It is critical to verify that any display monitors used to display medical images are kept clean and free of visual obstructions.

Data identification for a DICOM study is only as reliable as the information contained in the data source. Only images associated with the currently active patient context can be exported from the Images component. Each exported image file is in the same format (DICOM part 10 files), and contains the identical patient identification metadata as the original version received by Amalga UIS from the source system.

# Amalga UIS Images Component

You can use the Amalga UIS Images component to:

- Locate and review image studies
- Export and print images
- Review a study
- View multiple studies in a single view
- Make notes, measure, and mark a Region of Interest (ROI)

**Audience**

Trained clinical users, physicians or clinical researchers are expected to use the Amalga UIS Images component.

# Quick Start

**To open the study browser window**

1. In the Amalga UIS home window, double-click the patient visit row.
2. Click **Images** in the list of components.

For an overview of keyboard shortcuts see Keyboard Shortcuts for the Images Component on page 452. For an overview of mouse functions, see Mouse Functions on page 454.

**To view and manipulate an image**

1. In the home window, double-click a patient visit row.
2. Select **Images** in the list of components.
3. Double-click the study you would like to open in the Image Viewer window.
4. To adjust the Window/Level settings, click and drag the pointer.
5. To zoom, rotate the wheel button. Rotate the wheel button forward to zoom in. Rotate the wheel button backward to zoom out.
6. To pan an image in the layout, click the wheel button and drag the pointer. You can pan the image to reveal portions of the image that have been zoomed out of view.
7. To scroll through images in a series, right-click and drag the pointer
8. Click **Reset** to return to the default display in the Imaging component window.

Select **Window/Level**, **Zoom**, or **Pan** in the toolbar to change the function of the principal mouse button. For more information about using the mouse, see Mouse Functions on page 454.

# Images Component Windows

This section introduces the major features of the three main windows in the Images viewer.

## Amalga UIS Medical Imaging Module Component Windows: Overview

The Amalga UIS Medical Imaging Module component contains three windows:

- Info window (i.e., the study browser window)
- Image viewer
- Radiology report

You can use the study browser window to locate image studies of interest, review an overview of image study contents, and select one or more image studies for a more detailed view. Detailed information for each study appears, sorted by date, in columns and rows. Open one or more image studies for a detailed visualization in the Amalga Image Viewer window. If the study has an associated radiology report, open the Radiology Report window for more information. At all times, the Amalga UIS home window remains three or fewer mouse clicks away.

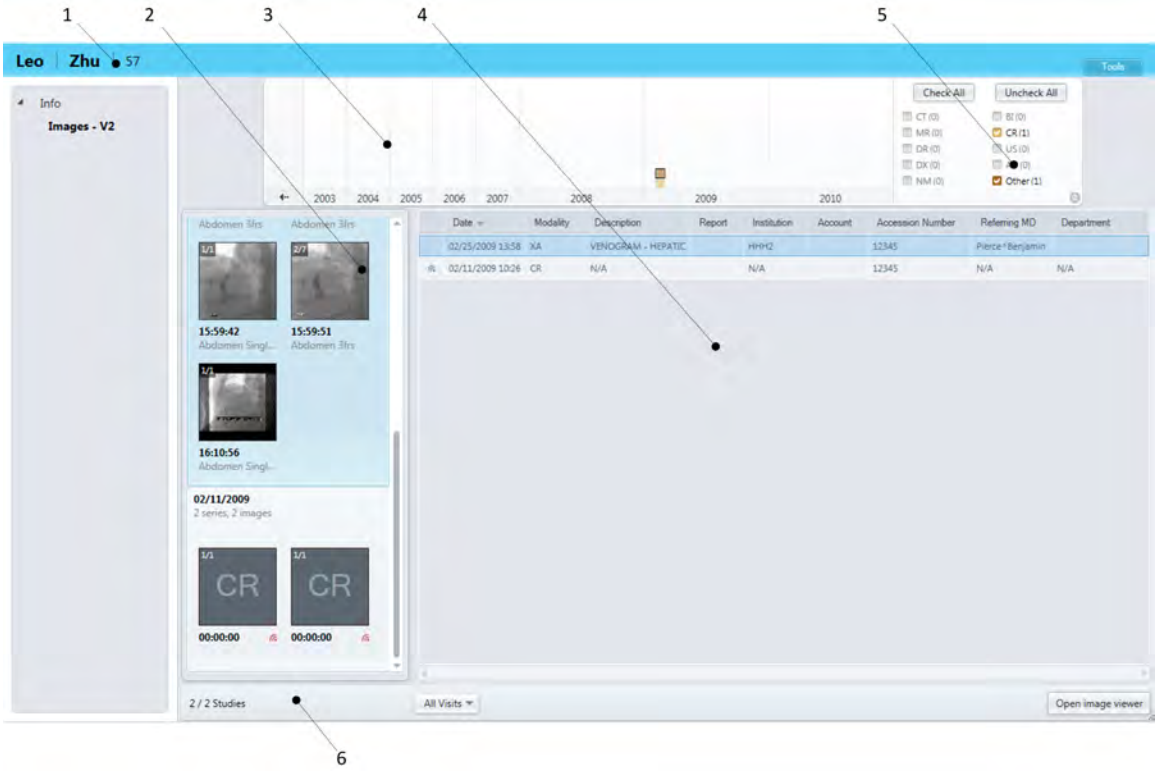
## Medical Imaging Module Component Module Windows

The table below lists all the windows in the Images module user interface.

| Window name | How to open | How to use |
|---|---|---|
| Info window (study browser window) | 1. In the home window, double-click the patient visit row.<br>2. Click **Images** in the list of components. | Select one or more images studies for viewing in the Amalga Image Viewer. The timeline provides a visual overview of the patient history. You can access previous entries and browse a timeline, which allows quick visualization of periods of high imaging activity. |
| Amalga Image Viewer window | 1. In the study browser window, browse for the study in the details view.<br>2. Double-click the study you would like to open. | Using the Amalga Image Viewer window, interact with, manipulate, annotate, and measure one or more images. This window includes five regions with patient banner, thumbnail timeline, toolbar, thumbnail tray, and display area. |
| Radiology Report window | 1. In the study browser window, browse for the study in the Details View.<br>2. Right-click and select **View report**. | Use the Radiology Report window to find and review radiology reports.<br>✓ You can also open the radiology report window from the image viewer window. |

## Study Browser Window: Overview

Using the Info window, referred to here as the study browser window, you can review the imaging history for the selected patient. This window includes six areas: the patient banner (1), thumbnail tray (2), time-line (3), details view (4), modality filter (5), and status bar (6).




## Study Browser Window Areas

The following table summarizes the use of the Info window.

| Area | Feature | Description |
|---|---|---|
| 1 | Patient banner | The default configuration of the patient banner indicates the patient's name and age. |

| Area | Feature | Description |
|---|---|---|
| 2 | Thumbnail tray | The thumbnail tray displays representative thumbnail images (if available) and associated data for each series. Thumbnails provide a visual overview of an individual study. Individual thumbnails present just one series in one study and are grouped together as a whole in the thumbnail tray.<br>The feature contains the following two elements:<br>• **Study**<br>a. **Study Date**<br>mm/dd/yyyy<br>b. **Number of Series, Number of Images**<br>**Study description**<br>Contains descriptive text about the study.<br>• **Series**<br>a. **Thumbnail Image**<br>The thumbnail shows a representative image from the series. The image in the thumbnail is indicated by a number over the total number of images in the series, for example, the thumbnail of image 23 out of 69 images will display 23/69.<br>A thumbnail place holder indicating the DICOM modality will display if the study thumbnail is not available.<br>b. **Series Time**<br>hh:mm:ss<br>c. **Remote Indicator**<br>The remote indicator [ ] will display if the study is available from an off-site image repository.<br>**Using the Thumbnail Tray**<br>• Resize the area of the thumbnail tray by selecting the bar dividing the thumbnail viewer and the details view. Your pointer will change to a right and left arrow. Drag the pointer to resize the viewer.<br>• Double-click a thumbnail-place holder to retrieve the study from the remote location.<br>• Right-click to view a menu with the following option:<br>• **View Series**<br>The selected series opens in the Amalga Image Viewer window.<br>• **Save Study as DICOM**.<br>• **Save Series as DICOM**.<br>For more information see Scanning through the Thumbnail Tray on page 423. |

| Area | Feature | Description |
|---|---|---|
| 3 | Timeline | The timeline provides a graphic overview of the patient's image study history. The timeline has two views: full timeline and minimized timeline. Each study is located on the timeline from the oldest at the left to the most recent on the right. A colored box indicates the modality of the study images and is referenced in the modality filter.<br>• **Full Timeline**<br>The full timeline is a horizontal listing all of the studies performed for the selected patient.<br>• **Minimized Timeline**<br>The minimized timeline provides a compressed, non-interactive view of the patient study history.<br>**Using the Full Timeline**<br>• Review a patient's image study history at a glance. Periods of high imaging study frequency are indicated by densely-clustered icons.<br>• Click on the left arrow to move the focus of the timeline to previous years. The presence of studies in prior years is indicated by gray icons in the left arrow column.<br>• Click on the right arrow to return the focus of the timeline to recent years. The presence of studies in recent years is indicated by gray icons in the right arrow column.<br>• Toggle between the full timeline and the minimized timeline using the chevrons in the lower right hand corner of the modality filter.<br>For more information see Locating Studies Using the Timeline on page 422. |

