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**CARESTREAM VITA/VITA LE/VITA SE  
CR System Long Length Imaging  
User Guide**

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## Use of the Guide

Carestream CR Systems are designed to meet international safety and performance standards. Personnel operating the unit must have a thorough understanding of the proper operation of the system. This guide has been prepared to aid medical and technical personnel to understand and operate the system. Do not operate the system before reading this manual and gaining a clear understanding of the operation of the system. If any part of this manual is not clear, please contact your Carestream Health representative for clarification.



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# Table of Contents

## 1 Introduction

Document Conventions ..... 1-1  
Indications for Use ..... 1-1

## 2 Safety and Related Information

Medical Equipment Classification ..... 2-3  
Conforming Standards ..... 2-3  
Cassette Disposal ..... 2-4

## 3 LLI System Components Overview

System Components ..... 3-5  
    Long-Length Cassette ..... 3-5  
    Portable Grid ..... 3-6  
    Wall-Mounting the Portable Grid ..... 3-7  
    Vertical Cassette Holder ..... 3-11

## 4 Processing a Long-Length Image

Recommended X-Ray Settings ..... 4-16  
Using Beam Attenuation Filters ..... 4-16

## 5 Scanning an LLI Cassette

Entering Patient Data ..... 5-19  
Processing the LLI Cassette ..... 5-20

## 6 LLI Troubleshooting

Errors, Causes, and Corrective Actions ..... 6-23



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# 1 Introduction

The information contained herein is based on the experience and knowledge relating to the subject matter gained by Carestream Health, Inc. prior to publication.

No patent license is granted by this information.

Carestream Health reserves the right to change this information without notice, and makes no warranty, express or implied, with respect to this information. Carestream Health shall not be liable for any loss or damage, including consequential or special damages, resulting from any use of this information, even if loss or damage is caused by Carestream Health's negligence or other fault.

## Document Conventions

**NOTE:** From this point on, CARESTREAM VITA/VITA LE/VITA SE CR LONG LENGTH IMAGING System will be referred to as "LLI" or "LLI system".

**NOTE:** Notes provide additional information, such as expanded explanations, hints, or reminders.

**IMPORTANT:** *Important highlights critical policy information that affects how you use this manual and this product*



**CAUTION:**

**Caution points out procedures that you must follow precisely to avoid damage to the system or any of its components, yourself or others, loss of data, or corruption of files in software applications.**

## Indications for Use

The LLI System generates and controls images in long-bone regions.



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# 2 Safety and Related Information

## Medical Equipment Classification

### **Mechanical Equipment**

This equipment cannot be classified for electrical safety because it does not use or generate electrical energy.

**Provides ordinary protection against harmful ingress of water (IPX0).**

**Suitable for continuous operation.**

**Not suitable for use in the presence of flammable materials.**

## Conforming Standards

**The following standards apply to the Long-Length Vertical Cassette Holder only:**

UL 60601-1:2003 - Medical Electrical Equipment, First Edition

CAN/CSA-C22.2 No. 601.1-M90 (R2001) - Medical Electrical Equipment

CAN/CSA-C22.2 No. 601.1S1-94 (R1999) Supplement No. 1-94 to  
CAN/CSA-C22.2 No. 601.1-M90

CAN/CSA C22.2 No. 601.1B-90 (R2002) - Amendment 2 to CAN/CSA-C22.2  
No. 601.1-M90

IEC 60601-1:1998, + Amendment 1:1991, + Amendment 2:1995 - Medical  
Electrical Equipment

EN 60601-1:1990, + Amendment 1:1993, + Amendment 2:1995,  
+Amendment 13:1996 - Medical Electrical Equipment

IEC / EN 60601-2-32:1994 - Safety of Associated Equipment of X-ray  
Equipment

## Cassette Disposal



**CAUTION:**

**CARESTREAM VITA CR Cassettes contain lead. Disposal of lead may be regulated due to environmental conditions. For disposal or recycling information, contact your local authorities. For further information concerning these products, inside the United States, call Carestream Health, Inc. at 1-800-328-2910 or if outside the United States, write to Carestream Health in your country.**

