removed if it contains ZERO studies.

Reject or move the images to remove them from the study.

1. From the Patient List, select the patient to be removed.
2. In the **Study Screen**, click the **Patient Information** bar to open the **Edit Patients** screen.
3. In the **Edit Patient** screen, click the **Remove Empty Patient** button.

A conformation dialog box will open. To remove the patient, click **Yes**. If successful, the User will be returned to the **Patient List** window.

## Removing All Patients

---



### Important:

Once removed, patient data is not recoverable. Perform a back-up before removing any patient data.

1. Ensure that Hidden Files and Folders are viewable, as covered in [Showing Hidden Files and Folders in Windows](#) on page 101.
2. Navigate to the iCRco XCfolder.
  - On Windows XP, the path is C:\Documents and Settings\All Users\Application Data\XC\.
  - On Windows 7, the path is C:\Program Data\XC\.
3. In the XC folder, delete the folders **Patients** and **Studies**, and the content of both folders.

## Querying a Worklist

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XC can be configured to automatically query a DICOM Modality Worklist Server (See Section [Setting Up Modality Worklist Query](#) on page 90 for more information on configuration). The worklist can then be queried by any green field on the Patient Scheduling screen. The query can be based on any of the green fields or a combination of green fields:

1. In the Worklist Query fields at the top of the Patient Information screen, enter the desired search criteria.

For example, to query by Patient Name, enter part or all of the patient's name into the LAST NAME search box. To query by Accession Number, enter the Accession Number into the ACCESSION NUMBER search box.

To query by a combination of values, enter the desired search criteria into more than field.

2. Click the **Query Worklist** button to initiate the query.

- If there are multiple matches, the results of the query will be displayed in the **Worklist Query Results** dialog. Then select an entry from the results and click **Use Selected**. The information from the selected entry populates the Schedule Patient data fields.



**Note:** In the Query Results dialog, the list can be sorted by clicking column headers and the columns can be reordered by clicking and dragging. The new column order is saved.

- If there is only one result that entry is automatically used to populate data fields.



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# Chapter

# 6

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## Configuration

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### Configuration

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The **Configuration** window contains all of XC's preference & User settings.

Only Users with Administrative privileges can access the **Configuration > Admin** tab.



**Figure 3: XC's Configuration Screen**

### Configuration > DICOM

The **DICOM** tab holds all the DICOM target information, as well as configuration settings for DICOM Modality Work List Query and DICOM Auto-Send.

#### DICOM Setup

The **DICOM Setup** tab contains a list of AET's known to XC. From the **DICOM Setup** tab the User may add, remove, edit, and test AETs using the appropriate button.

#### Work List Inputs

The **Work List Query** tab allows the User to easily set DICOM Modality Work List Query. Check the box next to the desired AET, then choose the query interval.

#### Auto Send Targets

The **Auto Send Targets** tab allows the User to easily set DICOM Auto Send. Check the box next to the desired AET, and when an image is accepted, it will be automatically send to the checked target(s).

## Pending

The **Pending** tab provides the User with a list of files that have been scheduled to DICOM Send, but have not actually been sent yet. This is only a list of files, the User may not interact with anything on this tab.

Click **Clear** to remove all items from the **Pending DICOM Sends** list.

To DICOM Send, ensure the computer has the proper network connection and the **Auto Send Targets** tab has been correctly configured.

## Configuration > Device Settings

The Device Settings tab holds the settings for the scanner hardware and X-ray generator (optional).

### Device Settings

The **Device Settings** tab allows the User to know the serial number and scanner model attached to the computer system, the specification of the spot size for normal and high resolution scans, enable demo scans, deep erase IP Plates, and provides access to the hardware EEPROM dialog.

### For This Device

This drop-down menu allows the User to select the scanner model.

If you have multiple scanners, or multiple capture devices (such as the Fusion DCR or Fusion DCR Flat Panel) there will be multiple selections in the drop down menu. Each device in the drop-down menu can have it's own Alias, Plate Size, and Spot Size Settings.

### Alias

For each device, the User may assign it an alias, or another name to call the device. This name will show up as the device name in the Scan tab. This feature is useful if more than one scanning device or a multiple capture device (such as the Fusion DCR or Fusion DCR Flat Panel) is plugged into the computer.

For example, if the User has one Fusion DCR Flat Panel and one iDR Long Bone plugged into the same computer, the user could "alias" the Fusion CR as "CR Scanner," the Fusion DR Flat Panel as "DR Scanner," and the iDR Long Bone as "DR Long Bone." Each would show the "alias" name on it's respective tab on the Scan screen.

### Scan Preview

If checked, XC will display portions of the image as the plate is scanned. If unchecked, the program will wait until the scan is finished before displaying the entire image.

### Plate Size and Spot Size

Each plate size can hold it's own spot size settings for both normal and high resolution scans.

To set a plate and spot size:

1. Select the desired plate size from the **Plates sized** drop-down menu.
2. Select the desired spot size for both normal and high resolution using the **Spot Size** drop-down menus.
3. Click the **Close and Accept** button to save the changes.

### CR Settings

Only certified technicians should alter the CR Settings. Entering improper values may damage the hardware.

The **CR Settings** allows the User to view the Exposure Index information (System Speed, Alpha, and Mu values).

The **Advanced** button reads in the settings from the scanner's EEPROM, and allows the User to edit these values.



## Demo Settings

Turning on the **Enable Demo CR** option will allow the User to mock-scan an image without a scanner attached to the computer. An image from the demo images library will appear when scanned.

Turning on the **With CR Motor** option will also the user to cassetteless scan in demo mode a with a scanner attached. The scanner will then run the motor, but will not acquire an image from the plate; instead it will use an image from the Demo images library.

## X-ray Tubes

Allows the User to choose which generator interface and COM port to use. The Exposure Count section lists the number of exposures taken with the generator interface. Click the **Reset** button to set the exposure count back to zero.

## Exposure Count

The Exposure Count lists the number of exposures triggered via the generator interface.

Click **Reset** to change the exposure count to zero.

## Configuration > Settings

The Settings tab contains general application settings, such as language and units of measurement.

### Data Representation

The bit-depth of the DICOM file when it is DICOM sent or exported out of . Current options are: 16, 12, 10, or 8 bit.

### Look Up Table Type

The type of Look Up table that is embedded in the DICOM file when it is DICOM sent or exported out of . Current options are: Linear or Sigmoid. If Sigmoid is selected the DICOM Value-of-Interested Look-Up-Table (VOI LUT) entries are generated and stored in the DICOM header.

### Data Conversion Clipping Level

The level of noise removed from the data when the 16-bit data is scaled to a lower bit resolution (using the Data Representation drop-down menu). A lower number means more noise will be included when the data is scaled. A higher number means that some useful information will be clipped when the data is scaled. Only a certified Applications Specialist should adjust this parameter.

### Language

Sets the language of the User interface. Current supported languages are:

- English (US)
- Spanish
- German
- Chinese (Traditional)
- Chinese (Simplified)
- Italian
- Portuguese (Brazil)
- French
- Polish
- Croatian
- Romanian
- Czech
- Ukrainian

### Displayed Name Component

For Japanese language users only. The Displayed Name Component allows the user to choose between several different Japanese character representations.