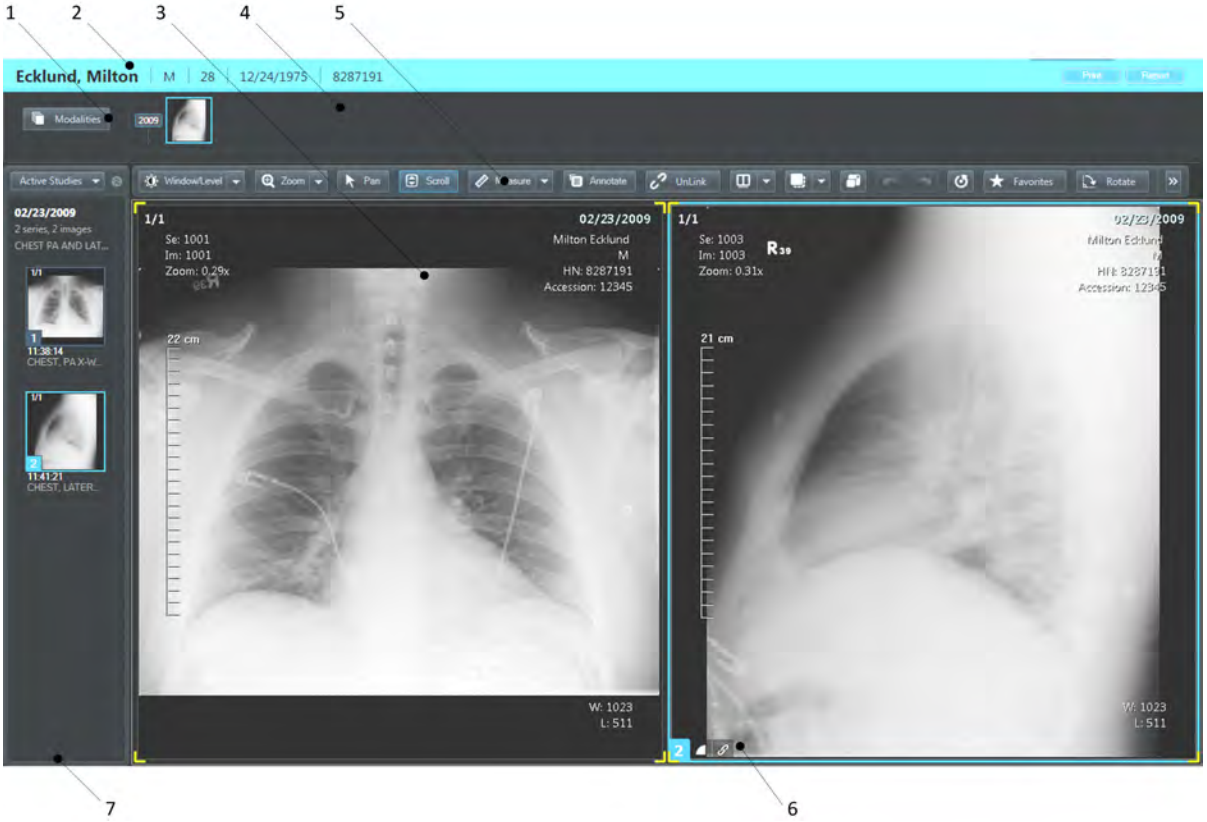
| Area | Feature | Description |
|---|---|---|
| 6 | Status bar | Shows the total number of studies displayed in the details view.<br>**Using the Status Bar**<br>• Click **All visits** to view all visits in the details view.<br>• Click **Selected visit** to view the selection in the details view.<br>• Click **Open image viewer** to access selected studies. |

| Area | Feature | Description |
|---|---|---|
| 5 | Modality filter | The modality filter shows all selectable imaging data modalities. Each modality is associated with a check box.<br>For each check box:<br>• The color indicates the corresponding modality of study icons in the timeline. For example, if dark blue indicates the CT modality in the modality filter, dark blue boxes indicate CT studies in the timeline.<br>• The modality is typically displayed using a two-character code.<br>• The study counter displays the number of studies available in the corresponding modality for the selected visit. If the All Visits is selected, then the number reflects all the studies for the patient.<br>**Using the Modality Filter**<br>• Select a box to show the corresponding modality in the details view and the thumbnail view.<br>• Click **Check All** to select all modality options.<br>• Click **Uncheck All** to remove all modality selections.<br>For more information see Filtering by Modality on page 423. |
| 6 | Status bar | Shows the total number of studies displayed in the details view.<br>**Using the Status Bar**<br>• Click **All visits** to view all visits in the details view.<br>• Click **Selected visit** to view the selection in the details view.<br>• Click **Open image viewer** to access selected studies. |

## Amalga Image Viewer Window: Overview

Using the Amalga Image Viewer window, interact, manipulate, annotate, and measure one or more images.

This window includes six areas: modality filter (1), patient banner (2), display area (3), thumbnail timeline (4) toolbar (5), viewport indicator (6) and thumbnail tray (7).




## Amalga Image Viewer Window Areas

The following table summarizes the use of the Amalga Image Viewer window.

| Area | Feature | Description |
|---|---|---|
| 1 | Modality button | Click **Modality** to open the modality filter. The status of the filter is indicated in the thumbnail timeline by a blue label for Unfiltered, and an orange label for Filtered.<br>For more information, see Filtering by Modality on page 423. |

| Area | Feature | Description |
|---|---|---|
| 2 | Patient banner | The default configuration of the patient banner indicates the patient's name, gender, age, date of birth, and patient number.<br>You can use the patient banner for two actions.<br>• Click **Print** to print the entire display area.<br>• Click **Report** to review a diagnostic report.<br>For more information, see Using the Amalga Image Viewer Patient Banner on page 426. |
| 3 | Display area | The display area is used for visualization of images. You can configure the display of up to four independent series (from the same or different studies). You can, in turn, format each individual display unit can to display the series of images either one at a time, or in a light box mode with up to 36 (6x6) frames shown at a time.<br>The active viewport is indicated with a blue border.<br>If there is a mismatch between the DICOM header and the patient record, each display unit will display a yellow warning bar labeled "The data in this image file does not match the data in the patent record." Click the chevron in the toolbar to display more information about the mismatch. For more information, see Reviewing the Mismatch Warning Window on page 442.<br>The image displayed in the display unit can be a single or a multi-frame image. Each display area shows a number corresponding to the thumbnail in the thumbnail tray when you place the cursor over the area.<br>A bar displays the progress of image series retrieved from storage.<br>You can select only one study at a time even if there are multiple studies displayed in the window.<br>a. Click  (display units) on the toolbar to select:<br>•  1x1<br>•  1x2<br>•  2x1<br>•  2x2<br>b. Click  (viewports) on the toolbar to select a single frame or light box:<br>• **Single**<br>This layout fills the entire layout with a single frame.<br>• **Tiled mode**<br>The tile mode formats the layout into a grid from 1x1 to 6x6. Use the button in the toolbar to choose your configuration.<br>For more information, see Using the Display Area on page 441. |

| Area | Feature | Description |
|---|---|---|
| 4 | Thumbnail timeline | The thumbnail timeline in the Amalga Image Viewer window represents each study as a thumbnail image arranged chronologically, with the earliest on the left to the most recent on the right. The contents of the thumbnail timeline are determined by the selections in the modality filter.<br>If a gap in time appears between one study and another study, the gap will be indicated by three dots [...].<br>**To use the thumbnail timeline**<br>• Hover over a study icon to review the study date, study description, and modality.<br>• Click the left arrow to navigate to previous studies in the patient timeline. The visible portion of the timeline appears in the navigation bar.<br>• Click on the right arrow to navigate to later studies in the patient timeline.<br>• Select an image by clicking and dragging the image either to the thumbnail tray or into a display unit in the display area. Note that any study that is active will retain a selection highlight.<br>For more information, see Using the Thumbnail Timeline on page 427. |

| Area | Feature | Description |
|---|---|---|
| 7 | Thumbnail tray | The thumbnail tray provides a visual overview of each open study and it also provides access to open studies in the display area. Each open study has an independent area within the thumbnail tray.<br>• **Favorites**<br>Favorite images appear at the top of the thumbnail tray. A star in the upper right corner of each favorite thumbnail indicates that it is a favorite.<br>• **Layout indicator**<br>Images in the display area will have a layout number indicating in which display unit the image is displayed. The number in the thumbnail corresponds to a number in the display area.<br>• **Remote indicator**<br>The remote indicator [ ] will display if the study is available from an off-site image repository.<br>**To use the thumbnail tray**<br>• Select a thumbnail filter set from the list, either All Studies, Active Studies, or Active Series. The current selection is displayed in the box.<br>• Click the chevron to collapse or expand the thumbnail tray.<br>• Click and drag a thumbnail into the display area to load an image or series.<br>• Expand and collapse thumbnails to see individual images within the series.<br>For more information, see Using the Thumbnail Tray on page 439. |

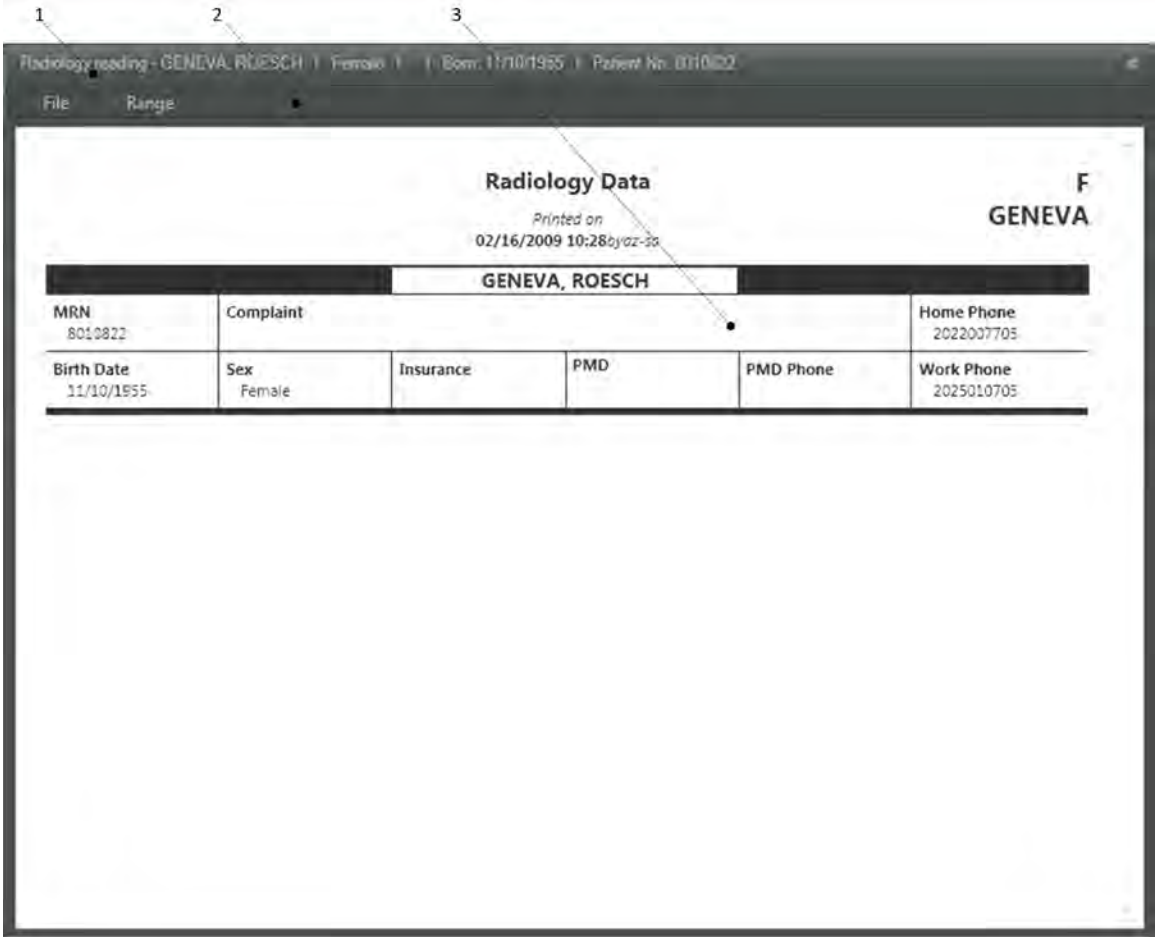
| Area | Feature | Description |
|---|---|---|
| 6 | Viewport indicators | The active viewport contains up to three icons. In addition, the active viewport displays a blue border.<br>• The following icons indicates the resolution of the image displayed in the viewport that has focus.<br>  Lossy icon indicates the image uses lossy compression as an image preview.<br>  Downloading indicates the Images component is retrieving the uncompressed image from remote storage.<br>  Lossless icon indicates the image is uncompressed and represents the image data contained within the DICOM file.<br>•  The active viewport indicator corresponds to the active image in the series displayed in the thumbnail tray.<br>• The link icon indicates the image is linked to other images in the display area.<br>**To use the link icon**<br>a.  Click the link icon to break the link for the image<br>b.  Click the broken link icon to re-link the image.<br>For more information, see Linking Images for Synchronized Viewing on page 436. |

