Welcome to ~RSTAR

April 14, 1989
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This chapter teaches you five basic skills you will need to use the µRSTAR workstation:

- using the mouse
- choosing commands from drop-down menus
- working with windows
- working with dialog boxes
- getting help
Mousing

A mouse is a hand-held pointing device used to interact with the \muRSTAR workstation. Control the mouse with your hand resting on the mouse body and your fingers lightly resting over the two buttons. The wire ("mouse tail") should be pointing away from you.

Moving the pointer by moving the mouse

As you slide the mouse along the desktop, an arrow-shaped pointer moves on the workstation screen. Every move you make with the mouse moves the pointer on the screen in exactly the same way.

Selecting objects by clicking

To select a single object, use the mouse to position the pointer over the item or screen area you wish to choose. Click by pressing and quickly releasing the left mouse button to make your selection.

The workstation screen will give you some feedback that you have selected an object. If you've selected an image, for example, the color of the partition border will change from blue to green.

*Note:* Whenever this manual refers to clicking, you should click by pressing and releasing the left mouse button. The rare instances when you should use the right mouse button will be mentioned explicitly.

Dragging objects

Some objects that you select can be moved on the screen with a technique called dragging — pressing and holding the left mouse button while you move the mouse.

For example, you copy images from one screen partition to another by dragging — using the left mouse button to select an image, and then holding the mouse button down as you move the mouse to another partition.
Windows

μRSTAR presents information in windows. Each window has a border with various control symbols which may be used to activate, size, move, and deactivate the window.

Each window has a header bar across the top, with an hourglass symbol at the left end and a diamond at the right. If the window contains more text than can be seen at once, a scroll bar will appear at the right. At the bottom right of the window is a special symbol which looks like a square with an arrow at the bottom left hand corner. This is the size symbol. The use of each of these symbols is explained below.

Changing the size of a window

To change the size of a window, position the pointer on the size symbol, press and hold down the mouse button, and drag the mouse. The window will change size as you move the pointer. Release the mouse button when the window is the desired size.

Moving windows

To move a window, position the pointer in the header bar at the top of the window, anywhere between the diamond and hourglass symbol. Hold down the button as you drag the mouse. The window will follow the pointer. Release the mouse button when the window is at the desired location.
Undoing your last window action

If you wish to recall the window's previous position or size, click the diamond. This will undo your last window change.

This is useful for temporarily moving windows out of the way while you continue with your work. For example, you can shrink a window to a small size so that you can see other windows below it. Clicking the diamond brings the window back to its original size. Clicking the diamond again will shrink the window once again.

Making a window active

You can have many windows on your control screen at the same time, but only one can be active. When more than one window is displayed, you may select the active window by clicking anywhere inside the border of the window you wish to activate.

The window title of the active windows is bold. The window titles of inactive windows are dimmed.

Closing a window

To keep things tidy, you might want to close some windows when you’re finished working on them.

If you are through using a window, click the hourglass symbol to close the window and remove it from the screen.

Using the scroll bars to see more

Sometimes there is more information than can fit in a window at one time. The scroll bars in an active window let you move what’s in the window so you can see more of it.

Clicking the up arrow will move the text up one line. Clicking the down arrow will move the text down one line.

The white rectangle in the middle of the scroll bar is the elevator. To move quickly through the document, click and drag the elevator up or down. When you release the mouse button, the text will move proportionately.

To scroll one page at a time, click the space between the elevator and either the up arrow or the down arrow.
Menus

Each of the five primary µRSTAR screens has a menu bar — a horizontal list of menu titles shown at the top of the screen. When you position the pointer over one of the titles, a vertical list of menu items drops down. This is a drop-down menu. Click one of the menu items to select its indicated action.

If you do not want to select any of the items, click anywhere outside of the list. This will clear the drop-down menu from the screen.
Dialog Boxes

After you have selected a menu item to perform some action, µRSTAR may present a dialog box to get more information to complete the action. A dialog box will have buttons to click, such as OK or Cancel, and may also include places for you to type additional information.

The three primary functions of dialog boxes are text entry, selection, and confirmation.

Entering text

If the dialog box requires you to enter text, µRSTAR will present a boxed text entry field with a vertical cursor.