### Character Set

Allows the user to choose which character encoding is embedded in the DICOM header. ISO\_IR 192 is UTF-8. This should be sufficient for the majority of systems.

### Default Unit System

Sets the units of measurement for the measurement tools. Supported units of measurement are: Imperial and Metric.

### Graphics-Acceleration

Controls whether the graphics rendering is done by the software or the video card. If the User notices problems with the display of the graphics, this option should be disabled.

### On Screen Keyboard

Toggles XC's built-in, on-screen keyboard.

### Automatically generate IDs

Allows for the automatic generation of Patient and Study IDs. This feature is useful if you are not using a RIS/HIS/EMR.

### Show Task-bar

Shows the Windows task bar when set to 'on.' Hides the Windows task bar when set to 'off.'

### Auto Sort Patients

Automatically sorts patients within the selected date range. Available date ranges are: Within One Year, Within One Month, Within One Week, Yesterday and Today, or Today.

### iDR-L Full Erase

Allows the User to choose whether to erase the whole iDR-L plate after every scan. If set to ON, the whole IP plate, regardless of region selected, will be erased. If set to OFF, only the scanned region will be erased.

### Show Default Smart Box

Toggles whether the Smart W/L tool should be automatically applied after scanning an image.

## Configuration > Admin

The Admin tab is only available to Administrative users and contains user accounts and data management options.

### Imaging Domain

Sets the scan interface for Medical (general radiography), Mammography, Podiatry, Specials, Veterinary (small animal), or Equine.



#### Note:

Available Imaging Domains are enabled/disabled on the USB Security Dongle Key.

## Launch Application Interface

The **Applications Interface** allows the User to change image processing libraries, define custom anatomy projections, define and edit default processing parameters, automatically rotate and flip images, assign laterality, adjust auto Window and Level values, enter exposure factors (for supported generator models), and restore defaults.

For more information on the Applications Interface, see Section [Adding Categories and Views](#) on page 91 and Section [Processing Parameter Evaluation](#) on page 92.

## Image Rejection Report

XC generates a report which contains all the information about the rejected images such as Patient ID, Anatomy, View, Date/Time when the image was acquired, Date/Time when the image was rejected, Reason for the image rejection, and Username. The user can save this report as a PDF. The following steps explain the procedure to generate an image rejection report:

1. Click "Configuration" and select the "Admin" tab.
2. Click "Image Rejections" button.
3. The user can search a particular rejection report by selecting the options available in "Sort by", "From Date", "To Date", "Reason", "User" and "Anatomy".
4. The user can choose a particular font style for the report by selecting "Font".
5. To save the report as a PDF, click on "Save to PDF" and save the file at the desired destination.

## Apply Fine Removal Drop Down Menu

This menu allows the user to select the number of times the fine line removal needs to be applied to the image.

## Data Location

The data location is the folder on the file system where XC will store settings and patient data. The default is the location on Windows 7 is C:\ProgramData\XC.

There should not be a need to alter this location unless the hard disk is running out of space and the user does not have archival storage (PACS).

## 24 Hours Study Management

The 24 Hours Study Limit option disables the ability for the user to add more images to a study that was created twenty-four hours prior to the image addition. When it is turned on, the user will not be able to add more images to a study that is 24 hours old or more.

Only an administrative user is able to change the setting of 24 Hours Study Limit.

## Embedded Computer

The Is Embedded option allows for the scan software to control the computer restart and shut down commands. This option is enabled if the scan software is installed onto a computer embedded with the scan unit. When this option is on, the upper right power button in the software allows the user to restart or shut down the computer.

## File Reader

The File Reader option allows for the scan software to import image files into the program. When the option is enabled and the user clicks scan, the software will ask for the location of the image to be imported and the user can select from multiple image rules (DICOM) .



### Note:

This option should only be enabled and utilized by qualified personnel.

## Imported File Processing

The Processing option determines if images will undergo post-processing when imported. When the option is enabled, the scan software will process imported images.



### Note:

This option should only be enabled and utilized by qualified personnel.

## Reconcile

Turn this feature on or off to, respectively, show or hide the "Reconcile Later" button in the Schedule Patient window.

## Users

The **Users** tab allows an administrative User the right to add/manage User names and passwords for accessing the XC application.

The **Require Login** toggles the User Login box functionality. If users must authenticate before using XC, turn this feature on. If user accounts are not desirable, turn this feature off.

### Adding a User Account

1. Open XC.
2. Login with the Administrator User name and password.
3. Click the **Configuration** button in the **Patient Information** window.  
If prompted, enter the appropriate password to access the configuration settings.
4. Click on the **Admin > Users** tab.
5. Click on the **Add** button. The **Add User** dialog will pop-up.
6. Enter the desired User name and password (the password will need to be entered twice, once in the **Password** text field, and again in the **Confirm Password** (text field), then click the **Finish** button.
7. If the new User account is to have administrative privileges, select the button **Allow Access To Configuration Settings**.
8. The new User account will be created.

### Changing a User's Password

1. Open XC.
2. Login with the Administrator User name and password.
3. Click the **Configuration** button on the **Patient Information** window.
4. Enter the appropriate password to access the configuration settings.
5. Click on the **Users** tab.
6. Select the User account to modify by selecting the desired User account from the list.
7. Click the **Edit User** button.

The **Edit User** dialog will pop-up.

8. Enter the new password in the **Password** text field, then enter the new password again in the **Confirm Password** text field, & click the **Finish** button.
9. The User's password will be changed.

### Removing a User Account

1. Open XC.
2. Login with the appropriate User name and password.
3. Click the **Configuration** button on the **Patient Information** window.
4. Enter the appropriate password to access the configuration settings.
5. Click on the **Admin > Users** tab.

6. Select the User account to remove by selecting the desired User account from the list.
7. Click the **Remove** button. The **Remove User** dialog will pop-up.
8. Confirm the removal of the User account by clicking **Yes** in the **Remove User** dialog.
9. The User account will be removed.

## Procedure

Procedures allow you to create a pre-defined set of image views. The procedure can then be selected on the study portion of the Scheduling screen.

To create a procedure, see [Creating a Procedure](#) on page 90.

## Data Management

The Data Management tab allows an administrative user to configure XC's disk usage. The goal of the Data Management tool is to help XC minimize disk usage by removing old images. The features available for the user to configure include setting a threshold value for overall use of disk capacity, an option to remove sent images after a specified image age, deletion of rejected images, an option to enable auto purge and emptying a virtual trash bin.

## Purge Constraints

The Purge Constraint feature allows the user to set the threshold value of XC's disk usage relative to the computer's total disk's capacity for saving data. Higher threshold value means the user allows XC to keep more studies in the hard disk, and inversely true, XC will keep less studies if the user sets the threshold value to a lower value.

To set the disk usage's threshold value, slide the Disk Usage Percentage slider to the desired value.

By turning on the Only Remove Sent Image option, XC will only remove a sent image from the study after a study has reached a specified age and the threshold value is met. When the setting is turned off, XC will delete all images contained in a study regardless of their status after a study has reached a specified age.