| Area | Feature | Description |
|---|---|---|
| 7 | Thumbnail tray | The thumbnail tray provides a visual overview of each open study and it also provides access to open studies in the display area. Each open study has an independent area within the thumbnail tray.<br>• **Favorites**<br>Favorite images appear at the top of the thumbnail tray. A star in the upper right corner of each favorite thumbnail indicates that it is a favorite.<br>• **Layout indicator**<br>Images in the display area will have a layout number indicating in which display unit the image is displayed. The number in the thumbnail corresponds to a number in the display area.<br>• **Remote indicator**<br>The remote indicator [ ] will display if the study is available from an off-site image repository.<br>**To use the thumbnail tray**<br>• Select a thumbnail filter set from the list, either All Studies, Active Studies, or Active Series. The current selection is displayed in the box.<br>• Click the chevron to collapse or expand the thumbnail tray.<br>• Click and drag a thumbnail into the display area to load an image or series.<br>• Expand and collapse thumbnails to see individual images within the series.<br>For more information, see Using the Thumbnail Tray on page 439. |

## Radiology Report Window: Overview

You can use the  radiology report window to review, print, and find related diagnostic reports for the selected study.

This window includes three areas: patient banner (1), report menu (2), the report header (3), and the report (4).




## Report Window Areas

The following table summarizes the use of the report window.

| Area | Feature | Description |
|---|---|---|
| 1 | Patient banner | The patient banner indicates the patient's name, gender, age, date of birth, and patient number. |
| 2 | Report menu | Using the report menu you can close, print, preview the print, or find a range of related reports.<br>For more information see Accessing a Report on page 426. |
| 3 | Report header | The report header displays the report header associated with the selected study. |
| 4 | Report | The report area displays the report associated with the selected study. |

# Using the Study Browser Window

This section looks at using the Info window, referred to this manual as the study browser window, to review medical image information by filtering by image type, comparing images, using the study details view, using the timeline, and saving DICOM series or study information.

## Locating Studies Using the Timeline

You can locate and select any image study using the timeline. The detail study list and thumbnail view will reflect your interactions with the timeline.

The timeline initially appears as the full timeline. You can collapse the timeline to make room for other study browser window elements. For more information on the study browser window, see Study Browser Window: Overview on page 409.

## Timeline Overview

### Full Timeline


In the timeline, each image study is represented by a color-coded box. The color coding represents image modality. Each box is located on the timeline according to the date of occurrence. Studies that occurred on or near the same date are stacked.

Using the timeline you can find periods of frequent image study activity, gain an overview of the patient's history, filter by modality, select image studies, and collapse the timeline by clicking on the chevrons in the lower-left-hand corner.

For information on filtering by modality, see Filtering by Modality on page 423.

### Minimizing the Timeline

The timeline can be collapsed. The timeline is not active when minimized. You can return to the full timeline by clicking the chevrons in the lower-right-hand corner.

## Using the Study Browser Timeline

You can use the timeline to navigate through a chronology of image studies for a patient.

**To find and open an study from the timeline**

1. Navigate to a study of interest.
   - Click the left arrow to navigate to older studies in the patient timeline.
   - Click the right arrow to navigate to recent studies in the patient timeline.
   - Click the label for a year to expand the timeline column from the year to the months of that year.
   - Hover over a study icon to review the study date, study description, modality, and the first sentence from the report (if available).

2. Click the study icon to select the image study

   The corresponding row in the detailed study list is also selected.

3. Click **Open image viewer** to view the selected image study.

**To minimize the timeline**

- Click the chevron in the lower-right-hand corner of the timeline.

**To expand the timeline**

- Click the chevron in the lower-right-hand corner of the timeline.

## Filtering by Modality

You can use the modality filter in the study browser window to filter studies by modality. For information on the types of studies supported by the Medical Imaging Module component, see Modality Support on page 458.

You can also access the modality filter in the Image Viewer window by clicking **Modality**. The status of the filter is indicated in the Image Viewer by a blue label for Unfiltered, and an orange label for filtered.

A given study can contain more than one series of differing modalities. If a study has any of the selected modalities, that study will be available in the details view, thumbnail viewer and timeline.

The Images component can be customized for your site. For more information, see Configure the Images Component and the DICOM Manager Component on page 165.

**To filter by image modality**

1. In the Amalga UIS home window, double-click a patient visit row.
2. ClickImages in the list of components.
3. If the Timeline is minimized, click **Modality filter**.
4. Select the modalities you would like to hide from the list in the details view, the thumbnail view, and timeline.

**To filter by all modalities**

1. In the home window, double-click a patient visit row.
2. Click **Image Viewer** in the list of components.
3. If the timeline is minimized, click **Modality filter**.
4. Click **Uncheck All**.

**To remove the modality filter**

1. In the home window, double-click a patient visit row.
2. Select **Image Viewer** in the list of components.
3. If the Timeline is minimized, click **Modality filter**.
4. Click **Check All**.

## Scanning through the Thumbnail Tray

You can use the thumbnail tray to browse patient studies, and load studies in the Image Viewer window. For more information on the study browser window, see Study Browser Window: Overview on page 409.

### Thumbnail Tray Overview

A thumbnail is a small image taken from the series it represents.

An individual study is comprised of a number of series. You will note that in scanning through the thumbnail tray that some studies contain multiple thumbnails (series).

A series may be single-frame image, a sequence of individual frames, a multi-frame image, or a sequence of multi-frame images. For instance, a radiology scan might be a single-frame image stored as a series in a study. An ultrasound reading may be a multi-frame image stored as another series in the same study. Even though these different images were created using different devices, they may be organized into a single study. However they would be represented as different series within the same study.

The study in the thumbnail tray contains a summary for each study with the date, number of series, number of images. and description. Each study also contains a thumbnail representation of each series. The series is identified by time.

An individual thumbnail contains a representative image of the series. In the left corner, it contains two numbers showing where the images occurs within the series. For example, image 21 out of 67 displays as 21/67.

## Selecting Studies Using the Thumbnail Tray

When you select a study in the thumbnail tray, the corresponding study will be selected in the details view and in the timeline.

**To select a study**

- Click a thumbnail to select the related study. The thumbnail represents one series in one study.

When you select **Open image viewer**, the selected studies remain selected and is loaded in the thumbnail tray. Their sort order in the thumbnail tray retains the order in the details view. The first study in the sorted list appears in the display area of the Image Viewer.

**To resize the thumbnail tray**

1. Move the pointer over the divider.
2. When the pointer becomes a double-headed arrow, drag the pointer to resize.

## Scanning through the Details View

You can use the details view to browse patient studies, sort, select, and view study reports. You can select a study and load the selection into the Image Viewer window. For more information on the study browser window, see Study Browser Window: Overview on page 409.

When you select a study in the details view, the corresponding study will be selected in the thumbnail tray and the timeline.

**To select a study**

- Click a patient study row in the details view.

**To sort by the values in a column**

1. Click the column header.
2. Click the column header again to reverse the sort order.

**To open a report**

1. Right-click on the study row.
2. Select **Open report**.

## Saving an Image Study as a DICOM File

In the study browser window, you can save the entire study as a DICOM file. Select a study, right-click, and select **Save Study as DICOM**.

When saving the DICOM study file, the DICOM header is the same as the one initially received by the Amalga UIS from the image source. This information will be the same even if the patient information has been updated in the Amalga UIS. For example, if a CT is received by the Amalga UIS and the patient name is updated, when saving the DICOM study file the name will be same as when the Amalga UIS initially received the study; the name, as part of the DICOM header, will not reflect the change.

Although the file saved from the Images component contains diagnostic quality data, the saved file does not include a DICOM DR or a self-contained DICOM image viewer.

**To save a DICOM study**

1. Select an image study in either the thumbnail tray or details view.
2. Right-click and click **Save Study as DICOM**.
3. Navigate to the file location, and click **OK**.

**To save a DICOM series**

1. Select an image study in the thumbnail tray.
2. Right-click and select **Save Series as DICOM**.
3. Navigate to the file location, and click **OK**.

**To cancel an in-progress save**

- Click **Abort**.

## Viewing a Patient Image Study History

When you select the initial study for review, the study browser window provides a comprehensive overview of patient imaging history. Studies are sorted by time. Periods of frequent image studies appear as dense clusters of study icons in the timeline. You can browse for relevant details using the timeline and detailed study list together, or limit content by filtering by specific modalities.

You can select a study to review and open the Amalga Image Viewer window to visualize the images in greater detail. You can also select and load a prior or related study to view together with the study of interest.

# Using the Amalga Image Viewer Window

This section introduces the features of Amalga Image Viewer. These topics describe how to perform common tasks on studies.

## Selecting an Image to Display

The study selected in the study browser will load in the Amalga Image Viewer window. If you selected multiple studies, the study that appears first in the list in the display area of the study browser will load in the Amalga Image Viewer.

A number of changes to the display will accompany the loading of the study.

- If the image is a series, stack scrolling controls will automatically appear.
- If the image is a cine, the cine controls automatically appear and the cine will play.

- A blue borders highlights the active display area.
- A number in a blue box displays that corresponds to the active thumbnail in the timeline and thumbnail tray.
- The image automatically loads into the active display unit. The initial display may not be full fidelity. An icon in the lower left corner of the display unit indicates whether the displayed image is full fidelity or lossy.

You can replace the study displayed in the Amalga Image Viewer by selecting another study and double-clicking or dragging the study into the active display area.

## Comparing to a Prior Study

You can compare a current study with a prior study by accessing the current study, loading the prior study, and displaying the current and prior image side-by-side in the Image Viewer window. You can refer to the highlighted dates and times in the image information to identify the prior study.

**To compare to a prior study**

1. In the study browser window open a current study.
2. Click  (display units) and select **1x2**.
3. Find an image of interest in the thumbnail timeline and drag it into the first display unit. This will display the first image of the first series.
4. Find a prior study to compare to the first in the thumbnail timeline, and drag into the second display unit.
5. Navigate through your current and prior studies to compare regions of interest.