# 3 LLI System Components Overview

## System Components

CARESTREAM VITA CR LONG LENGTH IMAGING System
Long-Length Cassette
Long-Length Phosphor Screen (84 x 34 cm)
Long-Length Portable Grid
Long-Length Vertical Cassette Holder with Grid

## Long-Length Cassette

### Cassette Specifications

Width	35 cm (14 in.)
Length	86 cm (33 in.)
Thickness	15 mm (0.591 in.)
Maximum load	158.76 kg (350 lb)
Weight	4.5 kg (10 lb)

### Cassette Labels

- Bar Code Labels—located in a product label recess on the non-tube side panel of the cassette.
- Process Indicator Labels—a large number 1 and a large number 2 provide a reminder to process both ends of the cassette.

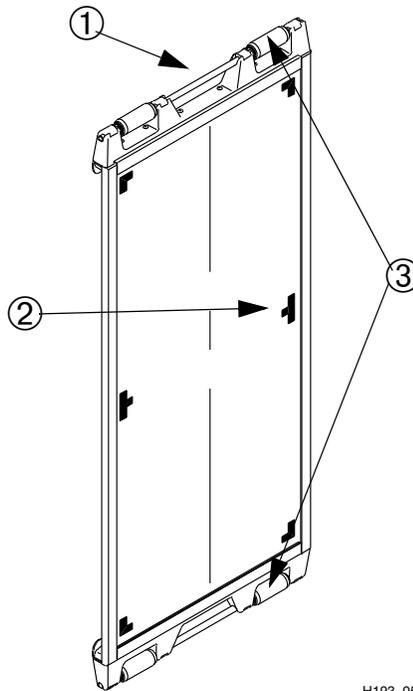
NOTE: The image area is approximately 1.5 cm (inside the cassette's length and 1.3 cm inside the width. Position the area of interest within these dimensions.

### Operation

To use the cassette, expose the patient once using the length of the cassette. Scan both ends of the cassette. The software stitches the image together automatically. See [“Processing the LLI Cassette” on page 5-20](#).

## Portable Grid

The Portable Grid has been designed to accommodate the Long-Length Cassettes. It gives you greater flexibility to take long-length images outside the radiology department.

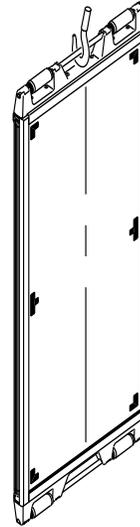


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Number	Feature	Function
①	Handles	Make it easy to transport. You can also use the handle to hang the grid on the wall.
②	Markers	Identify the tube side for exposure. Each marker provides an approximate boundary for the phosphor screens inside. When transporting or storing the grid, make sure that the markers are facing out.
③	Rollers	Make it easy to transport. For safety reasons, the rollers rotate in only one direction. See <a href="#">“Moving and Storing the Portable Grid”</a> on page 3-7.

## Wall-Mounting the Portable Grid

You can mount the Portable Grid on the wall using brackets or by hanging the handle on a hook (brackets and hook not supplied).



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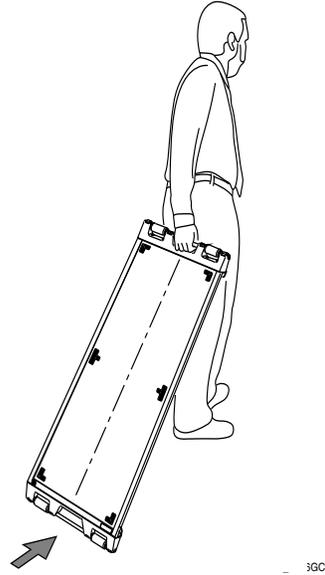
### Wall-Mounting Long-Length Portable Grid

## Grid Specification

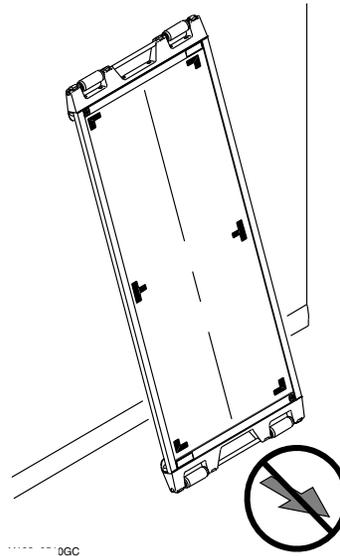
Specification	Description
Ratio	8:1
Source to Image Distance (SID)	102–183 cm (40–72 in.)
Focal Distance	150 mm
Density	103 lines per inch (40 lines per cm)
Dimensions	15 x 34 in.