The Minimum Image Age (Days) slider allows the user to set the minimum age of a study. Any study older than the minimum age will be removed from the folder once XC's disk usage has reached the set threshold value.

To set the minimum image age value, slide the Minimum Image Age slider to the desired value.



### Note:

The Purge Constraints can be modified if the user is in need of more disk space, however this will delete studies based on the constraint criteria. iCRco recommends that the user backup all studies on a regular basis.

## Purge

Enabling the auto purge option will automatically trigger XC to move studies that have met the purge constraints to the virtual trash bin.

The user can also move studies to the virtual trash bin manually by clicking the Purge Now button. All studies that have met the purge constraints will be moved to the virtual trash bin.



### Note:

If Auto Purge is enabled, it is not necessary to use the Purge Now button. XC will automatically purge images based on the Purge Constraints.

## Virtual Trash Bin

When data is automatically or manually purged by XC, it will be moved to the virtual trash bin. The virtual trash bin indicates the size of data that will be permanently deleted from the computer and allows the user to permanently empty the trash bin by clicking the "Empty" button.

## Delete Images When Rejected

Turning on the Delete Images When Rejected option enables XC to automatically moves rejected images to the virtual trash bin.

## Chrome Workflow Modes

In addition to the standard Manual Scan workflow modes, the Chrome and Chrome Duo can operate with XC using an Auto Scan Mode and Barcode Mode. Each mode offers a different workflow. The user should choose the mode that best matches their preferred workflow.



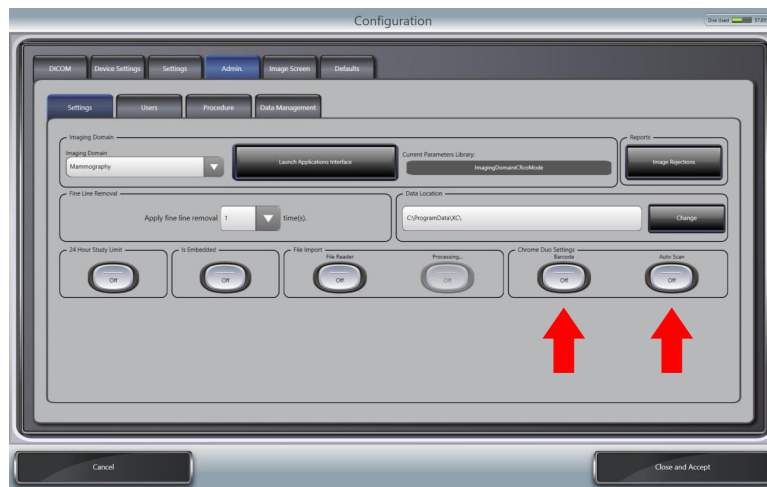
### Note:

The Chrome Duo can scan two cassettes at the same time in any of the modes.



### Note:

Modes can be activated in Configuration.



## Manual Scan Mode

The user can begin a scan by selecting the bay holding the cassette.



### Note:

When in Manual Scan Mod, XC considers the two bays of the Chrome Duo as two separate units connected to a single computer.

To activate Manual Scan Mode:

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Admin** tab.
3. Select the **Settings** tab.
4. In the lower right settings filed labeled **Chrome Settings**, set the **Barcode** and **Auto Scan** buttons to **Off**.



For information on the Manual Scan Workflows, see Section [Manual Scan Workflow](#).

For information on the Manual Scan Workflow, see Section [Manual Imaging Workflow](#) on page 23.

## Auto Scan Mode

When in Auto Scan Mode, XC allows you to start a scan without needing to select a specific bay or cassette size. The user can simply insert a cassette into the bay and the scan will begin automatically.

To activate Auto Scan Mode:

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Admin** tab.
3. Select the **Settings** tab.
4. In the lower right settings filed labeled **Chrome Settings**, set the **Barcode** button to **Off**.
5. Set the **Auto Scan** button to **On**.



For information on the Auto Scan Workflow, see Section [Auto Scan Workflow](#) on page 31.

## Barcode Scan Mode

With Barcode Scan Mode, XC allows the user to separate the registration process from the scanning process. The user scans a barcode on a cassette, then registers the cassette to a specific patient and anatomic view. After the cassette is exposed, the user can scan the cassette's barcode, and then insert the cassette into the bay to begin a scan.



### Note:

Barcode Scan Mode is especially useful to facilities in which the x-ray generator and the scan unit are not located within the same room.

To activate Barcode Scan Mode:

1. Click the **Configuration** button on the Patient Worklist screen.
2. Select the **Admin** tab.
3. Select the **Settings** tab.
4. In the lower right settings filed labeled **Chrome Settings**, set the **Barcode** button to **On**.



### Note:

When in Barcode Scan Mode, since the Auto Scan feature is always activated, the **Auto Scan** button is disabled.



For information on the Barcode Scan Workflow, see Section [Barcode Scan Workflow](#) on page 35.

## Configuration > Image Screen

### Image Screen

#### Maximum Zoom Value

Sets the maximum value for the Zoom tool. Options are: 100%, 200%, or 400%.

## Magnification Box Size

Sets the size of the Magnification tool as a value of total viewable size. Options are: 1/6, 1/4, 1/3, or 1/2.

## Predefined Crop Boxes

The user can Add a new crop box size, Edit and Remove the existing crop box size here.

Adding a new crop box size:

1. Click **Add**.
2. Enter the width and height of the crop box.
3. Select the units.
4. Click **Finish** to save the selected size.

Editing an existing crop box size:

1. Select an existing crop box size.
2. Click **Edit**.
3. Enter the required width and height of the crop box.
4. Select the units.
5. Click **Finish** to save the selected size.

Removing a crop box size:

1. Select the crop box size that needs to be removed.
2. Click **Remove**.

## Predefined Text Annotations

The **Text Annotations** tab allows the User to add a list of terms that can be automatically chosen when making a text annotation on the image.

To add an annotation, click the **Add** button, enter the desired term, then click the **Finish** button.

To remove a term from the list, check the check box next to the desired term, then click the **Remove** button.

# Configuration > Defaults

## Defaults

The **Defaults** tab allows the User to predefine the Referring Physician and Institution names, so that when the User is scheduling a patient, the only action needed is selecting the desired Referring Physician, Institution name and Institution address, instead of having to manually enter the names each time.

## Institution Address

Enter your facility's address in the text field. Click **Close and Accept** to save the changes. This will embed your facility's address in the DICOM file.

## Adding a Referring Physician/Institution

1. Navigate to **Configuration > Defaults** tab.
2. Click the **Add** button in either the **Referring Physician** or **Institution** section.
3. Enter the desired name.
4. Click the **Finish** button.

## Removing a Referring Physician/Institution

1. Navigate to **Configuration > Defaults** tab.



2. Select the desired information to remove by click the check box next to the name.
3. Click the **Remove** button in the appropriate section.

### Setting a Default Referring Physician or Institution

1. Check the box next to the desired default name.
2. Click the **Set** button. The entry will be set as the default selection.

## XC Data Directory

This directory contains application data and preferences.

To access the folder listed, the operating system must be configured to Show hidden files and folders.