✓ You can also link the studies for to coordinate the view of the images. For more information see Linking Images for Synchronized Viewing on page 436.

## Using the Amalga Image Viewer Patient Banner

The default configuration of the patient banner indicates the patient's name, gender, age, date of birth, and patient number. You can use the buttons on the right hand side of the patient banner to print the displayed image or access a report.

### Printing a Displayed Image

You can print all image views in the window to a single page print out. The print out includes a patient information label above the image, and a label that indicates the print is not of diagnostic quality.

**To print an image**

- Click **Print** in the patient banner.

### Accessing a Report

You can view the diagnostic report associated with current selected study. From the Report window you can:

- Select reports by accession number, account number, or all accounts
- Review a print preview
- Print the report

For an overview of the report window, see Radiology Report Window: Overview on page 421.

**To launch the study diagnostic report**

1. Select a study.
2. Click **Report** in the patient banner.

**To print the study diagnostic Report**

1. Select **File**.
2. Select **Print**.

**To view the print preview for the Study Diagnostic Report**

1. Select **File**.
2. Select **Print preview**.

**To select patient reports by accession number**

1. Select **Range**.
2. Select **Selected Accession number**.

**To select patient reports by account number**

1. Select **Range**.
2. Select **Selected Account**.

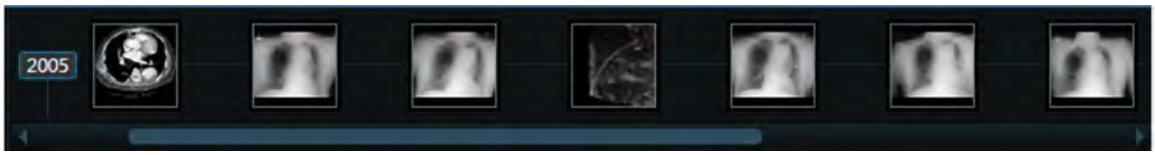
**To display all of the patient's reports**

1. Select **Range**.
2. Select **All Accounts**.

# Using the Thumbnail Timeline

You can locate and select a study using the thumbnail in the Amalga Image Viewer window.

## Thumbnail Timeline Overview




The thumbnail timeline in the Amalga Image Viewer window shows a row of study thumbnail previews in reverse chronological order. Place the mouse over an image in the timeline to review additional study information.

The filter can hide studies from view by modality.

## Using the Thumbnail Timeline

You can use the thumbnail timeline to navigate through a chronology of studies. You can also click **Modalities** to filter the timeline by modality. The status of the filter is displayed in the timeline, as either filtered or unfiltered.

**To find and open an image from the thumbnail timeline**

1. Navigate to a study of interest.
   - Click the left arrow in the navigation bar to navigate to previous studies in the patient timeline.
   - Click the right arrow in the navigation bar to navigate to recent studies in the patient timeline.

- Click the active area of the bar and drag right to view past studies and draft left to view more recent studies.
- Hover over a study icon to review the study date, study description, and modality.

> Gaps in the timeline will be indicated by three dots. The dots indicate there are not any studies for the patient during the time period.

2. Double-click the study of interest to load the image study in the thumbnail tray and load the image in the display area.

> You can also double-click the study in the thumbnail tray and it will open in the display area.

**To filter the thumbnail timeline by modality**

1. Click **Modalities** .
2. Select the modalities you would like to hide from the list in the details view, the thumbnail view, and timeline.
3. Click **Ok**.

# Using the Amalga Image Viewer Toolbar

The toolbar contains tools for working with medical images.

## Adjusting the Window Width and Window/Level

You can use the Window/Level tool to change the mapping of the pixel sample values that make up the image to the dynamic range of the display. This has the effect of changing the brightness and contrast of anatomical features in an image.

The tool provides two interactive options: Manual Window/Level, and Region Window/Level. Other standard Window/Level options include invert, optimize, and return to the default Window/Level settings found in the image data.

In addition there are preset Window/Level settings for CT images. CT Window/Level presets include settings for bone, lung, soft tissue, brain, and liver. These presets are not available for other modalities.

**To manually set Window/Level for an image**

1. Click the **Window/Level** arrow.
2. Select **Manual**.
3. Click and drag anywhere on the image to change the Window/Level settings.
    - Drag up to increase the level value.
    - Drag down to decrease the level value.
    - Drag left to decrease the width value. The image contrast will increase.
    - Drag right to increase the width value. The image contrast will decrease.

**To optimize the Window/Level settings over a specified region of an image**

1. Click **Window/Level**.
2. Select **Region**.
3. Click the upper left corner of area.
4. Drag to the lower right corner of the area.
5. Release the mouse button to define the area.

**To invert black and white values for the Window/Level for an image**

1. Click **Window/Level**.
2. Select **Invert**.

The Invert item in the Window/Level menu display a checkmark when the image is inverted.

**To optimize window/level for the entire image**

1. Click **Window/Level**.
2. Select **Optimize range**.

**To return the image display to default**

1. Click **Window/Level**.
2. Select **Default Setting**.

**To select a preset Window/Level value (CT only)**

1. Click **Window/Level**.
2. Select the presets for a variety of tissue or bone, for example, brain, liver, or bone.

## Zooming an Image

You can use the zoom tool and zoom map to increase or decrease the image size displayed in the displayed unit.

Using the zoom tool will stop a playing cine.

### Manually Zooming In and Out of a Map

Zoom in or out of an image using three zoom tools, the manual zoom, region zoom, and fit-to-window.

**To manually zoom in or out on an image**

1. Click **Zoom**.
2. Select **Manual**.
3. Click drag across the image.
4. Drag up to zoom in.
5. Drag down to zoom out.
6. Select the visible region in the Zoom Map.

**To zoom in on a region of a selected image**

1. Click **Zoom**.
2. Select **Region**.
3. Click and hold the mouse button at the upper left corner of region to zoom.
4. Drag to the lower right corner of the region to zoom.
5. Release the mouse button.

**To fit the image to the window**

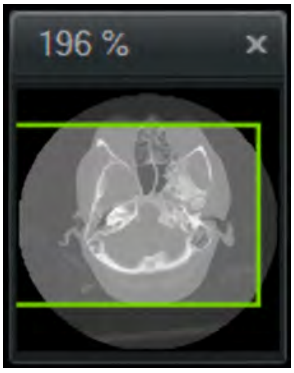
1. Click **Zoom**.
2. Select **Fit to viewport**.

### Using the Zoom Map

When you zoom or pan a study in the Amalga Image Viewer, the zoom map appears in the lower-right corner of the display area. The map provides context for the area of the image visible in the Amalga Image Viewer window. The area is indicated by a green box. A percentage of zoom appears above the image.

As you zoom, the box will reduce in size to reflect the currently visible area. As you zoom out, the box will increase in size. As you pan across the study, the box will move.

The following image shows the zoom map.




**To use the zoom map to navigate an image**

1. Select the area within the green box.
2. Drag the box to pan the image.

✓ Click an area of the image in the zoom map to move the viewable region to that point.

**To minimize the zoom map**

- Click the **x** (close button) in the title bar.

**To open the zoom map**

- Click the zoom map icon.

The zoom map only appears when any portion of an image falls outside of the active display area. When playing a cine, the zoom map will disappear; if the cine stops, the zoom map will appear again.

When switching viewport layout from 1x1 to another configuration, the zoom map will disappear. If you switch back to 1x1, the zoom map will reappear.

## Panning an Image

Panning an image allows the user to move a zoomed image within an active display unit.

Using the pan tool will stop the playback of a cine.

**To pan an image**

1. Click **Pan**.
2. Click and drag the image.

## Scrolling Through a Series

Scrolling a series allows you to move forward and backward with the mouse within an active display unit.

**To scroll an image**

1. Click **Scroll**.
2. Click the series.
3. Drag the cursor forward to increase the image number in the series. Move the mouse rapidly to increase the speed of the scroll.
4. Drag the cursor backward to decrease the image number in the series. Move the mouse rapidly to increase the speed of the scroll.

# Measurements

This section looks at using the angle, distance, point, and region of interest tools to measure an image.

> Using a measurement tool will stop the playback of a cine.

## Measurement: Overview

You can measure features using the calipers, points, angle and ellipse tools. You can perform multiple measurements on your images. The Image Viewer window shows measurements for images that have associated pixel calibration data. Pixel calibration data defines the dimensions of image pixels in real world units (such as mm/pixel), and are included as part of the DICOM data set.

The medical image may contain two types of calibrated data: spatial and pixel sample value.

The spatial calibration corresponds to the real-world size of the pixels. Pixel calibration data defines the dimensions of image pixels in real world units (usually mm/pixel), and are included as part of the DICOM data set. When present in an image, spatial-calibration allows for distance measurements and the display of the ruler.

Another type of calibration, pixel sample value depends on the imaging technology. For CT images, pixel sample value is calibrated using Hounsfield Units (HU). Pixel sample values for other modalities is relative.

> When clinicians perform measurements on projection images, which include modalities CR, DX, XA, MG, and IO, they yield results similar to measurement taken directly from traditional film images. Projection images are subject to geometric distortion. Distance and area measurements taken using these modalities will not be the dimensions of actual body parts.

> You will not be able to save your measurements.

## Using the Selection Tool

You can use the selection tool to select and move the position of a measurement or annotation. You can also use the tool to delete a measurement or annotation.

> ✓ You can turn a measurement into the selection tool by holding the ALT key.

**To select and move a measurement or annotation**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Selection** to change the pointer to the Selection tool.
5. Click the measurement or annotation.

   > ✓ You can click either an endpoint or line. Clicking an endpoint lets you edit the length or angle of the line segment. Clicking on the line allows you change the position of the measurement.

6. Drag the measurement or annotation to the new position.

**To select and delete a measurement or annotation**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Selection** to change the pointer to the Selection tool.

5. Click the measurement or annotation.
6. Right-click and select **Delete**.

## Using Distance Measurements

You can use the distance tool to measure the distance between two points.

Distance measurements are not available for images that have not been spatially calibrated.

**To measure a distance**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Distance** to change the pointer to the Distance tool.
5. Click at the beginning point of the line.
6. Drag the distance tool at the end point of the measurement.

**To edit a measurement**

1. Move the pointer over an measurement point.
2. Click the line to increase the length, decrease the length or rotate the measurement.

**To delete a measurement**

1. Select a distance measurement.
2. Right-click and select **Delete**.

**To move a measurement**

1. Select a distance measurement.
2. Drag and release the measure.

## Using Angle Measurements

You can use the angle or Cobb angle tool to measure the angle or Cobb angle.

Use the Cobb angle tool to measure the angle between two unconnected lines within an image. The Cobb angle is the angle formed between a line drawn parallel to the superior endplate of one vertebra above a fracture and a line drawn parallel to the inferior endplate of the vertebra one level below the fracture.