As you type, the text will be displayed in the field. During text entry, µRSTAR will respond to the following keys:

- `<Esc>`: Escape Key
- `<Backspace>`: Backspace Key
- `<Tab>`: Tab Key
- `<Shift>`<`Tab>`: Shift & Tab Key
- `<Left>`: Left cursor key
- `<Right>`: Right cursor key
- `<Up>`: Up cursor key
- `<Down>`: Down cursor key
- `<Enter>`: Enter/Return key

Erase field.
Backspace 1 character.
Advance to next field.
Go to preceding field.
Move left 1 character.
Move right 1 character.
Move up 1 field.
Move down 1 field.
Exit from dialog box using defaults.
Selecting with buttons

In some dialog boxes, you can choose from one of several actions or items which are presented in selection buttons. Use the mouse to click the action or item you require.

Confirming actions with buttons

At the end of most dialog boxes are two confirmation buttons. The first contains text (such as OK or Accept) which confirms whatever action you have entered in the dialog box. Click this button to have µRSTAR proceed with the dialog box action.

The second confirmation button is Cancel. Click Cancel if you do not want µRSTAR to carry out the dialog box action.
Getting Help

μRSTAR offers you two ways to solicit help as you work. You may either

* select Help from the menu bar to get the complete help text; or

* holding down the <ALT> key as you click.

Selecting help from the menu bar

To request help for any part of μRSTAR, click the title Help in the menu bar. μRSTAR will present a list of help topics to review. Choose a topic and μRSTAR will present the complete text for that subject.

Using the mouse and the <ALT> key

If you want an explanation about a specific menu item, hold down the <ALT> key as you click a menu item. μRSTAR will respond with a brief help screen to describe the item further.
1. **Type rstar at the C: > prompt.**

   This will launch GEM, the software which allows you to use the mouse with the workstation. After a few seconds, you will see a message notifying you that µRSTAR is initializing the system. Finally, the copyright notices will appear on the screen.

2. **Click Continue (or press the Return key) at each of the two copyright notices.**

![Diagram](image_url)
3. Select *Start Login Process* from the Login menu

![Login Menu](image1)

For information about this workstation please call
Jaime Taaffe x8785
or
Dr. Roger Bauman x8333

![μRSTAR Startup Screen](image2)

This will bring up the System Login dialog box.

![System Login Dialog Box](image3)
4. Type your user name and press the TAB key.

   NOTE: Do not press the return key after entering your username!

   Your username is given to you by the μRSTAR system manager. It identifies you to the μRSTAR System.

5. Type your password.

   Your Password is given to you by the μRSTAR system manager. It provides security for the information stored in μRSTAR.

6. Press the Return key, or click the OK button.

   If all the information is correct, use the mouse to move the pointer to the box titled OK and click the left mouse button. If you made a mistake, click CANCEL. This will bring you back to the μRSTAR Startup Screen.

   Logging onto μRSTAR connects you to the "Head-End" (one of the hospital's Digital Equipment Corporation VAX mainframe computers) which contains the database of exam information, image information and image data.

   The following message appears in response to your login.

   ![Please wait... logging on to the VAX]

   You will then be asked to wait while your default user preferences (such as the type of images and screen formats you will generally be working with) are transferred from the Head-End computer.

   ![Please wait... Getting YOUR Defaults]

   Only users with valid accounts on the VAX will be able to log onto μRSTAR. If you need an account, please see the μRSTAR system manager.

If you have questions about μRSTAR, refer to the μRSTAR Overview, or feel free to call

   Ken Freundlich       x8381  (μRSTAR system manager)
   Dr. Roger Bauman     x8333
   Jaime Taaffe         x8785
   Maria Kaldis         x8381
Troubleshooting

If there are any problems with the connection to the VAX or with your login, \( \mu \)RSTAR will display alert messages describing the problem and your course of action.

1. **Incorrect Password**

   The name or password given is incorrect. Retry if you wish. If you need an account contact the system manager. EXIT

   The alert box above will appear if you have entered your username, or your password, or both incorrectly. Click the EXIT button. This will bring you back to the \( \mu \)RSTAR Startup Screen. Check your username and password and try to login again. Remember to press TAB and not return after you enter your username. Contact the \( \mu \)RSTAR system manager if you continue having problems.

2. **Network Error**

   An unspecified error has occurred at the VAX. You are not logged-in! Please contact the system manager.

   If the connection between the workstation and the VAX is not working, \( \mu \)RSTAR will present the alert box above. Click the OK button. This will bring you back to the \( \mu \)RSTAR Startup Screen. Try to login again. If you continue to have problems, contact the \( \mu \)RSTAR system manager who will check the connection.