### Important:

Editing any of these files by hand will result in data loss!

The path to this folder is:

Windows XP:

C:\Documents and Settings\All Users\Application Data\XC\

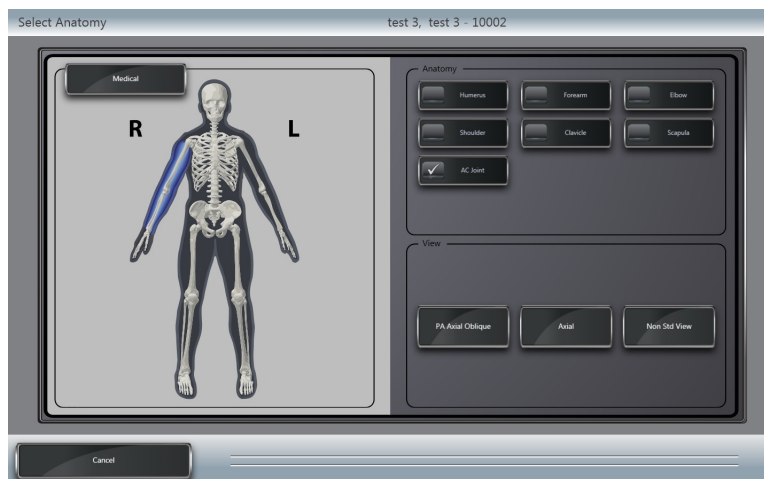
Windows 7:

C:\ProgramData\XC\

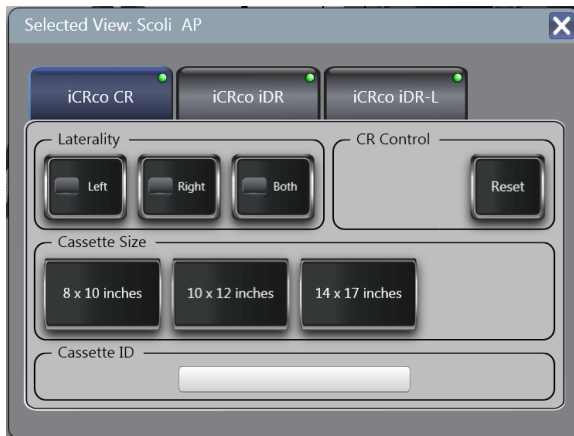
## Hardware Interfaces

XC employs the concept of an "interface" to visually represent the methodology of selecting scan parameters. For each iCRco hardware product, there is one or more interfaces.

- If there are multiple devices or a device with multiple scan functions (such as the Fusion DCR or Fusion DCR Flat Panel), XC will show a tab for each device or scan function on the Scan dialog.
- For iCR 3600, 3600M, 3600+, Chrome, and VertX, select a body part (from the skeleton graphic), Anatomy, and View.



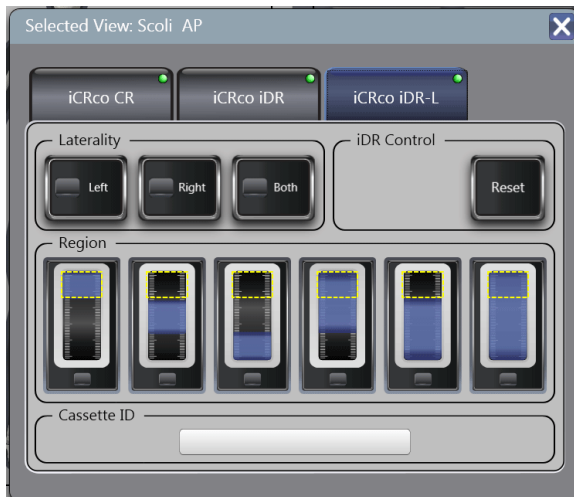
When the View is select, the Scan dialog will pop-up. Choose the desired plate size to initiate a scan.



- For iDR, select the **14x17 inches** button from the Scan dialog to initiate a scan.



- For iDR-L, select the appropriate "Region" from the Scan dialog to initiate a scan.



## Domains

XC employs the concept of "domain" to distinguish between *what* is being scanned. Domains also include processing parameters, enabled in the Applications Interface.

To choose a domain, go to **Configuration > Admin > Imaging Domain**. See [Imaging Domain](#) on page 78

XC has several domains:

- Medical
- Mammography
- Veterinary
- Equine
- Podiatry

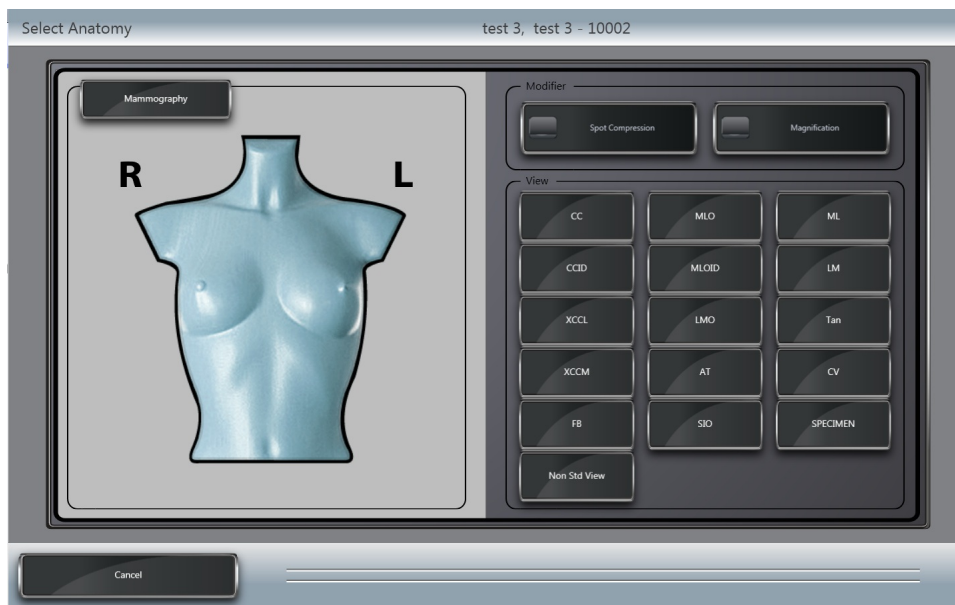
## Medical

Medical is the default domain in XC. The Medical domain is aimed at general radiography.

## Mammography

The Mammography domain shows a pair of breasts at the Anatomy Selection screen and relevant mammography sub-anatomies. At the Scan Screen, the Mammography domain shows mammography sized plates: 18X24CM, 24X30CM.

The Mammography domain changes at the following screens:



## Veterinary

The Veterinary domain shows a pair of small animals at the Anatomy selection screen and remaps fields on the Schedule Patient screen as appropriate for Veterinary.