**To measure an angle**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Angle** to change the pointer to the Angle tool.
5. Click to define the first ray of the angle.
6. Click to define the vertex of the angle.
7. Click to define the end point of the second ray.
8. Drag either ray to adjust the angle.

**To measure a Cobb angle**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Cobb Angle** to change the pointer to the Cobb Angle tool.
5. Click to define the first line of the Cobb angle.

6. Drag and release to define the second line of the Cobb angle.
7. Drag to change the angle and length of each side.

**To delete an angle measurement**

1. Select an angle measurement.
2. Right-click and select **Delete**.

**To move an angle measurement**

1. Select an angle measurement.
2. Drag and release the measurement.

**To edit an angle measurement**

1. Move the pointer over a ray of the angle.
2. Select the angle and reposition the desired angle.

## Using Point Measurements

You can use the point tool to measure the pixel value at a point.

> You will not be able to use this tool when displaying a preview image.

**To measure a point**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Point** to change the pointer to the point tool.
5. Click to set a point value measurement.

**To delete a point**

1. Select a point measurement.
2. Right-click and select **Delete**.

**To move a point**

1. Select a point measurement.
2. Drag and release the measurement.

## Using a Circular ROI

You can use the circular ROI tool to measure the pixel value of a circular shape.

> You will not be able to use this tool when displaying a preview image.

The image will show the following pixel densities for the region:

- **Average**:
  Average pixel value.
- **Std. Dev**:
  Standard deviation in pixel value.
- **Min**:
  Minimum pixel value.
- **Max**:
  Maximum pixel value.
- **Area**:
  Area of the region of interest.

**To measure a circular ROI**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Measure**.
4. Select **Circular ROI** to change the pointer to the circular measure tool.
5. Click and drag the area to define the measurement area.

# Annotations

You can mark parts of an image using annotations such as lines, circles, and text.

Nontextual annotations overlay the image and will adjust as you zoom, pan, and rotate an image. However, text annotations will remain unchanged by your changes in image orientation.

Using an annotation tool will stop the playback of a cine.

## Annotate an Image

Mark the interesting parts of an image using annotations such as lines, circles, and text. Select, move, or delete lines and circles. Click text to add, delete, or modify your notes.

You will not be able to save your annotations.

**To add text to an image**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Annotate**.
4. Select the **text tool**.
5. Click the text tool at the location on the image where you would like to add your text annotation.
6. Enter your annotation.

**To use an arrow to mark highlights in an image**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Annotate**.
4. Select the arrow tool.
5. Click to place the first point of the line.
6. Drag the end point to draw a line with an arrow.
7. Enter a note.

**To highlight an area of image with a circle or ellipse**

1. In the study browser window, select a study.
2. Click **Open image viewer**.
3. Click **Annotate**.
4. Select the circle tool.
5. Click the circle tool at the upper right curve.
6. Drag the circle tool at the lower left curve.

**To delete an annotation**

1. Select an annotation.
2. Right-click and select **Delete**.

**To move an annotation**

1. Select an annotation.
2. Drag and release the annotation.

**To hide annotations**

1. Click the chevrons in the Amalga Image Viewer window toolbar.
2. Select **Display**.
3. Select **Off**.

**To show annotations**

1. Click the chevrons in the Amalga Image Viewer window toolbar.
2. Select **Display**.
3. Select **On.**

## Using Display Units and Viewports

The display area is used for visualization of images. You can configure the display of up to four independent series (from the same or different studies) in display units. You can, in turn, format each individual display unit to display the series of images either one at a time, or in light box mode with up to 36 (6x6) viewports shown at a time.

You can use  (display units) or  (viewports) on the toolbar in the Amalga Image Viewer window to configure up to four independent series (from the same or different studies). Each active display unit displays a blue border.

The display unit has four main features:

- **Display unit indicator**

  Each unit is numbered 1 to 4. The thumbnail tray will also show the corresponding display unit indicator for studies.

- **Mismatch warning**

  When the DICOM data in the file and the data in Amalga UIS do not match, a mismatch warning is displayed in the viewport. For more information see Reviewing the Mismatch Warning Window on page 442.

- **Preview status**

  As a study loads the first image, a preview label appears. As the high-fidelity image loads, a blue progress bar indicates progress. Image fidelity status is either full fidelity or lossy.

- **Configurable viewports**

  Each individual display unit can in turn by formatted to display the series of images either one at a time, or in light box mode with up to 36 (6x6) frames shown at a time.

✓ To display side-by-side studies, you can specify a display layout and drag studies into each area. In addition to displaying one study in one frame and another study in another frame, you can divide an area into a grid to display individual frames from a multi-frame image.

## Using Display Units

You can use the display units layout to reconfigure the display area to view a single series, a pair of series, or four series.

**To reconfigure the display in one of four different configurations**

1. Select  (display units) in the toolbar.
2. Select a layout from the four options.
   -  1x1
   -  1x2
   -  2x1
   -  2x2

## Using Viewports

You can use the viewport to change the display format for an image series. The available options are stacked (one image per display unit), or light box (up to a 6x6 grid per display unit).

**To configure a series layout to display a single frame**

1. Select  (viewports) in the toolbar.
2. Select **Single**.

**To configure a image layout to display series in a grid**

1. Select  (viewports) in the toolbar.
2. Select **Light Box**.
3. Select the desired layout grid for your series (1x1 to 6x6).

# Linking Images for Synchronized Viewing

You can use the Link tool to synchronize two related series as you zoom, pan, flip, rotate, scroll, or change Window/Level. Use the Unlink tool to unlink the image and disconnect the series synchronization. You can also use the viewport indicators to unlink and link images.

The following procedures cover how to linek two images, but you can link up to four viewports using a variation of these steps.

**To link images by dragging them from the thumbnail tray**

1. In the study browser window, select an image series.
2. Click **Open image viewer**.
3. Click  (display units) and select **1x2**.
4. Place a second image series from the thumbnail tray into the second layout, using a drag-and-drop operation.
5. Click **Link**.
6. Zoom, pan, adjust Window/Level, flip, or rotate the linked images.
7. Press SHIFT to temporarily unlink a single display unit from synchronization.

   For example, to pan two linked CT images after they are linked, click the pan tool, and then press SHIFT and click the CT you would like to move, and adjust it. After adjusting it, release shift key and all of your display units will return to synchronized viewing.

**To link images by dragging them from the thumbnail timeline**

1. In the study browser window, select an image series.
2. Click **Open image viewer**.
3. Click  (display units) and select **1x2**.
4. Navigate to the prior image using the thumbnail timeline.

5. Place a second image series from the thumbnail timeline into the second layout using a drag-and-drop operation.
6. Click **Link**.
7. Zoom, pan, adjust Window/Level, flip, or rotate the linked images.
8. Press shift to temporarily unlink a single display unit from synchronization.

**To unlink images**

- Click **UnLink**.

**To unlink the images using the active indicator**

- Click on the  (link) indicator to link the unit.

**To relink the image using the indicator**

- Click on the  (broken link) indicator to restore the link.

## Undoing or Redoing an Action

In the toolbar click  (undo) or  (redo) to either undo an action or redo an undone action.

**To undo an action**

- Click 

**To redo an undone action**

- Click 

## Maximizing the Display Area

You can hide the thumbnail tray and the thumbnail timeline to increase the viewable area in the Amalga Image Viewer window.

**To display full screen**

Click  (full screen) display in the toolbar.

**To restore the thumbnail tray and thumbnail timeline**

Click  (exit full) screen display in the toolbar.

## Resetting the Amalga Image Viewer Display

You can return the settings in the Amalga Image Viewer window display to the default settings by selecting reset.

**To reset the image viewer display**

- Click  **Reset** in the toolbar.

## Setting Your Amalga Image Viewer Preferences

Set your Amalga Image Viewer window preferences to configure your work area for DICOM information display, annotations, and ruler display.

> Settings will revert to the configured system defaults when the Amalga Image Viewer window is closed.

**To set your Amalga Image Viewer preferences**

1. Click the chevrons in the toolbar.
2. Select **Display**.
3. Select your settings.

## Overview of Display Preferences Settings

The list below explains each preference setting and the default configuration.

**Image Details**

The Image Detail information display can show DICOM information over the image. On is selected by default.

- **On**
  Turn on DICOM information display.
- **Off**
  Turn off DICOM information display.

For more information, see Modality Support on page 458.

**Annotations/Measurements**

Annotations and measurements display your notes and measurements over the image. On is selected by default.

- **On**
  Show all annotations and measurements on the image.
- **Off**
  Hide all annotations and measurements on the image.

For more information, see Annotating and Measuring an Image Overview.

**Ruler**

The ruler displays a length measure calibrated for the image. On is selected by default.

- **On**
  Show the ruler on the image. Note that ruler will not display for uncalibrated images.
- **Off**
  Hide the ruler on the image.

**Text Confirmation**

Text conformations are set to display by default.

- **On**
  Display text confirmations.
- **Off**
  Hide text confirmations.

**Flagged Images**

Flagged images are disabled by default.

- **On**
  Display flagged images.
- **Off**
  Hide flagged images.

For more information, see Annotating and Measuring an Image Overview.

# Rotating and Flipping an Image

You can rotate or flip an image to change its presentation.

**To rotate an image 90 degrees**

1. Click the chevrons in the toolbar.
2. Select **Rotate**.
    - Click **90 CW** to rotate the image in the active viewport 90 degrees clockwise.
    - Click **90 CCW** to rotate the image in the active viewport 90 degrees counter clockwise.

**To flip an image**

1. Click the chevrons in the toolbar.
2. Select **Rotate**.
    - Click **Flip Vertical** to flip the image vertically.
    - Click **Flip Horizontal** to flip the image horizontally.

## Adding and Removing an Image from the Favorites List

You can mark images as favorites to quickly access them from the thumbnail tray. Favorite images appear first and expanded in the thumbnail tray. An icon indicating the favorite images appears in the upper right hand corner of the thumbnail.

**To add an image to favorites**

1. Click the chevrons in the toolbar.
2. Select **Favorites**.
3. Click **Add to favorites**.

**To remove an image from favorites**

1. Click the chevrons in the toolbar.
2. Select **Favorites**.
3. Click **Remove**.

# Using the Thumbnail Tray

You can use the thumbnail tray to scan through your currently selected studies. You can also close the thumbnail tray to increase the size of the display area.

The thumbnail tray contains eight elements: chevrons (1), image count (2), favorite (3) display unit indicator (4), remote indicator (5), series time (6), thumbnail image (7), Plus [+] or negative [-] sign (8), study date (9), and thumbnail filter (10).