## Moving and Storing the Portable Grid

To move or store the Portable Grid, grasp the handle and pull the grid so that the screen markers are facing up. The wheeled grid makes moving the portable system easy to do. For best results, do not push the grid.



**CAUTION:**  
The rollers can turn if the grid is stored upright with the processing labels facing out, and the unit could fall. Make sure you store the grid with the markers facing out as shown.

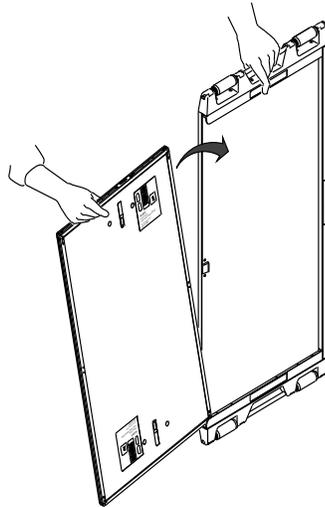


**CAUTION:**  
Handle the grid with care. Dropping or bumping the grid causes serious internal damage that produces permanent, unacceptable imaging artifacts.

## Loading and Unloading the Portable Grid

**To load the cassette into the  
grid from an upright  
position:**

1. Hold the grid upright.
2. Hold the portable cassette at a slight ( $15^\circ$ ) angle so that the lower right corner enters first. Let the weight of the cassette press down the release latch.
3. Slide the cassette into the grid.

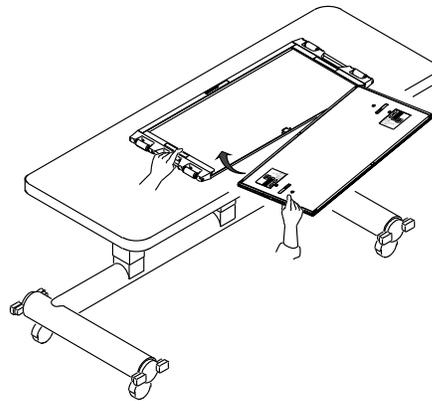


**To load the cassette into the grid from a horizontal position:**

1. Turn the grid so that the open back side is facing you.
2. Place the grid on a table or floor.
3. Hold the cassette flat with one corner leading into the grid.
4. Push the cassette into the grid. Let the weight of the cassette push down on the release latch.

**⚠ CAUTION:**

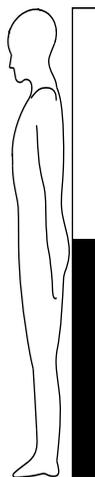
**Do not load or unload the cassette while the patient is in contact with the grid.**



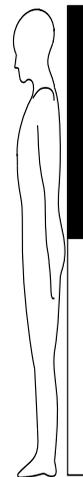
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## Vertical Cassette Holder

The Vertical Cassette Holder with Grid contains an X-ray grid for optimizing image quality. The cassette holder lets you expose long-length images on a single cassette in a vertical position. You can move the cassette holder up or down to position the cassette for any long-length exam, in the upper region or lower region, as shown:



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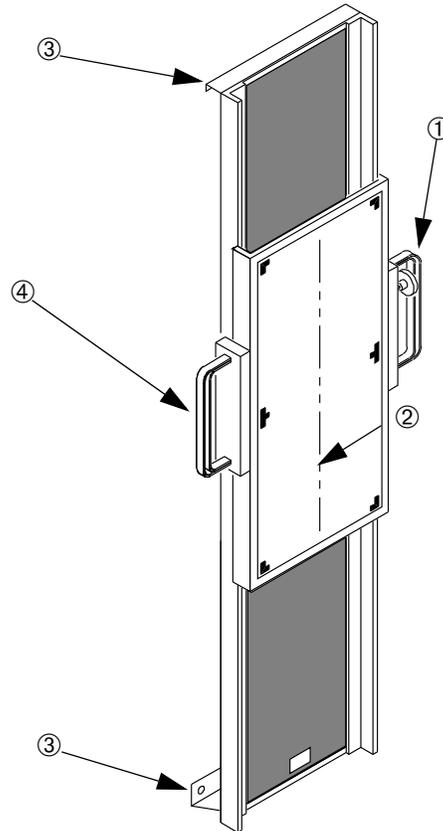
H193\_1074AC

### Upper and Lower Regions

Insert the cassette in the upper region for spine studies or the low region for leg studies.