The Veterinary domain changes at the following screens:

Select Anatomy test 3, test 3 - 10002

**Veterinary**



Anatomy

---

View

PA Portrait

Lateral

AP Portrait

PA Landscape

AP Landscape

Oblique

Non Std View

Cancel

---

Schedule Patient Disk Used 15%

**Patient Info**

Owner\*

Pet Name\*

Birth Date

January

1

2012

Sex

Male

☒ Female

Species

Breed

Neutered

Yes

No

Pet ID\*

Automatically Generate IDs

**Study Info**

Procedure

Accession #

Veterinarian\*

Clinic\*

Study Date

March

7

2012

Study Time

11

22

AM

Study Comments

Visit Comments

Cancel

Query Worklist

Finish

Finish And Scan

## Equine

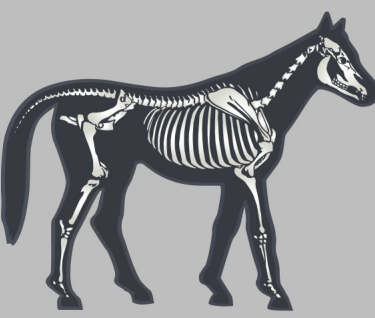
The Veterinary domain shows a horse at the Anatomy selection screen and remaps fields on the Schedule Patient screen as appropriate for Equine Veterinary.

The Equine Veterinary domain changes at the following screens:

Select Anatomy

test 3, test 3 - 10002

Equine



Anatomy

View

PA Portrait

Lateral

AP Portrait

PA Landscape

AP Landscape

Oblique

Non Std View

Cancel

Schedule Patient

Disk Used 15%

Patient Info

Owner\*

Pet Name\*

Birth Date

January

1

2012

Species

Breed

Sex

Male

☒ Female

Neutered

Yes

No

Pet ID\*

Automatically Generate IDs

Study Info

Procedure

Accession #

Veterinarian\*

Clinic\*

Study Date

March

7

2012

Study Time

11

22

AM

Study Comments

Visit Comments

Cancel

Query Worklist

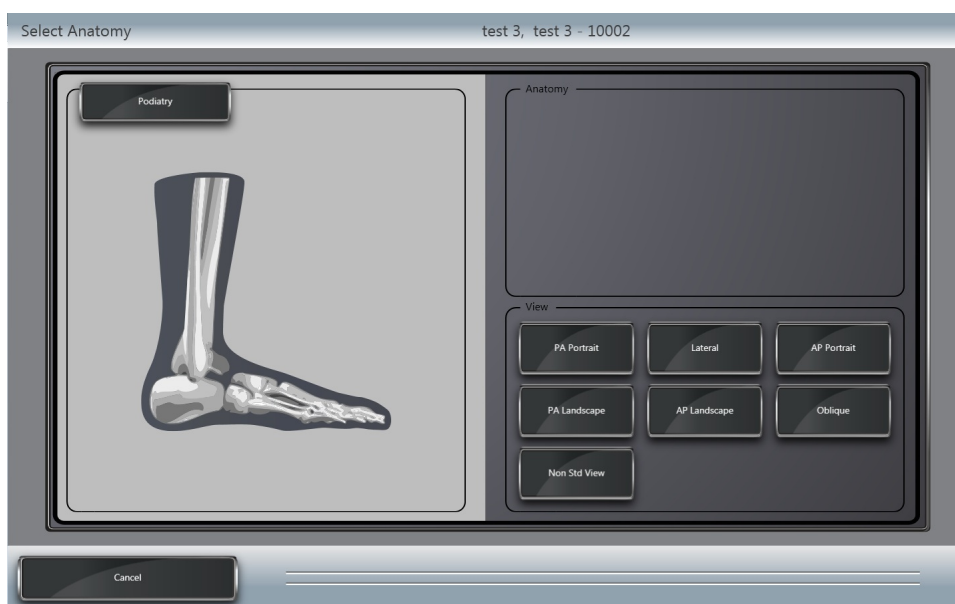
Finish

Finish And Scan

## Podiatry

The Podiatry domain shows a foot at the Anatomy selection screen. It does not change other parameters.

The Podiatry domain changes at the following screens:



## Setting Up Modality Worklist Query

1. Double-click on the XC short-cut on the desktop to open XC.
2. In the **Patient Information** window, click the **Configuration** button.
3. In the **Configuration** window, select the **DICOM** tab.
4. In the **DICOM** tab, select the **DICOM Setup** tab.
5. Click the **Add New AET** button.
6. Enter the desired AE Title information, then click the **Finish** button.
7. To ensure that the new AE Title is valid, highlight the newly created AE Title in the **List of known DICOM AETs**, then click the **Test AET** button. If the test is successful, continue to the next step. If the test is not successful, please ensure that the AE Title information is correct, and try the test again.
8. Select the **Worklist Inputs** tab.
9. In the **Worklist Inputs** tab, put a check mark in the box(es) for the AE Title(s) you want query.  
 OPTIONAL: The Modality Worklist Query can be set to query on a timer, and the query can be limited to Local AET, Target Modality, or Today's date. To enable these features, select the desired query constraints from the **Query for new patients every** drop-down menu or the **Filter query by** check boxes.
10. Click the **Close and Accept** button to save the changes.



### Note:

For information on Querying a Worklist, see Section [Querying a Worklist](#) on page 72.

## Creating a Procedure

Creating a procedure in XC requires an XC administrative account.

1. In the Patient List Window, click the **Configuration** button and select the **Admin** tab. Click **Procedure** to go to the Procedure Configuration Window.
2. Enter the Procedure's name and ID, and click **Add**.  
 The procedure will be added to the list on the right.

### Adding Views to a Procedure

3. Click on the procedure name in the Procedure List.

4. Select the anatomy from the drop-down menu. This will open a list of views for the selected anatomy.
5. Drag and drop the view(s) onto the Procedure.  
The view(s) will be added to the Procedure.
6. Save the changes by clicking **Close and Accept**.

## Editing a Procedure

In the Patient List Window, click the **Configuration > Admin > Procedure** to go to the Procedure Configuration Window.

- To add views to the procedure, click on the procedure name in the Procedure List.

Select the anatomy from the drop-down menu. This will open a list of views for the selected anatomy.

Drag and drop the view(s) onto the Procedure.

The view(s) will be added to the Procedure.

- To delete a procedure or view, click the **Delete (red 'x')** button positioned next to the procedure or view name.
- To edit a procedure's name, click on the pencil icon located to the left of the procedure's name and ID.