## Thumbnail Tray Elements

The following table summarizes the use of the thumbnail tray.

| Element | Feature | Description |
|---|---|---|
| 1. | Chevrons | The chevrons point up to indicate an open thumbnail tray. The chevrons point down to indicate a closed thumbnail tray. |
| 2. | Image count | The corresponding image number within the series , and the total number of images in the series are shown as a text overlay. For example, the thumbnail of image 23 out of 69 images will display 23/69. |
| 3. | Favorite | A star indicates that the study is a favorite. |
| 4. | Display unit indicator | An icon indicates the position of the study in the display area. The display area can contain up to four display units. In this example, the study is in position 1. |
| 5. | Remote indicator | The remote indictor icon [ ] displays for studies stored in an off-site image repository |
| 6. | Series time | The time series was acquired, expressed as Hour:Minute:Seconds. |
| 7. | Thumbnail image | Each series has a thumbnail image (or multiple images if it is expanded). The thumbnail image shows a representative image in the series (usually about 1/3 of the way through the series). |
| 8. | Plus [+] or negative [-] sign | The Negative sign [-] indicates the series has been expanded to show thumbnails. Use the scroll bar to navigate to images.<br>The Plus sign [+] indicates the series is stacked. |
| 9. | Study date | The date of the study using the mm/dd/yyyy format. |
| 10 | Thumbnail filter | The list indicates the currently study filter, ie., All Studies, Active Studies, or Active Series. |

## Selecting a Study

You can use the thumbnail tray to scan through your currently selected studies. Each study series appears as a stack of thumbnails.

**To select a study using the thumbnail tray**

1. Scroll to a study of interest.
2. Double-click the study to load the series in the display area.

✓ You can click a thumbnail and drag the study to a display unit. For example, if you have defined four display units in the display area, you can click and drag four studies from the thumbnail tray into the individual display units.

## Expanding and Closing the Study Series

You can expand or collapse the series to preview images.

**To expand a study series**

- Click the **[+]**.

**To collapse the study series**

- Click the **[-]**.

## Opening and Closing the Thumbnail Tray

You can open and close the thumbnail tray to display the studies currently selected in the Amalga Image Viewer.

**To close the thumbnail tray**

- Click the chevrons in the thumbnail tray. The chevrons will point down.

**To open the thumbnail tray**

- Click the chevrons in the thumbnail tray. The chevrons will point up.

## Filtering the Items in the Thumbnail Tray

You can filter the items in the thumbnail tray with the list. The current selection displays in the box. You can choose to show all studies for the current patient, just the active ones, or just the active series.

**To filter the items in the thumbnail tray**

- Click the list and select:
    a. **All Studies**.
    Displays all studies for the current patient.
    b. **Active Studies**.
    Displays the studies that have series visible in the display area.
    c. **Active Series**.
    Displays the series that are visible.

# Using the Display Area

The display area is used for visualization of images. Images can contain header information and a ruler. You can use the ruler to measure an image or features of an image. You can scroll through an image series. You can play a multi-frame image using the cine panel. You can configure the display area to view up to four independent series (from the same or different studies). Each individual display unit can in turn be formatted to display the series of images either one at a time, or in light box mode with up to 36 (6x6) frames shown at a time.

When the Images component has not loaded an image from its remote source, a message will display instead of the image. For example, the message will read **Retrieving image from remote** along with the retrieval progress data.

## Active Display Unit Indicator

A blue border highlights the active display unit. If you drag your cursor over the display area, a number will appear indicating the display area position. This number will also appear on the item in the thumbnail tray.

**To select the display unit using the cursor**

- Drag the cursor over the display unit you would like to select.
- Click within the area of the display unit. A blue box will appear around the display unit, this is the display unit indicator.

**To select the display unit using the keyboard**

- Press the right arrow to move to the next display unit. If the current active display unit is the last, the selection will move to the first unit.
- Press the left arrow to move to the previous display unit. If the current active display unit is the first, the selection will move to the first unit.

**To select the display unit using the mouse**

- Clicking on the display unit indicator will scroll the thumbnail tray to the corresponding thumbnail.

## Adjusting the Display Layout

You can use  (display units) or  (viewports) on the toolbar in the Amalga Image Viewer to configure up to four independent series (from the same or different studies). For more information, see Using Display Units and Viewports on page 435.

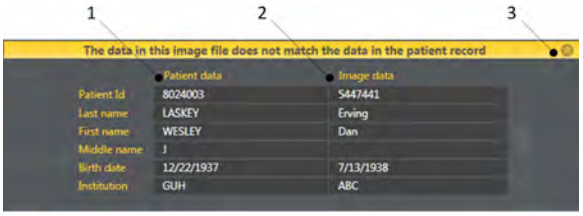
## Save as Image or Movie

You can save all image views in the Amalga Image Viewer window to a JPG image file or a movie in AVI (Audio Video Interleave) for multi-frame images. Right-click and select **Save Image** or **Save Movie**. For more information, see Save a Displayed Image on page 450.

## Reviewing the Mismatch Warning Window

When the DICOM data associated with the image study and the data in Amalga UIS do not match, a mismatch warning displays in the viewport. The warning appears as a bar at the top of the viewport. You can click the chevrons in the bar to open the warning and review the details of the mismatch.

The data mismatch warning window includes three areas: patient data (1), image data (2), chevrons (3).




### The Mismatch Warning Window Areas

| Area | Feature | Description |
|---|---|---|
| 1 | Patient data | Patient data displays data from the Amalga UIS database. |
| 2 | Image data | Image data displays data from the DICOM header, part of the DICOM file. |
| 3 | Chevrons | Click the chevrons to open or close the mismatch warning window. |

### Using the Mismatch Warning Window

You can open the mismatch warning window to review data that does not match between the patient information stored in Amalga UIS and in the DICOM file. After you close the mismatch warning window, it will no longer be highlighted in yellow while you are reviewing the series.

**To open the mismatch warning**

- Click the chevrons in the warning bar.

**To collapse the mismatch warning**

- Click the chevrons in the warning bar.

# Flagged Images

Image flags provide a means for reviewing image studies based on the selections and presentation settings made by radiologists or other physicians on the source PACS. This information is sent to Amalga UIS in the form of DICOM key object series (KO) and presentation state (PR) objects. By enabling this feature, you can do the following:

- Select from one or more flagged image sets available for the study.
- Easily navigate between images that have been flagged as important without limiting access to other images in the study.
- View flagged images with annotations, measurements, and other presentation settings saved on the source system.
- Access key image notes if the notes were saved during the flagging process on the source system.

## Reviewing Flagged Images

Detailed procedures are listed in the following table.



## Flagged Images Overview

Using the Amalga Image Viewer, you can list, select, and display flagged image sets. Flagged image sets correspond to key image series saved in DICOM format as key objects.

A flagged image includes two areas: flag (1) and flagged image set list (2).

| Area | Feature | Description |
|---|---|---|
| 1 | Flag | A flag in the upper right hand corner of the viewport indicates a saved presentation state and key object.<br>For a flag set, the next arrow, the previous arrow, and the drop down list are hidden by default. Move the cursor over the flag to the selection arrows and display a short summary of the current selection.<br>ⓘ If the feature is enabled, and a flag icon does not display in the viewport, then the study is not associated with a flagged image set.<br>The flagged image has four states:<br>• **No flag set selected**<br>A gray flag icon with an x indicates that at least one flagged image set exists for the image study, but none have been selected..<br>• **Flagged image**<br>A yellow flag icon indicates that the current image displayed in the viewport is not a flagged image referenced by the currently selected flag set.<br>• **Not a flagged image**<br>A gray flag icon indicates that the current image displayed in the viewport is not a flagged image in the currently selected flag set.<br>• **Expanded**<br>When the cursor enters the area near the flag icon, the full flagged image control set becomes visible. These controls include:<br>◦ Flag set label/selection list<br>ⓘ Click the list to expand the list.<br>◦ A summary of flagged image information which includes:<br>▪ The summary contains Flag (*current number of images*) of (*full number of images*).<br>▪ Title of the presentation state.<br>▪ The name of the clinician and the date the state was saved.<br>▪ The text of a note (if available) for the state.<br>◦ Flagged image navigation controls,<br>When a flag set associated with more than flagged image is selected, hovering over the flag will also display the flagged image set navigation controls. To use the control:<br>▪ Click right arrow [**>**] to navigate to the next flagged image.<br>▪ Click left arrow [**<**] to navigate to the previous flagged image. |

| Area | Feature | Description |
|---|---|---|
| 2 | Flagged image set list | A list control appears next to the flag. Click the control to review the flagged image set list.<br>When opened by clicking on the label, the pull-down lists all pre-sentation state series associated with the study. Each saved pre-sentation state and key object contains:<br>• Title, such as **Of interest**, **For Surgery**, **For Conference**, or **For patient**.<br>• The User ID on the PACS of the content creator.<br>• Creation date, such as 11/24/2010 |

## Enable or Disable Flagged Images

You must enable flagged images in the Display preferences window.

> The initial state can be set to either display or to not display flagged images, depending on the Medical Imaging Module configuration. Please see your administrator if you want the initial state of this setting changed.

**To enable flagged images**

1. Click **Display** from the toolbar in the Amalga Image Viewer window.
2. Click **On** for Flagged Image in the Display Preferences window.
3. Close the window.

**To disable flagged images**

1. Click **Display** from the toolbar in the Amalga Image Viewer window.
2. Click **Off** for Flagged Image in the Display Preferences window.
3. Close the window.

## Select a Flagged Image Set

A flag icon appears on the thumbnail of series images that have been flagged. A flag also appears in the upper left-hand corner of any open image viewport. When you move the cursor over the flag icon in an image viewport, the flagged image set control will appear.

> When the viewport link feature is active for the viewport, the set selection is disabled.

**To display a flagged image set**

1. Select the desired study, and click **Open image viewer** from the study browser window in the Images component.
2. Drag the cursor over the flag icon in the upper left corner of a viewport. The flagged image set selection box will appear.

   > The current selection may be **Hide Flags** in the case that no flagged image set is selected.

3. Click the **down arrow** to expand the list of flagged image sets.

4. Select a row. The first flagged image in the flag set will display with the associated settings and annotations.

## Navigate Flagged Images

Once a flagged image set has been selected, you can navigate forward or backward in the sequence of flagged images.

When the viewport link feature is active for the viewport, the flagged image navigation controls are disabled.

**To navigate using the flagged image set control**

- Click **right arrow** [>] to select the next flagged image (or use the keyboard and press CTRL + Right Arrow).
- Click **left arrow** [<] to select the previous flagged image (or use the keyboard and press CTRL + Left Arrow).
- When you pause on the flag icon, a summary will appear. The summary contains the following information:
  - **Flag** (*current sequential number of flagged images*) of (*total number of flagged images in the currently selected flag set*).
  - Title of the flag set.
  - The user ID of the clinician who created the flag set and the date the set was saved.
  - A text note (if available) that may have been saved with the flagged image.

The presence of the flagged image navigation controls does not limit the full use of image review features of the Medical Imaging Module. In addition to navigating to flagged images using the flagged image controls, they can also be displayed while scrolling through an image series. There is an important difference, however between these two methods of navigation:

When using normal image scrolling to navigate an entire image series, only the annotations saved with the flagged image will be added to the display. In order to maintain continuity of display, other presentation settings such as Window/Level adjustments, zoom, pan, or image flip/rotation that have been saved with the flagged image will not be applied.