## Grid Specification

Specification	Description
Ratio	8:1
(Source to Image Distance (SID))	102–183 cm (40–72 in.)
Density	103 lines per inch (40 lines per cm)
Dimensions	15 x 34 in.



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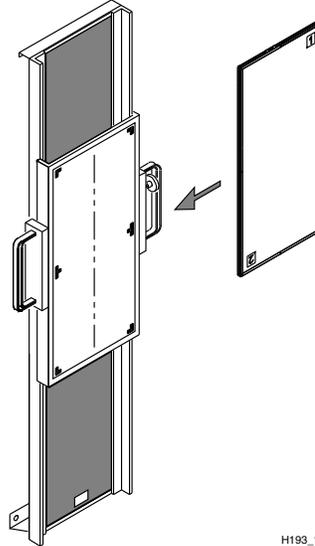
### Vertical Cassette Holder

1. Handle Lock Pin—pull to unlock the cassette holder's position, release to lock.
2. Grid Cabinet—holds the cassette.
3. Attachment Bar—use to attach the cassette holder to the wall.
4. Handle—push up or down to change the position of the cassette holder.

## Loading a Cassette

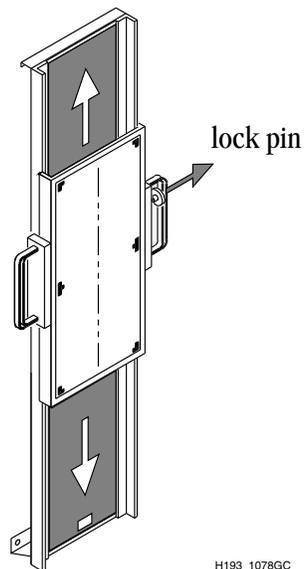
To load a cassette into the vertical cassette holder:

1. Select a long-length cassette. Slide the cassette into the cassette holder.



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## Loading a Cassette



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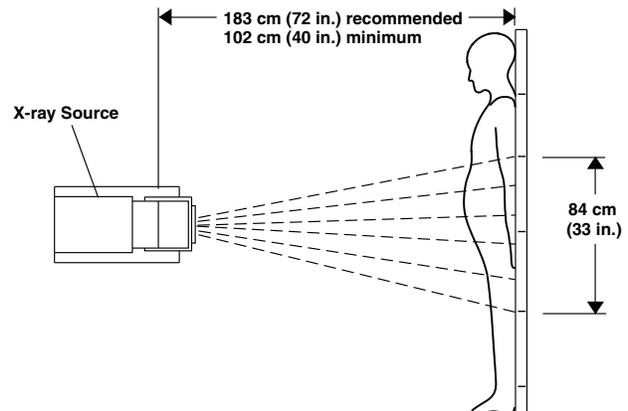
## Moving the Cassette Holder Into Position

2. Pull and hold the lock pin, and adjust the height of the grid cabinet. Release the pin to lock it into a pre-selected opening.