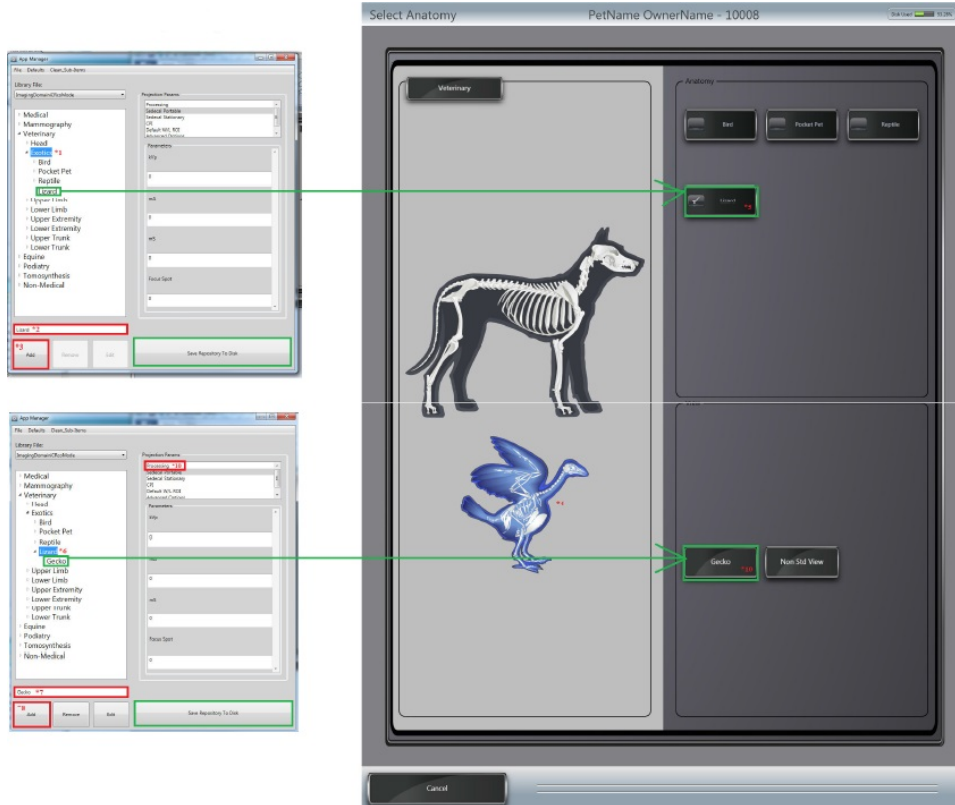
## Adding Categories and Views

It is possible to add or remove anatomy and sub-anatomy categories using XC's Application Interface. For example, it is possible to add a **Lizard** category to the **Exotics** anatomy type or add a **Gecko** view to the **Lizard** category.



### Note:

The **Exotic** anatomy type is represented by an image of a bird.



## Opening the Applications Interface

1. Click the **Configuration** button on the **Patient Worklist Screen**.
2. Go to **Admin. > Settings**. In the **Imaging Domain** field, click the **Launch Applications Interface** button. The **Applications Interface** will open.

## Add Category

1. Open the Applications Interface.
2. Select the parent tree item that the new category will be placed under (e.g. Exotics).
3. Type the name of the new category in the text box. Click **Add**.
4. Click **Save Repository to Disk**. The new category will appear under the parent tree item.

## Add View

1. Open the Applications Interface.
2. Select a category.
3. Type the name of the new view in the text box. Click **Add**.
4. Click **Save Repository to Disk**. The new view will appear under the category.



### Note:

All views can have specific processing parameters applied to them. See Section [Processing Parameter Evaluation](#) on page 92 for more information.

## Processing Parameter Evaluation

---

The processing parameters can also be clinically adjusted and evaluated through the image preview functionality of the App Manager. The purpose of this feature is to allow the user to adjust the processing parameter to their liking and make the images better tailored to fit their specific needs.

Users can adjust the processing parameters to fit specific needs.

1. Click the **Configuration** button on the **Patient Worklist Screen**.
2. Go to **Admin. > Settings**. In the **Imaging Domain** field, click the **Launch Applications Interface** button. The **Applications Interface** will open.
3. Select the appropriate library file in the combo box.
4. Select the appropriate imaging modality (e.g. Medical), anatomy (e.g. Chest), and view (e.g. AP Portrait).
5. Select the **Processing** option from the **Project Params** group in the second column of the window.
6. A list of the processing parameters will be displayed showing their current value. If you click the expanding arrow on the right side of the window, you can select a patient, study, series, and image.

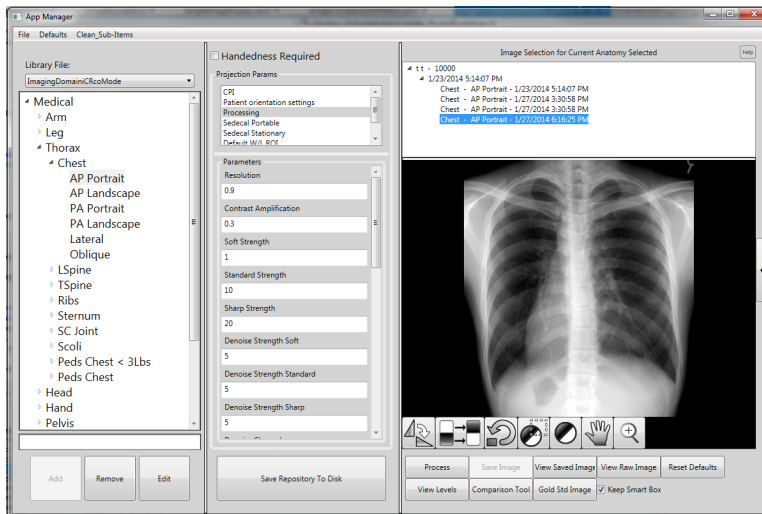
Selecting an image will load an image into the image preview window. Images in the image preview window can be temporarily reprocessed with the parameters in the second column.



### Note:

The images that will populate in this list originate from XC. If there are no images present in the list, this means that there have been no images of that anatomy type and view acquired using XC.





7. You may modify the processing parameters. If you do, click **Process** to reprocess the image.



**Note:**

You can maximize the window, zoom in, or use any of the provided image manipulation features like Smart Box to evaluate the image.



**Note:**

Click **Save Image** to save the current images for comparison later.

8. After processing or saving an image, click the **Comparison Tool** button to compare the manipulated images side-by-side.
9. Load the DICOM image into the Image Comparison Window by clicking **Processed Image**, **Saved Image**, **Raw Image**, **Gold Image**, or **Browse**.



**Note:**

Clicking **Processed Image** will load the last images you processed, while clicking **Saved Image** will load the last images you saved.



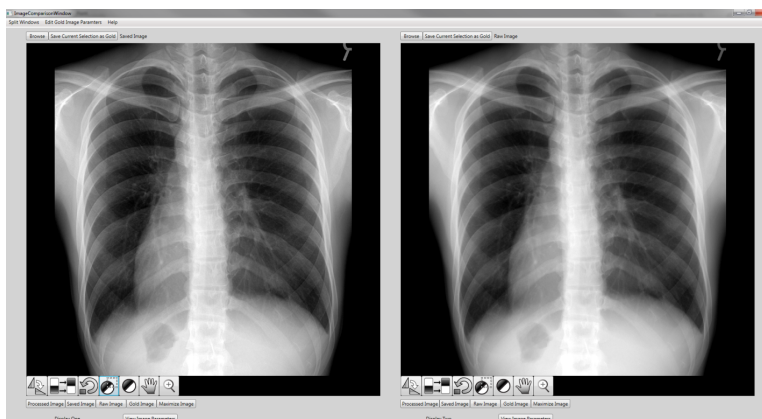
**Note:**

If you reprocess an image in the App Manager window, click **Processed Image** to reload it into the Image Comparison Window.



**Note:**

The processing parameters used for each image during the comparison can be seen in the comparison window by clicking **View Processing Params**.