On the other hand, when using the flagged image controls (next/previous flagged image arrows and flag set selector), all associated image presentation settings (Window/Level adjust, zoom, pan, flip, or rotation) will all be applied to the flagged image display in addition to showing the annotations.

# Set Image Retrieval Quality

An icon in the lower left hand margin of the viewport indicates the quality of the image. You can click the image to change the quality. The quality has three states: lossy, lossless, and downloading.

The following icons indicate the resolution of the image displayed in the viewport that has focus.

 Lossy icon indicates the image uses lossy compression as an image preview.

 Downloading indicates the Images component is retrieving the uncompressed image from remote storage. . In cases where the full-quality images must be retrieved from a

third-party image archive, a progress bar will display over both the image and series thumbnail as the series is retrieved. During this retrieval time, any images that have been received can be viewed and manipulated using all Images component functions. When the entire series has been retrieved, the progress bars will be hidden.

Lossless icon indicates the image is uncompressed and represents the image data contained within the DICOM file.

If the image storage only contains a partial record of the metadata, the viewport will only retrieve the full-quality image.

## Change Image Retrieval Quality

You can explicitly request retrieval of full-quality images from a third-party image archive.

**To change image retrieval quality**

1. In the home window, double-click a patient visit row.
2. Select **Images** in the list of components.
3. Double-click the study you would like to open in the Image Viewer window.
4. Click the lossy icon [ ] to retrieve the full quality image from remote storage.

   The viewport will display the downloading icon [ ] and a progress bar. When the Images component has retrieved the series, it will display the lossless [ ] icon.

# Scrolling an Image Series

When you place an image series in the display area, stack scroll buttons appear. Click to scroll through the stack.

When viewing a stack of sagital images, an orientation marker appears in the layout to indicate whether the image is to the right (“R”) or left (“L”) of the midline of the series..

**To review a single image series**

1. In the study browser window, select an image series.
2. Click **Open image viewer**.
3. Click the (forward) to move forward in the image series.
4. Click the (backward) to move backward in the image series.

Right-click and drag the pointer to rapidly scroll forward or backward in the stack. If you move the mouse forward rapidly, the frame rate will increase.

You can also use the keyboard up arrow (forward) or down arrow (backward) to move through the series.

# Cine Display

This section discusses using the cine player in the Image Viewer.

## Cine Overview

The Image Viewer window displays the cine controls on multi-frame images. The cine controls will be shown for any multi-frame image when the pointer is within the boundaries of an active display unit containing a multi-frame image. The controls include buttons for looping the image, rewinding, advancing,

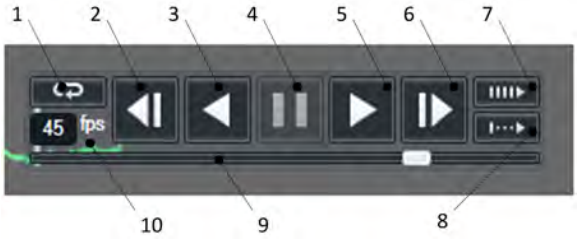
playing, and setting the speed of playback. The rate of play is displayed in the number of frames per second. The progress and jump bar shows the position of the current frame in the image.

> The ability of the Image Viewer to maintain high cine rates without skipping frames will depend on factors such as the processing power of the Image Viewer computer, the amount of memory on the computer, the graphic capabilities of the computer, and the speed of the network connection.

For a series containing only single-frame images, the cine controls will not be active by default. You can right-click and select **show cine control**. The controls will play all of the images in the series.

> The cine controls will not display on a series containing both single and multi-frame images.

The controls include: loop (1), reverse one frame (2), rewind (3), pause (4), PLAY (5), advance one frame (6), fast (7), slow (8), the playback controller (9), and frames per second (10)




| Area | Feature | Description |
|---|---|---|
| 1 | Loop or Single play | Click **loop** to set the multi-frame image to play through all of the frames and start again.<br>Click **Single play** to for the cine to stop when it reaches the last image. |
| 2 | Reverse one frame | Click **reverse** to single step the current image back one frame. |
| 3 | Reverse play | Click **reverse play** to continuously play the image backwards at the selected frame rate. |
| 4 | Pause | Click **pause to** stop the image on a frame. |
| 5 | Play | Click **play** to continuously advance the image at the selected frame rate. |
| 6 | Advance one frame | Click **forward one frame** to single step the current image forward one frame. |
| 7 | Faster | Click **faster** to increase the rate of multi-frame display. Each click will incrementally increase the number of frames, so that to click it once will increase by a fixed number of frames-per-second.<br>The increment of change is configurable. For more information, see "Application Management" and the following topics in the *Amalga UIS 2009 Desk Reference*. |
| 8 | Slower | Click **slower** to decease the rate of multi-frame display. Each click will incrementally decrease the number of frames, so that to click it once will decrease by a fixed number of frames-per-second.<br>The increment of change is configurable. For more information, see"Application Management" and the following topics in the *Amalga UIS 2009 Desk Reference*. |
| 9 | Playback controller | • Press the position button on the progress bar and drag the button to your desired location, either backward or forward in the multi-frame image.<br>• Press and hold the button to freeze playback on the current frame. Drag the button to interactively change the currently displayed frame. |
| 10 | Frame rate | Displays the frame rate at which the cine player shows individual frames in frames-per-second. |

## Viewing a Cine Image

When you place a multi-frame image in the display area, the cine playback will start automatically.

For a series containing only single-frame images, the cine controls will not automatically appear. You can right-click and select **Show cine panel**. The controls will play all of the images in the series.

> The cine controls will not display a series containing both single and multi-frame images.

**To use a cine controls for a series with multi-frame images**

1. In the study browser window, select a multi-frame image.
2. Click **Open image viewer**.
3. Drag a multi-frame image into the display area.
   The cine panel display and the cine playback starts automatically.
4. Use the cine panel to play, rewind, advance, or loop the multi-frame image.

**To use cine display on a series of single-frame images**

1. In the study browser window, select a series.
2. Click **Open image viewer**.
3. Drag the series into the display area.
4. Right-click, and select **Show cine panel**.
5. Use the cine controls to play, rewind, advance, or loop the multi-frame image.

## Save a Displayed Image

You can save all image views in the Amalga Image Viewer window to a JPG image file or a movie in AVI (Audio Video Interleave) for multi-frame images. Alternatively, you can save a still image to your computer clipboard. The image includes a patient information label above the image, and a label that indicates the printout image is not of diagnostic quality.

**To save an image as a JPG**

1. Right-click and select **Save Image**.
2. Navigate to the file location and name the file.
3. Click **Save**.

**To save an image as a movie (AVI format)**

1. Right-click and select **Save Movie**.
2. Navigate to the file location and name the file.
3. Click **Save**.

**To save an image to the clipboard as a JPG**

1. Right-click.
2. Select **Copy to clipboard**.

## Hiding Patient Information in Saved Images

To blind patient information for a saved image or movie, turn off annotations, and then save the image or movie.

**To blind patient information in a saved image or movie**

1. In the home window, double-click a patient visit row.
2. Select **Images** in the list of components.
3. Double-click the study you would like to open in the Amalga Image Viewer window.

4. Click the chevrons in the Amalga Image Viewer window toolbar.
5. Select **Display**.
6. Select annotations **Off**.
7. Right-click the image in the Amalga Image Viewer window:
    - For an image (JPG format), select **Save Image**.
    - For a movie (AVI format), select **Save Movie**.
8. Navigate to the file location and name the file.
9. Click **Save**.

## Amalga Image Viewer Context Menu

You can right-click in the Amalga Image Viewer window and select from the context menu.

**To set values for window/level select**

- Manual window/level
- Region window/level
- Invert window/level

For more information, see Adjusting the Window Width and Window/Level on page 428.

**To zoom select**

- Manual zoom
- Region zoom
- Fit to Window

For more information, see Zooming an Image on page 429.

**To move an image select**

- Pan

For more information, see Panning an Image on page 430.

**To scroll an image**

- Scrolling

For more information, see Scrolling Through a Series on page 430.

**To select an annotation or measurement**

- Selection

For more information, see Using the Selection Tool on page 431.

**To measure an image select**

- Measure distance
- Measure angle
- Measure Cobb angle
- Measure point
- Measure circular ROI

For more information, see Measurements on page 431.

**To link or unlink an image**

- Link images
- Unlink images

For more information, see Linking Images for Synchronized Viewing on page 436.

**To set favorites select Favorites**

- Favorites

For more information, see Adding and Removing an Image from the Favorites List on page 439.

**To rotate an image select**

- Rotate

For more information, see Rotating and Flipping an Image on page 438.

**To show the cine player select**

- Show cine panel

For more information, see Cine Display on page 447

**To copy an image to the clipboard, select**

- Copy to clipboard

**To save an image as a JPG, select**

- Save Image

**To save an image as a movie, select**

- Save Movie

**To print an image, select**

- Print image...

**To undo the last action, select**

- Undo

**To redo the last undone action, select**

- Redo

**To rest the display area, select**

- Reset

# Amalga UIS Medical Imaging Module Component Reference

This reference section includes the following:

- Image Viewer window keyboard shortcuts
- Mouse key functions
- Modality support
- Hardware Performance

## Keyboard Shortcuts for the Images Component

Keyboard shortcuts can make it easier to interact with your computer. With keyboard shortcuts, you don't need to use the mouse as often. This list of keyboard shortcuts will help you quickly complete certain common tasks in the Images component.

| To do this | Use this keyboard shortcut |
|---|---|
| Print | Ctrl-P |
| Save Image | n/a |
| Save Movie | n/a |

| To do this | Use this keyboard shortcut |
|---|---|
| Toggle Cine Panel | C |
| Toggle link for active viewport | L |
| Toggle mismatch warning display | M |
| View Report | R |
| Toggle Cine (Start/Stop) | Space |
| Speed up Cine Display | > |
| Slow down Cine Display | < |
| Toggle Full Screen Mode | F11 |
| Manual Window Level | F2 |
| Measure Distance | F6 |
| Manual Zoom | F3 |
| Pan (enter Pan mode) | F4 |
| Manual Scroll | F5 |
| Default Window/Level | D0 |
| Invert Window/Level | Ctrl-I |
| Optimize Window/Level | O |
| Window/Level Preset 1 | D1 |
| Window/Level Preset 2 | D2 |
| Window/Level Preset 3 | D3 |
| Window/Level Preset 4 | D4 |
| Window/Level Preset 5 | D5 |
| Window/Level Preset 6 | D6 |
| Window/Level Preset 7 | D7 |
| Window/Level Preset 8 | D8 |
| Window/Level Preset 9 | D9 |
| Window/Level Preset 10 | n/a |
| Next Image (in series) | Down Arrow |
| Previous Image (in series) | Up Arrow |
| Next Series (in study) | Page Down |
| Previous Series (in study) | Page Up |
| Reset | Home |

These shortcuts will not work while the Image Viewer text annotation tool is in use.