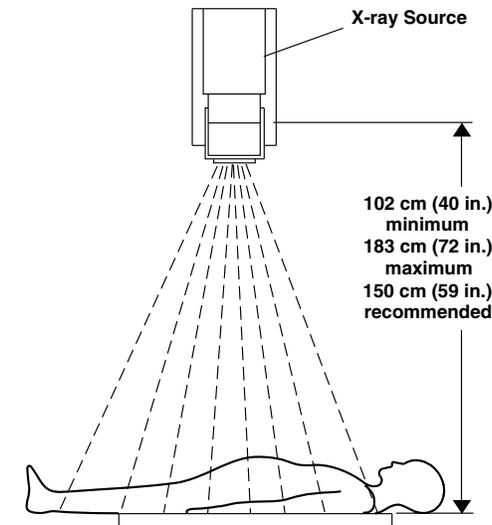


# 4 Processing a Long-Length Image

1. Insert the Long-Length CR Cassette into the cassette holder with the tube side toward the X-ray machine.
2. Position the patient.
3. Set the Source to Image Distance (SID).
  - Vertical Cassette Holder: Enter a value from 102 cm to 183 cm (40 to 72 in.)  $\pm$  1 cm.
  - Portable Grid: Enter a value from 102 cm to 183 cm (40 to 72 in.)  $\pm$  1 cm.
  - Verify that the entire length of the cassette is illuminated by the collimator.
4. Set the X-Ray equipment. See [“Recommended X-Ray Settings” on page 4-16.](#)
5. Set the Beam Attenuation Filter (BAF). See [“Using Beam Attenuation Filters” on page 4-16.](#)



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## Recommended X-Ray Settings

The settings in the table below are general guidelines. Optimal settings may vary according to patient size and site equipment..

Organ and Position	Kv	mAs	Filter model
Full Spine AP – child	85	50	57-405
Full Spine Lateral – child	96	125	57-407
Full Spine AP	96	65	57-405
Full Spine Lateral	110	160	57-407

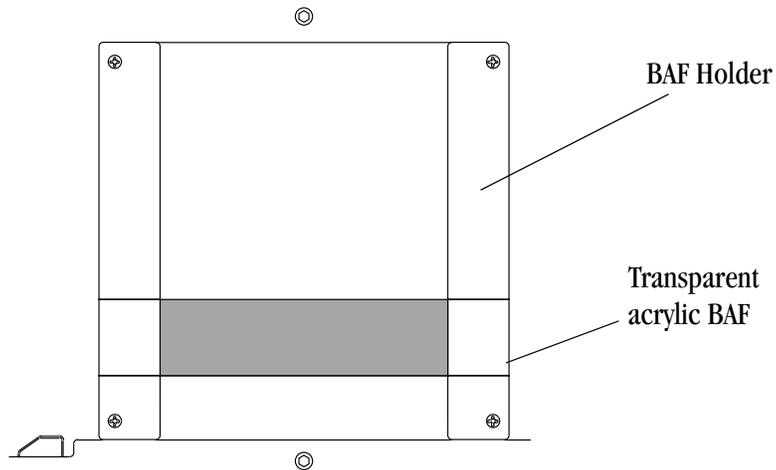
## Using Beam Attenuation Filters

Beam Attenuation Filters (BAF) help ensure uniform exposure by compensating for varying degrees of thickness on the body. Two filters are recommended:

Filter Type	Image
Transparent	Full spine AP / Full leg
Transparent	Lateral Full Spine

Place the BAF holder (model 57-426) onto the x-ray collimator as shown in

the figure.