   Other messages may be added to the system which will indicate the type of error and your best course of action.
The Modes and Fixed Menus of \( \mu \)RSTAR

The Modes

Due to memory restrictions on the PC workstations, \( \mu \)RSTAR was organized into modes so that many commands are only available from certain control screens. For example, in order to search the database manually, you must first enter Database Mode. In order to manipulate images (zoom, rotate, window and center, etc), you must first enter Image View Mode. In order to change the partitioning of the screens, you must first enter Image Placement Mode.

One moves between the modes through the Select menu. It will take you from your current screen mode to the requested one. It also allows you to exit from \( \mu \)RSTAR by choosing Quit \( \mu \)RSTAR.

```
Select-3
F1 Database Mode
F2 Image-View Mode
F3 Image-Place Mode
F4 System Mode
F5 Exam Review Mode
=================
F6 QUIT \mu RSTAR
```

SELECT MENU

Luckily, there is also Exam Review Mode, which combines some simple commands from a few modes so that exams can be retrieved and displayed quickly. In Exam Review Mode, you can do the most important database searches — by unit number, patient name, today's exams, and exams from the last 7 days; and display exams retrieved by these database searches.

Each mode will be explained in detail in subsequent sections of this user guide.
The Fixed Drop Down Menus

A limited number of commands are available in all modes through the "fixed" menus.

<table>
<thead>
<tr>
<th>Help-2 Select-3 Info-4 I/O-5 UR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIXED MENU BAR</td>
</tr>
</tbody>
</table>

There are five fixed drop-down menus: HELP, SELECT, INFO, I/O, and UR. They are present on all of the screens except for the initial login screen which contains only LOGIN and UR. All the screen modes have a menu bar across the top of the screen which contains all the fixed drop-down menus. As mentioned before, some screen modes also have specialized drop-down menus that are not shown here.

The Help and Select menus have been explained above.

The UR Menu

The UR drop-down menu contains desktop accessories such as a calculator and clock. The calculator is fully functional. Pressing the <num lock> key on the numeric key pad on the right side of the keyboard will make it easier to operate. To remove the calculator or the clock from the screen, close the window by clicking the hourglass symbol at the top left of the window.

NOTE: Do not attempt to use the print spooler. If you choose it by mistake, click the cancel button to exit.
The Info Menu

The Info drop-down menu gives you information about the current status of the workstation. When you choose one of the items by moving the pointer on top of the item with the mouse and clicking the left hand mouse button, a window will appear in the middle of the screen with the information. To close the window, click the hourglass symbol.

<table>
<thead>
<tr>
<th>Info-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 System Status</td>
</tr>
<tr>
<td>F2 uRSTAR News</td>
</tr>
<tr>
<td>F3 Patient Information</td>
</tr>
<tr>
<td>F4 Exam Information</td>
</tr>
<tr>
<td>F5 Image Information</td>
</tr>
<tr>
<td>F6 Summary Of Patients</td>
</tr>
<tr>
<td>F7 Summary of Exams</td>
</tr>
<tr>
<td>F8 Summary of Images</td>
</tr>
</tbody>
</table>

INFO MENU

The I/O Menu

The I/O drop-down menu allows you to send and receive information from the VAX HeadEnd. Text in a window can be printed on a local printer or sent to the VAX HeadEnd for printing. A file from the VAX HeadEnd can be brought to the workstation and displayed in a window. The contents of a window can be saved as a file on the VAX HeadEnd.

<table>
<thead>
<tr>
<th>I/O-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 Save UR Window</td>
</tr>
<tr>
<td>F2 Get UR Window</td>
</tr>
<tr>
<td>F3 Save Text Window</td>
</tr>
<tr>
<td>F4 Get Text Window</td>
</tr>
<tr>
<td>F5 Print Text Window, Local</td>
</tr>
<tr>
<td>F6 Print Text Window, Head-End</td>
</tr>
<tr>
<td>F7 Submit to Head-End</td>
</tr>
</tbody>
</table>