10. If needed, you can set an image to fill the whole screen by clicking the **Maximize Image** button. To view the images in two separate windows, click the **Split Windows** button on the top, left side of the screen.



11. Click **Save Current Selection as Gold** to store the image for image processing evaluation in the future. Images stored this way can be retrieved later by clicking the **Gold Image** button.
12. Click **Save Repository to Disk** to save the image processing parameters.



**Note:**

Image Processing Parameter changes need to be clinically validated, either through the Image Comparison Window or through the standard XC workflow.

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# Appendix

# A

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## XC Help

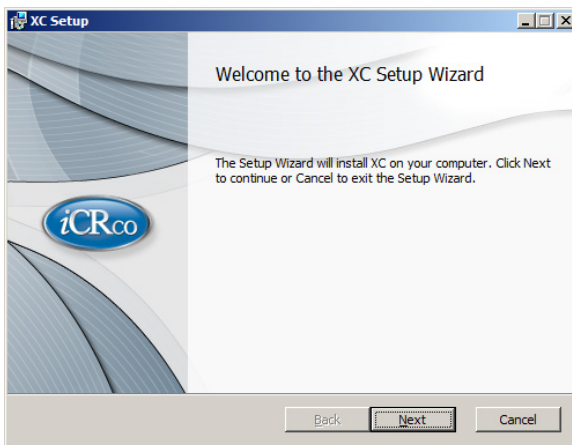
---

### Installing XC

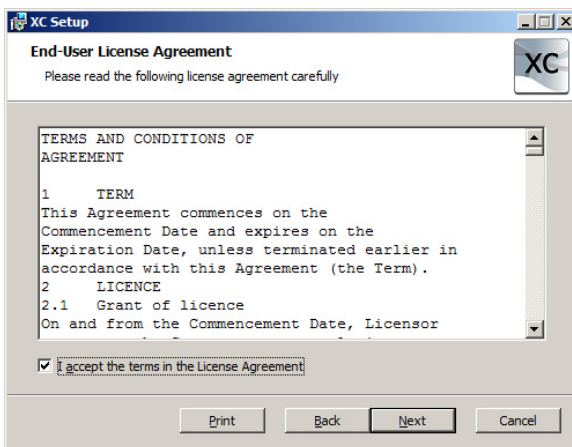
---

These instructions describe how to install XC. USB drivers for iCRco hardware are installed automatically with the installation of XC.

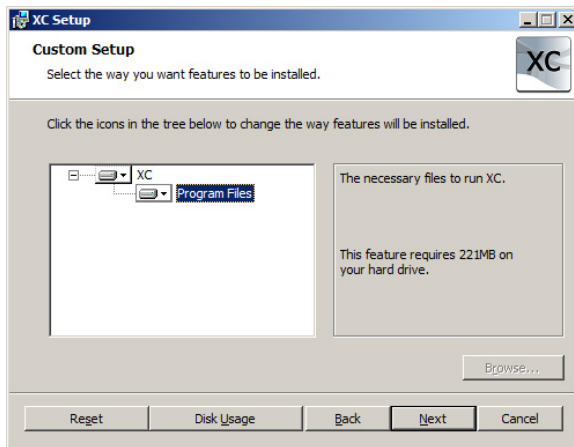
1. Insert the media containing the XC installer in the computer.
2. Double click `Setup.exe` to begin the installation process.
3. Click **Next** at the Welcome screen.



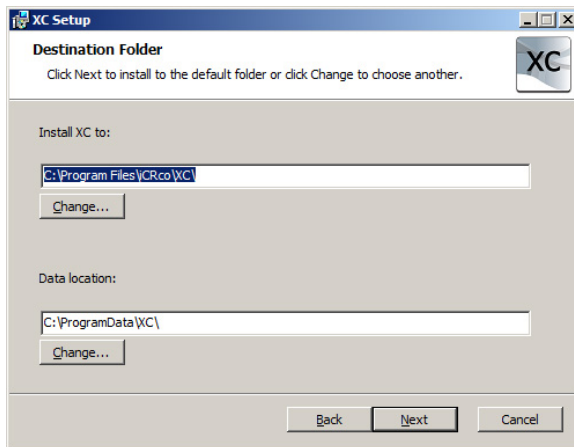
4. Check the box next to **I accept the terms in the Licence Agreement**, then click **Next** to continue.



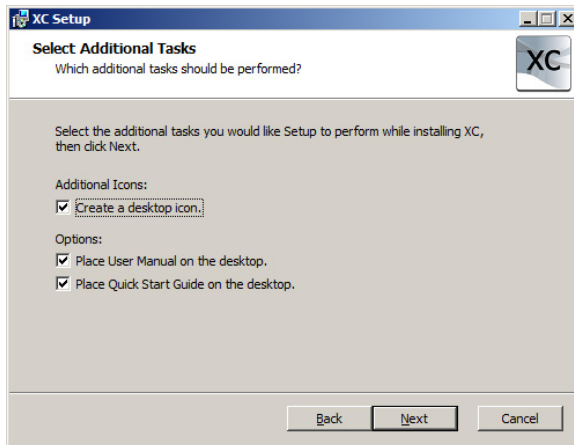
5. Click **Next** at the Custom Setup screen to continue.



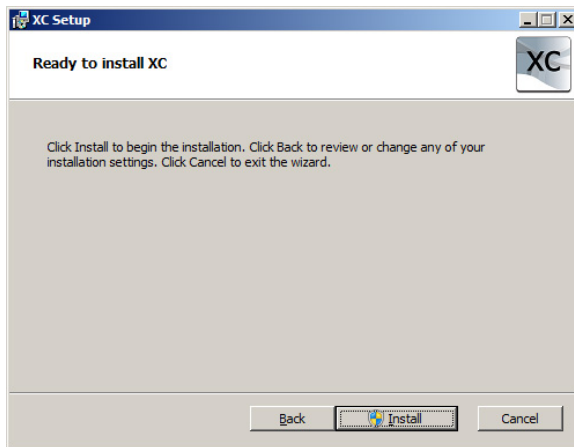
6. Choose XC's data location. This is where XC will store images and patient data. Click **Next** to continue.



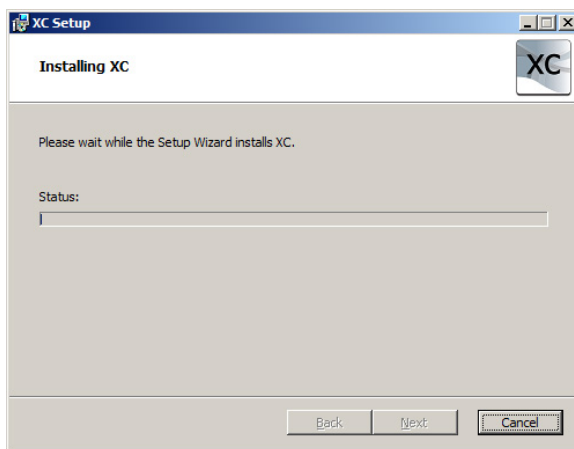
7. Click **Next** to continue.