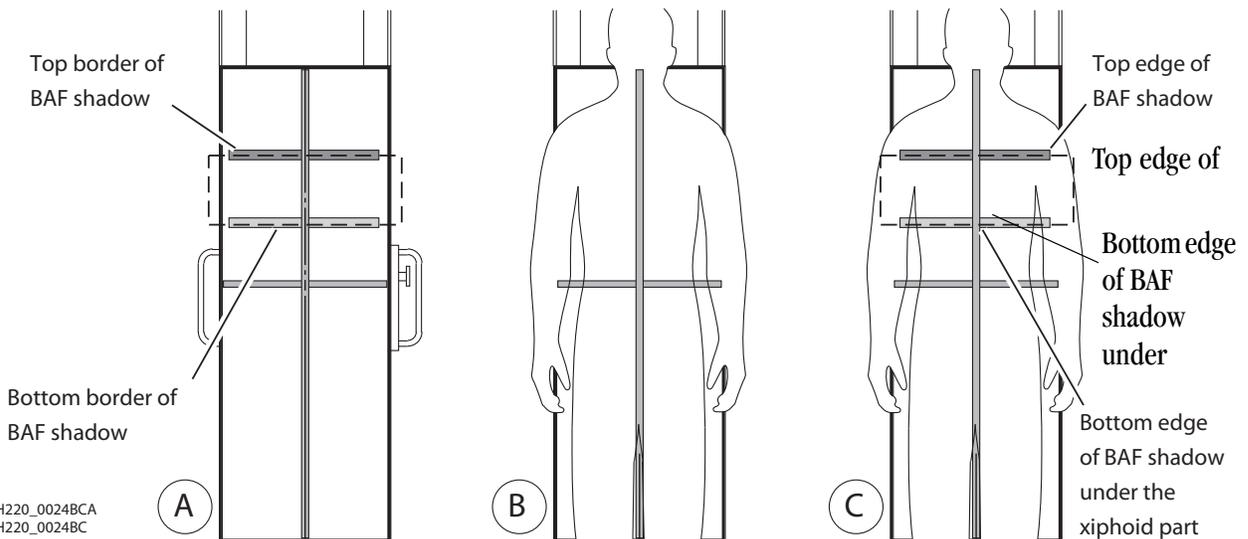
H220\_0023AC

### Beam Attenuation Filter Placed in BAF Holder

Position the BAF according to the patient anatomy shown in the figures (AP and Lateral) and according to “[Recommended X-Ray Settings](#)”. Note that the transparent BAF shadow on the patient's body is visible.

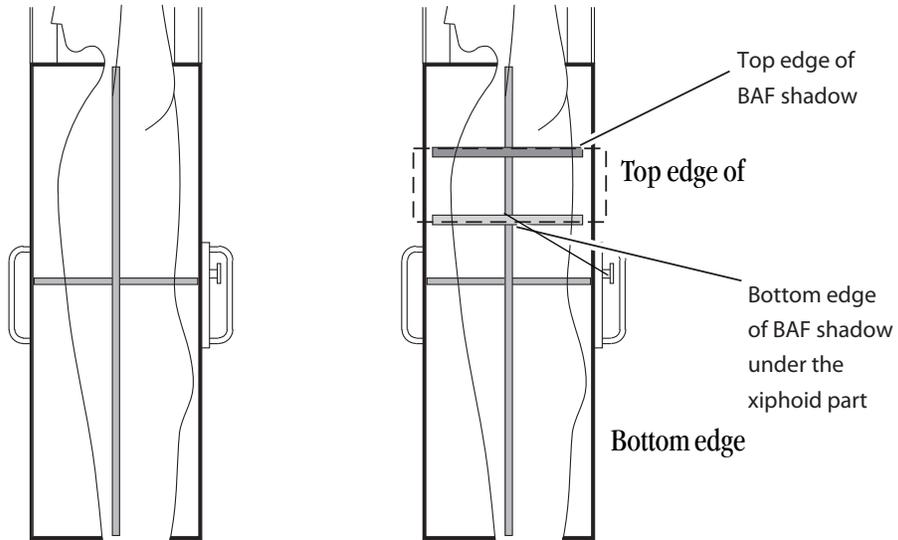
For full spine procedure, adjust the lower edge shadow under the xiphoid part in the AP projection and on the xiphoid part on the lateral projection.

For full leg images, position the lower border shadow of the BAF on the lowest part of the anatomy visible (ankle area) since this is the thinnest area in the image.



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H220\_0024BC

**Proper placement of BAF shadows, AP projection**



**Proper Placement of BAF Shadows, Lateral Projection**

Perform the exposure.

Wait 2-3 minutes before starting the scan process to allow the energy on screen to stabilize.

# 5 Scanning an LLI Cassette

## Entering Patient Data

1. Start the CARESTREAM VITA CR System Software.
2. Enter your username and password.
3. Select **Patient** in the lower left corner of the screen.



### Entering Patient Data

NOTE: See the "CARESTREAM VITA CR System Software User's Guide" for information about entering patient data.