INPUT/OUTPUT MENU
### µRSTAR Functions at a Glance

<table>
<thead>
<tr>
<th>Function</th>
<th>Mode</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cining images</strong></td>
<td>Image View</td>
<td><strong>Click</strong> <strong>Start A button</strong></td>
</tr>
<tr>
<td><strong>Change partitioning of displays</strong></td>
<td>Image Placement</td>
<td><strong>Choose Select Partition Keep or Select Partition Clear from Partition menu</strong></td>
</tr>
<tr>
<td><strong>Display an exam</strong></td>
<td>Exam Review</td>
<td><strong>Click Display current button after choosing exam from Exam Summary Window</strong></td>
</tr>
<tr>
<td><strong>Manipulate images</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoom</td>
<td>Image View</td>
<td><strong>Click Zoom/Pan button</strong></td>
</tr>
<tr>
<td>Flip horizontally</td>
<td>Image View</td>
<td><strong>Click Flip H button</strong></td>
</tr>
<tr>
<td>Flip vertically</td>
<td>Image View</td>
<td><strong>Click Flip V button</strong></td>
</tr>
<tr>
<td>Rotate 90° clockwise</td>
<td>Image View</td>
<td><strong>Click Rcw 90 button</strong></td>
</tr>
<tr>
<td>Rotate 90° counterclockwise</td>
<td>Image View</td>
<td><strong>Click Rcw 90 button</strong></td>
</tr>
<tr>
<td>Invert</td>
<td>Image View</td>
<td><strong>Click Invert button</strong></td>
</tr>
<tr>
<td>False colorize</td>
<td>Image View</td>
<td><strong>Click Color button</strong></td>
</tr>
<tr>
<td>Zoom all selected images</td>
<td>Image View</td>
<td><strong>Click Undef button</strong></td>
</tr>
<tr>
<td>Clear graphics from images</td>
<td>Image View</td>
<td><strong>Click ClrGraph button</strong></td>
</tr>
<tr>
<td>Return images to original state</td>
<td>Image View</td>
<td><strong>Click Normal button</strong></td>
</tr>
<tr>
<td><strong>Mark an exam as dictated</strong></td>
<td>Exam Review</td>
<td><strong>Click Mark dictated button</strong></td>
</tr>
<tr>
<td><strong>Measuring images</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>Image View</td>
<td><strong>Choose Ruler from Tools menu</strong></td>
</tr>
<tr>
<td>Angle</td>
<td>Image View</td>
<td><strong>Choose Protractor from Tools menu</strong></td>
</tr>
<tr>
<td>Area</td>
<td>Image View</td>
<td><strong>Choose Area from Tools menu</strong></td>
</tr>
<tr>
<td>Point</td>
<td>Image View</td>
<td><strong>Choose Point from Tools menu</strong></td>
</tr>
<tr>
<td>Region of Interest</td>
<td>Image View</td>
<td><strong>Choose ROI from Tools menu</strong></td>
</tr>
<tr>
<td><strong>Search database</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By Medical Record Number</td>
<td>Exam Review</td>
<td><strong>Click By unit# button</strong></td>
</tr>
<tr>
<td>By Name</td>
<td>Exam Review</td>
<td><strong>Click By name button</strong></td>
</tr>
<tr>
<td>By Today's date (and default modality)</td>
<td>Exam Review</td>
<td><strong>Click Todays button</strong></td>
</tr>
<tr>
<td>Last 7 days (and default modality)</td>
<td>Exam Review</td>
<td><strong>Click Last 7 days button</strong></td>
</tr>
<tr>
<td>Canned Search</td>
<td>Database</td>
<td><strong>Choose Canned from Lookup menu</strong></td>
</tr>
<tr>
<td>Manual Search</td>
<td>Database</td>
<td><strong>Choose Simple Exam Search or Complex Exam Search from Lookup menu</strong></td>
</tr>
<tr>
<td><strong>Window and center images</strong></td>
<td>Image View</td>
<td><strong>Click one of the preset buttons OR Adjust using slider OR Hold down left and right mouse buttons</strong></td>
</tr>
</tbody>
</table>
### µRSTAR Mouse Techniques at a Glance