## Selecting Areas in the Study Browser Window

You can press the tab key to move the window focus from one area of the Study Browser window to the next. The selection sequence follows from the top right of the window to the bottom:

1. Patient banner
2. Component area
3. Timeline
4. Thumbnail tray
5. Details view

Within each area you can use the arrow key to select elements. For instance, in the thumbnail tray you can press the arrow key to move from the first thumbnail to the second, and so on.

Press **F10** to click each elements, such as check boxes, and list items.

## Selecting Areas in the Images Viewer Window

You can press the tab key to move the focus from one area of the Images Viewer window to the next. The selection sequence follows from the top right of the window to the bottom:

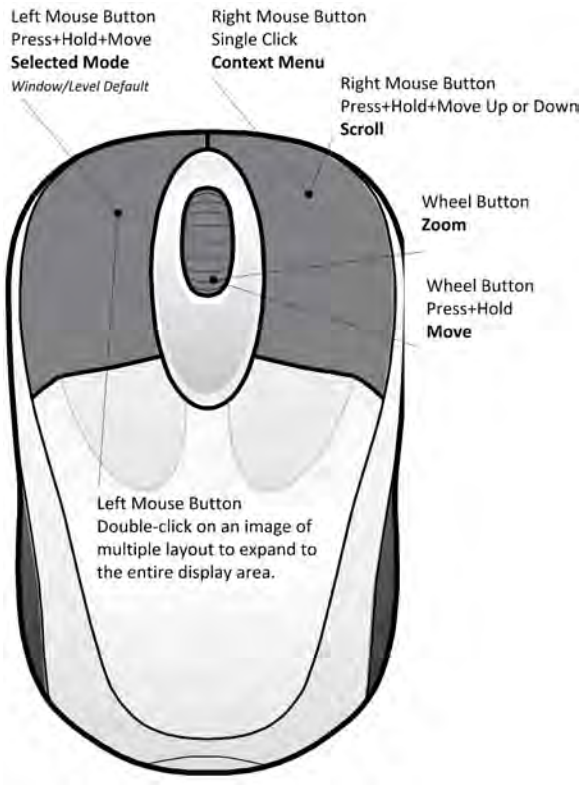
1. Patient banner
2. Thumbnail timeline
3. Thumbnail tray
4. Toolbar
5. Display area

Within each area you can use the arrow key to select elements. For instance, in the thumbnail tray you can press the arrow key to move from the first thumbnail to the second, and so on.

Press **F10** to click each elements, such as check boxes, and list items.

# Mouse Functions

Use the mouse buttons to perform common actions in the Amalga Image Viewer window. The following diagram shows the functions associated with each mouse button.




The following table lists the mouse buttons and functions for Amalga Image Viewer modes.

| Mouse Key | Action | Functionality | Mode |
|---|---|---|---|
| Left button | Press and drag, move the pointer up | Click and drag the pointer up to increase the Window/Level settings. | Windows/Level |
| | | Click and drag the pointer up to zoom out. | Zoom |
| | | Click and drag the pointer up to move the study up. | Pan |
| | Press and drag, move the pointer down | Click and drag the pointer down to decrease the Window/Level settings. | Windows/Level |
| | | Click and drag the pointer down to zoom in. | Zoom |
| | | Click and drag the pointer down to move the image down. | Pan |
| | Double-click | Double-click an image in a multiple image layout to expand the image to the entire display area. | |
| | Press and hold | Click and hold to set a point. | Measure |
| Wheel button | Press and drag the pointer up | Press and hold the wheel button, drag the pointer up to move the image up. | |

| Mouse Key | Action | Functionality | Mode |
|---|---|---|---|
| | Press and drag, move the pointer down | Press and hold the wheel button, drag the mouse down to move the image down. | |
| | Rotate the wheel button forward | Rotate the wheel button to zoom in. | |
| | Rotate the wheel button backward | Rotate the wheel button to zoom out. | |
| Right button | Right-click | Right-click to display a context menu. | |
| | Right-click and drag the pointer up. | Right-click and drag the pointer up to move forward in an image stack. The image number will become larger. | |
| | Right-click and drag the pointer down. | Right-click and drag the pointer down to move back in an image stack. The image number will become smaller. | |

## Assigning Keyboard and Pointing Device Settings

The Images component supports the configurable assignment of actions to pointing devices. For example, with the three button scroll wheel mouse, you can assign Images component functionality to the button, combinations of buttons, or the scroll wheel.

You can assign a variety of functions:

- Manual Window/Level adjustment
- Zoom
- Pan
- Scroll

For more information, see the Images component reference in the *Amalga UIS 2009 Component Reference*.

## Shortcut Keys

The Images component supports assignment of the following actions to shortcut keys (or key combinations):

- Print
- Save Image
- View Report
- Toggle Cine Panel
- Toggle start or stop cine
- Run the cine faster or slower up or down cine
- Toggle Full Screen Mode
- Manual Window/Level
- Measure Distance
- Manual Zoom
- Pan
- Default W/L

- Invert W/L
- Optimize Window Level
- Window Level Preset 1
- Window Level Preset 2
- Window Level Preset 3
- Window Level Preset 4
- Window Level Preset 5
- Window Level Preset 6
- Window Level Preset 7
- Window Level Preset 8
- Window Level Preset 9
- Window Level Preset 10
- Next Image
- Previous Image
- Next Series
- Previous Series
- Reset
- 3D orientation (Anterior, posterior, left, right, head, foot)
- Key stroke based rotation of 3D objects

## Short Keys

Shortcut keys use a key and an optional key modifier.

### Keys

Valid keys include:

- Letters

  for example: P, Q
- Numbers

  prefix with D

  for example: D1, D7
- Function Keys

  prefix with F

  for example: F1, F10
- Arrow Keys

### Modifiers

Valid key modifiers include:

- Control
- Alt
- Shift
- Control + Alt
- Control + Shift
- Alt + Shift
- Control + Alt + Shift

## Modality Support

The Amalga UISMedical Imaging Module component operates on images in the Digital Image Communications in Medicine ( DICOM) format.

The DICOM format specifies the image modality. The modality is indicated by an abbreviation, that represents the type of medical image, such as x-ray, mammogram, and ultrasound.

You can filter images in the Image Select window by their DICOM modality in the study browser window. For more information see, Filtering by Modality on page 423.

The Image Viewer displays all image modalities listed in the following table.

| Abbreviation | Description |
|---|---|
| CT | CT Image |
| CR | Computed Radiography Image |
| DX | Digital X-Ray Image |
| IO | Digital Intra-oral X-Ray Image |
| MG | Digital Mammography X-Ray Image |
| MR | Magnetic Resonance (MR) Image |
| NM | Nuclear Medicine Image |
| PR | Grayscale Softcopy Presentation State |
| PT | Positron Emission Tomography Image |
| RF | X-Ray Radio Fluoroscopic Image |
| RTIMAGE | RT Image |
| SC | Multi-frame True Color Secondary Capture Image |
| US | Ultrasound Multi-Frame Image |
| XA | X-Ray Angiographic Bi-Plane Image Storage (retired) |
| XC | VL Photographic Image |
| | Stand-alone Overlay Storage |

## Images Component Hardware Configurations

The minimum hardware listed in the "Client Hardware and Software Requirements" section in the Amalga UIS 2009 Client Installation Guide is acceptable for viewing single-frame images and can be expected to playback some multi-frame images (depending on modality) at acceptable frame rates.

For example, an Amalga UIS client computer with the minimum listed hardware requirements can expect to play a 430x480 pixel multi-frame US image at 30 frames per second (fps) in the Images Images component(with the format option set to 1x1). For more information about the Amalga Image Viewer window and playback of multi-frame images, see Using the Amalga Image Viewer Window on page 425.

Upgrading the processor speed and amount of RAM will increase the frame rate that can be achieved when multi-frame DICOM images are played back in the Amalga Image Viewer window.

For example, an Amalga UIS client computer with the minimum hardware listed, but upgraded to a dual core 2.4 GHz processor and 4 GB of RAM, can be expected to playback the 430x480 pixel multi-frame US

image at 60 fps (with the Amalga Image Viewer window Fit to window option disabled and the format option set to 1x1).

The maximum frame rate in Amalga UIS is 70 frames per second (fps).

## Images Component Modifications

The Amalga UIS client can be modified to meet specific requirements at your site. In addition, the Images component supports the assignment of actions to pointing devices.

For more information about modifying the Images component or DICOM Manager component see "Modifying Components" on page 1 in the *Amalga UIS 2009 Desk Reference*.

## Home Window Launch Modification

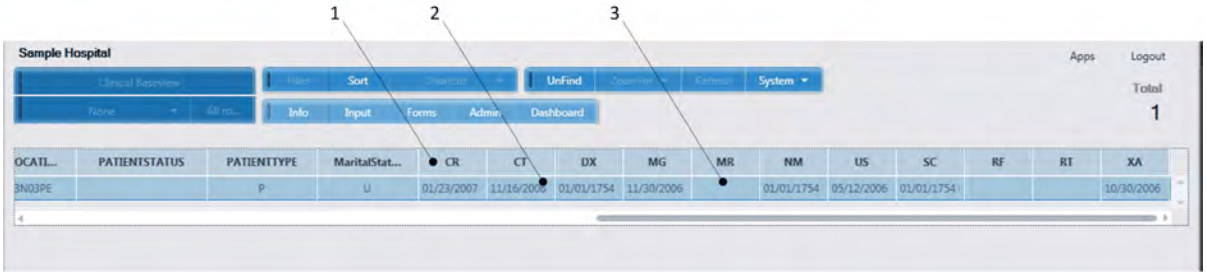
The Home Window Launch Modification affects the Amalga UIS home window component. Using the modification you can launch a selected study image in the Study Browser window in the Images component from the Amalga UIS home window.

For information on configuring the modification see " Launch to the Study Browser Window" on page 1.

### Home Window Launch: Overview

You can use the modified home window to find the most recent image study for each modality by patient.

Each column lists a study modality (1) and the last series date for this modality (2) unless the DICOM image store does not contain a study (3).




# Home Window Launch Areas

The following table summarizes the use of the Home Window Launch.

| Area | Feature | Description |
|---|---|---|
| 1 | Modality | Each column displays a modality code.<br>For a list of modalities, see Modality Support on page 458. |
| 2 | Series date | The series date lists the most recent occurrence of the image study. You can double-click the study date, and the study browser window will open in the Images component with the study selected and the modality selected in the modality filter.<br>For information about using the study browser window see Study Browser Window: Overview on page 409. |
| 3 | Blank Cell | If the patient has not had a DICOM image study for a specific modality, the cell will be empty. |