4. Search for an existing patient or enter a new patient record.
5. Select **Acquire**.
6. Select a body part from one of the following:
  - Full leg lateral
  - Full leg AP
  - Full spine lateral

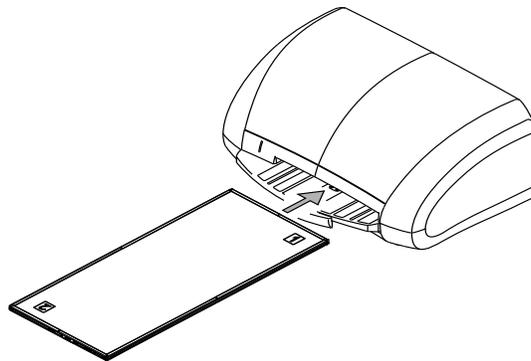
- Full spine AP

## Processing the LLI Cassette

1. Extend the support arm on the front of the CR System.

NOTE: When extended, the support arm aligns the long-length cassette properly and keeps the cassette level while scanning. After scanning, push the arm all the way back in.

2. Insert the end of the cassette labeled “1” into the CR System.



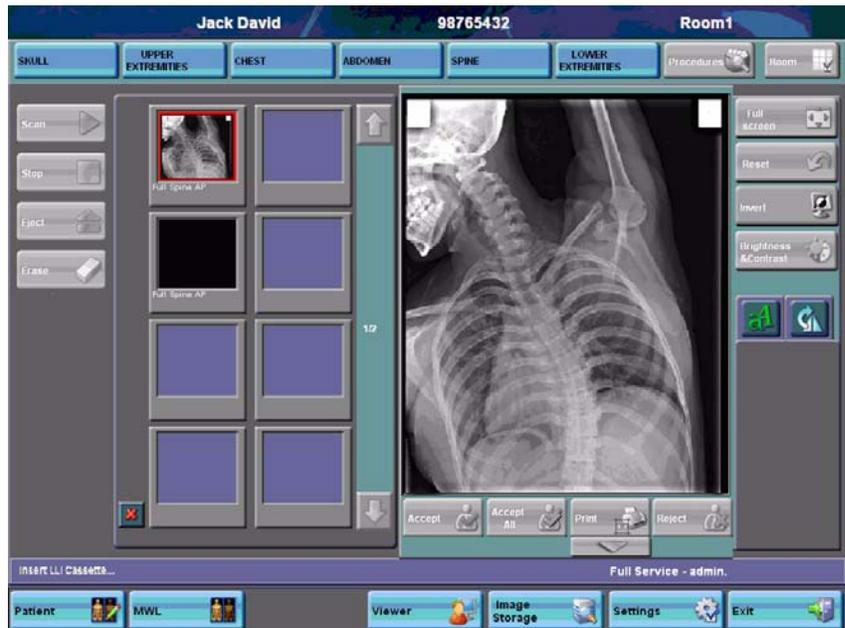
H232\_0002AC

### Inserting the Cassette into the System

NOTE: If auto-scan is selected, scanning begins automatically.

3. Select **Acquire**.

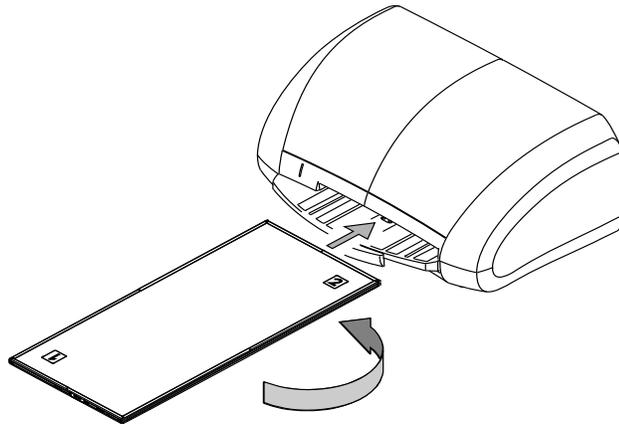
The reader scans the first half of the plate.



### First Half of LLI Exposure

The CR System extracts the phosphor screen and draws it into the drum where one side is read and erased. The screen re-enters the cassette.