<table>
<thead>
<tr>
<th>Function</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one image</td>
<td>Click left mouse button</td>
</tr>
<tr>
<td>Select all images on a screen</td>
<td>Click right mouse button</td>
</tr>
<tr>
<td>Copy an image from one partition to another</td>
<td>Click left mouse button and drag</td>
</tr>
<tr>
<td>Copy all images from one screen to another</td>
<td>Click right mouse button and drag</td>
</tr>
<tr>
<td>Exchange images between partitions</td>
<td>Click left mouse button and &lt;SHIFT&gt; drag</td>
</tr>
<tr>
<td>Exchange all images between screens</td>
<td>Click right mouse button and &lt;SHIFT&gt; drag</td>
</tr>
<tr>
<td>Copy images from one screen to the empty partitions on another</td>
<td>Click right mouse button and &lt;CTRL&gt; drag</td>
</tr>
<tr>
<td>Get help about a menu item</td>
<td>&lt;ALT&gt; Click menu item with left mouse button</td>
</tr>
<tr>
<td>Change window and center of all images on a screen</td>
<td>1. Move the mouse over any image on the screen</td>
</tr>
<tr>
<td></td>
<td>2. Click both mouse buttons at the same time</td>
</tr>
<tr>
<td></td>
<td>3. Move mouse side to side to change center</td>
</tr>
<tr>
<td></td>
<td>4. Move mouse up and down to change window</td>
</tr>
<tr>
<td></td>
<td>5. Click both mouse buttons at same time to exit</td>
</tr>
</tbody>
</table>
Using Exam Review Mode

Exam Review Mode is the easiest method for selecting and displaying exams on the µRSTAR workstation. Using "default" settings set up for you by the µRSTAR Administrator, µRSTAR determines the type of images you will generally be working with, e.g., Nuclear Medicine, CT, MRI, or PET. You can select exams from the µRSTAR database based on patient name or medical record number. In addition, all exams in your default modality (Nuclear Medicine, CT, MRI, or PET) from the current day or past week may be searched. Exam Review Mode allows you to step through an exam that has more images than will fit on all the display screens at once. Finally, Exam Review Mode lets you mark an exam as "dictated" so that you can separate exams which have been reviewed from those which have not been reviewed.

![Exam Review Control Screen](image-url)
Searching the database

Click one of the buttons in the top row of the screen (GET EXAMS) to perform a search.

By Unit #: Prompts the user to enter a medical record number and then displays a list of all exams with that number. Type only the digits of the medical record number — you do not have to type the dashes.

By Name: Prompts the user to enter a patient name and then displays a list of all exams with that patient name. The "*" symbol should be used as a "wildcard", i.e., entering "Randall*" would display a list of all exams for patients named Randall; entering "F*" would display a list of exams for all patients whose last names begin with "F". You can also enter the full name in the format "Last name, First name".

Todays: Displays a list of all exams with the current date in the user's default modality (Nuclear, CT, MRI, etc.).

Last 7 days: Displays a list of all exams from the last 7 days in the user's default modality.

Selecting exams

In response to a database search, the following window appears:

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>MRN</th>
<th>Exam Code</th>
<th>Mode</th>
<th>Date</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayo, James</td>
<td>900-00-00</td>
<td>CO2 PET</td>
<td>20</td>
<td>MAY-80</td>
<td>10</td>
</tr>
<tr>
<td>Smith, John</td>
<td>123-45-67</td>
<td>MRI</td>
<td>15</td>
<td>JUN-88</td>
<td>32</td>
</tr>
</tbody>
</table>

To select and display one exam:

a) Click the text line describing the exam.

b) Click Select this line to get only the HIGHLIGHTED ITEMS.

μRSTAR will display the exam images and a text window summarizing the exam.
To select multiple exams to bring to the workstation:

a) Click the text lines describing the exams.
b) Click Select this line to get only the HIGHLIGHTED ITEMS.
c) Click the Display Current screen button. A window summarizing the exams appears.

d) Click the text line summarizing one of the exams to display it first.

To select all the exams to bring to the workstation:

a) Click Select this line to get ALL ITEMS.
b) Click the Display Current screen button. A window summarizing the exams appears.
c) Click the text line summarizing an exam to display it.

Viewing an exam with many images

You can review an exam which has more images than will fit on all the display screens at once by using the Next Group and Prev Group screen buttons. These buttons will show images from the exam sequentially. The Next Group button steps forward, while the Prev Group button steps back.
Other exam review mode functions

Display Comparison

Not currently implemented.

Goto Image Manipulation Screen:

Transfers the workstation to Image View Mode, where images may be manipulated, e.g., cined, windowed and centered, inverted, rotated, magnified, colored, as well as more complex processing routines.

Mark Dictated:

You may wish to isolate exams you have reviewed from those which have not been reviewed. μRSTAR allows you to classify an exam as "dictated". In Database Mode, you can use this classification (Dict = "done" or Dict = "not done") when looking up exams.

Make Room: Forget Displayed Exam:

Clears exams from the screens and from the workstation's memory.