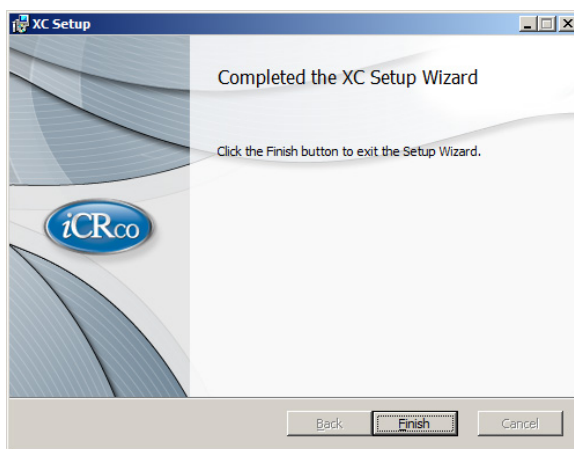
8. Click **Install** to begin the installation.



9. Please be patient while XC installs. Depending on the speed of the computer and available RAM, this process could take a few minutes.



10. Click **Finish** to finish the XC installation.



## Device Specific Error

Error	Error Code
NONE	0x0000
UNKNOWN	0x0001

Error	Error Code
CANNOT LOAD USB CR DLL	0x0002
CANNOT LOAD USB CR FUNCTIONS	0x0003
USB DLL NOT LOADED	0x0004
SCAN STATUS USB INITIALIZE FAIL	0x0005
SCAN STATUS USB NO DEVICE ID	0x0006
SMALL EEPROM	0x0007
BIG EEPROM SETTINGS NOT SAVED	0x0008
MEMORY ISSUE	0x0009
USER CANCELLED SCAN	0x000A
INVALID SETTINGS	0x000B
MOTOR CONTROLLER ERROR	0x000C
THREAD ERROR	0x000D
INVALID CASSETTE SIZE	0x000E
PROCESSING PARAM ERROR	0x000F
SCAN_IN_PROGRESS	0x0010
FOCUS IN PROGRESS	0x0011
PATH DOES NOT EXIST	0x0012
NO CR DEVICE ATTACHED	0x0013
UNKNOWN CR SETTING	0x0014
INT CR SETTING	0x0015
FLOAT CR SETTING	0x0016
BOOL CR SETTING	0x0017
NO DATA ACQUIRED	0x0018
USB BOARD ERROR SLOW	0x0019
USB BOARD ERROR FAST	0x0019
USB BOARD ERROR FAST	0x001A
NO OEM CR CLASS CREATED	0x001B
DEVICE ID MISMATCH	0x001C
IDRL INVALID SCAN REGION	0x001D
INVALID EEPROM SETTING AT 0x0000	0x001E
USBICRCDLL DOES NOT EXIST	0x001F
IDRL SENSOR NOT FOUND	0x0020
USER CANCELLED FOCUS	0x0021
IDRL USER CANCELLED MOVE TO REGION	0x0022

Error	Error Code
ERROR INVALID DEVICE SELECTED	0x0023

## Adjusting MWL query filters

If after creating and setting the DICOM modality worklist target XC is not populated with worklist entries, the filters may need to be modified.

MWL filters are contained in the Query Constraints text file located in the XC Public Directory. This directory is discussed at the bottom of this document. In this file anything following a # is a comment and is ignored by the application. The first twelve lines of the file are solely comments. Each additional line is a DICOM tag from the MWL entry to be queried for. The tag line is format as:

```
Tag VR [<tag value>] # Comment
```

Any value present between the

```
[
```

and

```
]
```

of the tag line will act as a filter.

There are several tags inserted by the application when the MWL query is performed. These tags are list in the comments on the top of the page. For most of these tags XC will insert a value between the square brackets to filter the query results. For example, the tag:

```
(0040,0002)DA [] # ScheduledProcedureStepStartDate
```

will be given the current date so that only worklist items schedule for today are retrieved. Adding one of these tags to the tag list will stop XC from adding the value on its own. This should be done if the customer does not want the query to be filtered by these values.

In particular some worklists will use a default value for Scheduled Station AET where as XC will use the configured local AET. This means a query will fail to return any items since the values don't match. If XC isn't being populated by the worklist try adding the Scheduled Station AET to the tag list in QueryConstraints.txt. This tag will be placed within the Scheduled Procedure Step Sequence.

### Adding a Sequence tag and tags that belong in the Sequence

Sequences require at least four tags. First is the tag for the sequences itself. Then Begin Item and End Item tags for each item in the sequence. Followed by the End Sequence tag. A Sequence can have multiple Items and an Item can contain multiple tags. Though have only one Item with all relevant tags is fairly standard.

Example:

```
(0040,0100) SQ [] # Schedule Procedure Step Sequence (fffe,e000) - # Begin
Item # All tags that belong in this sequence should be placed here ...
(fffe,e00d) - # End Item (fffe,e0dd) - # End Sequence
```

## List of Devices Supported by XC

This section provides a list of hardware devices supported by XC.

**Table 2: Table of Devices**

Name	Cassete / Plate Size
3600	8 x 10 inches, 10 x 12 inches, 14 x 14 inches and 14 x 17 inches
3600 SF	8 x 10 and 10 x 12 inches
3600 M	18 x 24 cm and 24 x 30 cm
VertX	10 x 12 inches and 14 x 17 inches
Chrome	10 x 12 inches and 14 x 17 inches
Fusion DCR	10 x 12 inches and 14 x 17 inches
iDR	14 x 17 inches
iDR-L	14 x 51 inches
iDR-L 17"	17 x 51 inches
Vmotion AMX	10 x 12 inches and 14 x 17 inches
Chrome Mammo Duo	18 x 24 cm and 24 x 30 cm
Air DR	14 x 17 inches



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# Appendix

# B

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## Windows Help

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### Installing and Using the Microsoft Windows XP Input Method Editors

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#### Installing the Desired Language



**Note:**

The User may need the Windows XP installation disk to install new languages.

1. Go to **Start > Control Panel > Regional and Language Options**.
2. Click on the **Advanced** tab.
3. In the section labeled **Code page conversion tables**, select the languages to install.
4. Click the **Apply** button to install the selected languages.

#### Using the Windows XP Input Method Editor

1. In the Taskbar, right click, then select **Toolbars > Language Bar**. The Language bar will become visible in the Taskbar.
2. Open the desired application.
3. Place the cursor in a text entry field in the application.
4. Use the Left **Alt** and **Shift** to toggle through the available languages.



**Note:**

Optionally the User may also left click on the language code in the Language toolbar to select from the available languages.

#### Using Hotkeys with the Windows XP Input Method Editor

**Table 3: Input Method Editor Hotkeys**

Action	Hotkey
Switch between languages or keyboard layouts	left <b>Alt+ Shift</b>
When Japanese is the input language, select the Hiragana character set	<b>Ctrl+ Caps Lock</b>
When Japanese is the input language, select the Katakana character set	<b>Alt+ Caps Lock</b>

### Showing Hidden Files and Folders in Windows

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The following instruction is applicable to both Windows XP and Windows 7.

1. Open **My Computer**, then click on **Folder Options**.

2. In the **Folder Options** dialog, select the **View** tab.
3. Check the box labeled **Show hidden files and folders**, then click **OK**.