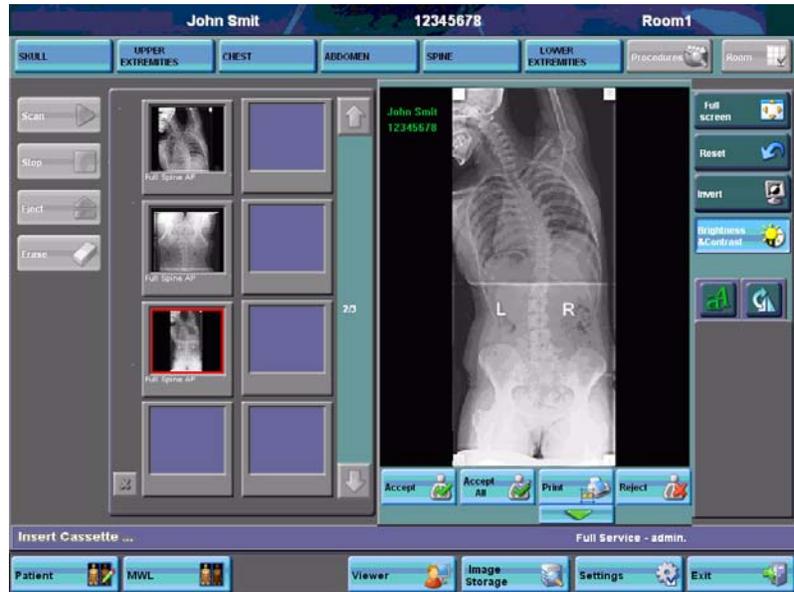
4. Remove the cassette from the processor, turn it 180 degrees, and insert side two into the processor (end of cassette labeled "2").
5. Select the second thumbnail.



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### Processing the Other End of the Cassette.

After the second long-length image is scanned, the screen is erased and returns to the cassette. The images are stitched together automatically. The stitched image appears as a third thumbnail image.



### Stitched Image Displayed

NOTE: You can view each image using by selecting **Full Screen** viewing. See the *CARESTREAM VITA CR System Software Guide* for other viewer options.

IMPORTANT: *You must select **Accept** or **Reject** after scanning is complete before you can exit the screen.*

6. Select **Accept** to send the stitched image to DICOM Workstations, PACs, or printer destinations.

Select **Accept All** to send the stitched image and its components to destinations.

Select **Reject** to send the the stitched image to the database as "Rejected." The resulting image will not be sent to PACs.

# 6 LLI Troubleshooting

## Errors, Causes, and Corrective Actions

Error Message	Cause	Action
The cassette Bar Code ID does not match the top side. Operation is cancelled.	A wrong cassette was used by mistake.	Check that the barcode label does match (bad cassette if not). Or, make sure the first and second sides belong to the same cassette.
Can't choose an LLI sub-organ without a license. Operation is cancelled.	A license may not be present.	Verify presence of a license, by going to the <b>About</b> tab.
Can't choose LLI sub-organ after regular sub organ was chosen. Operation is cancelled.	A non-LLI study was started, but an LLI body parts was selected.	Go to the patient list, reselect the patient, and select non-LLI body part, or select a new patient for an LLI study.
Can't choose bottom before top is scanned, or scan top side twice. Operation is cancelled.	Side two was scanned first. or side one was scanned twice.	Scan side one first, then scan side two. See <a href="#">"Processing the LLI Cassette"</a> on page 5-20.
Can't choose a sub-organ which is not for LLI during LLI study. Operation is cancelled.	A non-LLI body part was selected during an LLI study.	Once you begin an LLI procedure, you must select an LLI sub-organ.
The cassette is not an LLI cassette. Please either replace the cassette or re-select the sub-organ.	A standard cassette was scanned as a long-length cassette. The cassette type is not compatible with the sub-organ.	Select a long-length cassette or select a standard scan.
Can't choose a sub-organ during LLI procedure.	The user attempted to select a new body part between scans one and two.	To choose a different sub-organ after LLI scanning, go to the patient list and select the patient again without the LLI procedure.
Press the Cassette Size button and select a cassette.	The bar code label fails or the cassette bar code is not recognized.	Make sure the bar code label is readable. Allow scan to continue, and choose <b>LLI1</b> or <b>LLI2</b> .
The cassette does not match the selected sub-organ. Please either replace the cassette or reselect the sub-organ.	The cassette type is not compatible with the sub-organ.	Select a long-length cassette, or select a standard scan.
Can't choose a sub-organ during scanning. Operation is cancelled.	The user attempted to select a new body part between scans one and two.	No thumbnail is added. See <a href="#">"Processing the LLI Cassette"</a> on page 5-20.



### Publication History

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