This does not delete the exam from the μRSTAR database.

Exams that are "at the workstation" can be displayed more easily since the μRSTAR database does not need to be searched a second time. At any one time, about fifty exams with up to 200 corresponding images can be at the workstation. As the number of images at the workstation approaches this limit, the workstation slows down. The Make Room command should be used in this case to increase the efficiency of the workstation.
Using Image View Mode

Image View Mode allows you to manipulate images on the μRSTAR displays. In addition, it provides you with several image measurement tools whose results are displayed in the measurement results window, as well as tools for complex image processing routines.

Image View Mode Menus

Many functions are controlled by buttons; others are available under the three menus *Transforms* (which will eventually allow sophisticated high frequency image processing), *Tools*; and *HeadEnd* (which transfers textual information about exams required for some complex image processing functions performed by the VAX Head-End).
Selecting Images

Image manipulations are performed on selected images. To select an image, move the mouse over the image, and click the left mouse button. The partition border around the image will change from blue to green. To select several images, move the mouse over each image and click. To de-select an image, move the mouse over the image and click again.

*Hint:* To select all the images on a screen, click the right mouse button.

Button Functions

- **Zoom/Pan:** Prompts the users to select a point on an image over which to zoom in or zoom out. Once the point is selected, pressing the left mouse button zooms in on the image, pressing the right mouse button zooms out on the image, and pressing both mouse buttons simultaneously exits from the zooming mode.
- **Flip H:** Horizontally flips all selected images.
- **Flip V:** Vertically flips all selected images.
- **Rcw 90:** Rotates all selected images clockwise by 90°.
- **Rccw 90:** Rotates all selected images counter-clockwise by 90°.
- **Invert:** Inverts all view screens with selected images.
- **Normal:** Returns all selected images to their original state.
- **ClrGraph:** Removes all graphics (partition borders, image measurement graphics, etc) from all selected images.
- **Color:** Performs a pseudo-colorization algorithm on all selected images based on each image's current window/center values.
- **Zoom Sel:** Zooms in or out on several selected images. [Undefn 4 button]
- **Undefn 5:** Currently undefined.
- **Undefn 6:** Currently undefined.
- **Goto Review:** Transfers the workstation to Exam Review Mode to select another exam.
Windowing and centering images

µRSTAR allows you to "window and center" images, mapping the range of recorded pixel values (from 0 to 4096) to displayed grayscale values (from 0 to 255). You can window and center images

- by clicking the preset buttons on the screen; or
- by moving the slider on the screen with the mouse; or
- using the left and right mouse buttons simultaneously.

Using the presets

Each image in the µRSTAR system has four window/center preset buttons which highlight various features in the image data. These presets are computed for each image based on the frequency distribution of pixel values in the image. Clicking a preset button determines the window/center for the selected image. When more than one image is selected, all screens with selected images are adjusted to the preset value of the selected image at the upper left.

Using the slider

The window/center slider allows manual adjustment of the window/center values on all screens with selected images.

To adjust the window/center on screens with selected images:

1) Move the cursor over the window/center slider.
2) Press the left mouse button down (and keep it down).
3) Mouse movement adjusts the window/center values:
   left  ->  lowers center
   right ->  raises center
   down  ->  widens window
   up    ->  narrows window
4) When adjustment is complete, release the mouse button.

Using just the mouse

Click the left and the right mouse buttons at the same time. As above, mouse movement adjusts the window/center values.

left  ->  lowers center
right ->  raises center
down  ->  widens window
up    ->  narrows window

When adjustment is complete, click both buttons at the same time.
Displaying Ciné Loops

Sequential Image Display - Ciné Loops may be displayed dynamically when both view screens 1 and 2 have been partitioned appropriately with identical ciné partitions.

Note: If the displays have not been partitioned to display ciné loops, use the Select menu to enter Image Placement Mode where you can repartition the screens.

Start A: Dynamically displays all images on view screens 1 and 2.

Start S: Dynamically displays selected images only on view screens 1 and 2.

Pause: Pauses dynamic display of a running ciné loop.

Finish: Terminates dynamic display of a running ciné loop.

Slider: Changes the speed of a running ciné loop.

To use the slider:
1) Move the cursor over the ciné speed slider.
2) Press the left mouse button down (and keep it down).
3) Mouse movement adjusts the ciné loop speed as follows:
   left  ->  decreases ciné speed
   right ->  increases ciné speed
4) When ciné speed adjustment is complete, release the mouse button.
Performing Measurements with the Tools Menu

Ruler: Prompts you to select two points with the left mouse button on an image between which to measure the linear distance. The result is put into the measurement results window in pixel units (and in millimeters if a millimeters-per-pixel conversion factor is available for the image). The format of the result is:

| LINE     | 86902 | 1   | 85.09 pixels | 119.13 mm |

Protractor: Prompts you to select three points with the left mouse button on an image to define two lines with a common endpoint between which to measure the angle. The result is put into the measurement results window in degrees. The format of the result is:

| ANGLE    | 86902 | 1   | 46.76 degrees |

Area: Prompts you to select multiple points on an image to define the vertices of a polygon using the left mouse button for all but the last point. You are then prompted to click with the left mouse button over the interior of the polygon. There are two initial result lines with the following format:

| POLYGON  | 86902 | 1   | 4 sides 1889 pixels | 3702.4 sq mm |
| STATS    | 86902 | 1   | mean 397.00 | sd 0.00 |

If you have selected a higher level of "verbosity" in the Options choice of the HeadEnd menu, additional lines for each vertex of the polygon are also displayed.

Point: Prompts you to select points on an image to identify their coordinates relative to the top left corner of the image. The result is given in pixel units (and millimeters if a millimeters-per-pixel conversion factor is available for the image). The format of the result is:

| POINT    | 86903 | 1   | 121, 154 pixels | 169.4, 215.6 mm |

ROI: Prompts you to select locations with the left mouse button for region-of-interest measurements. The right mouse button is pressed to exit. The format of the result for each region is:

| ROI      | 86908 | 1   | 400 pixels | 784 mm |
| STATS    | 86908 | roi.2 | mean 229.00 | sd 0.00 |
Processing Images with the HeadEnd Menu

Some complex image processing routines performed by the VAX Head-End require textual information about the exams and images. The choices from the HeadEnd menu allow you to put this information into a measurement results window for transfer to the VAX Head-End.

We recognize that is a very awkward way to perform complex image processing. It is merely an interim approach that will be much improved in future versions of RSTAR.

**Options:** Displays a dialog box that allows you to set the verbosity level for the results of the use of the image measurement tools, i.e., the higher the level, the more detailed the results. It also allows you to clear all or part of the measurement results window.

**Exam Information:** Not currently implemented

**Patient Information:** Not currently implemented

**Image Information:** Not currently implemented.

**Put Text:** Prompts you to enter a line of free text that will be inserted into the measurement results window.

**Put Integer Number:** Prompts you to enter an integer number that will be inserted into the measurement results window.

**Put Real Number:** Prompts you to enter a real number that will be inserted into the measurement results window.

**Put Terminate:** Puts a "Terminate" signal into the measurement results window.

**Return Message:** Prompts you to enter a line of free text that will be inserted into the measurement results window, sent to the VAX Head-End for use by a processing routine, and then returned to the workstation at the completion of the routine.
Using Database Mode

Database Mode lets you search the μRSTAR HeadEnd Database using criteria of your own devising when the criteria available from Exam Review Mode do not meet your needs. Searches can be

- **canned** — set up for you by the μRSTAR administrator;
- **simple** — manually entered by you using one or two commonly used search keys, such as patient name, exam date, medical record number, exam type; or
- **complex** — manually entered by you using more than two search keys, or employing less commonly used search keys.

Database Mode also allows you to free up space at the workstation and increase its speed by "forgetting" exams.
The Database mode commands are available from the menus Lookup and Forget:

### Database Mode Menus

<table>
<thead>
<tr>
<th>Lookup 6</th>
<th>Forget 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 Mine Not Looked At..</td>
<td>F1 All Exams and Images</td>
</tr>
<tr>
<td>F2 Teaching Files</td>
<td>F2 Displayed Exams</td>
</tr>
<tr>
<td>==============</td>
<td>F3 Selected Exams</td>
</tr>
<tr>
<td>F3 Canned-1</td>
<td></td>
</tr>
<tr>
<td>F4 Canned-2</td>
<td></td>
</tr>
<tr>
<td>F5 Canned-3</td>
<td></td>
</tr>
<tr>
<td>F6 Simple Exam Search</td>
<td></td>
</tr>
<tr>
<td>F7 Complex Search</td>
<td></td>
</tr>
</tbody>
</table>

**Using canned searches**

The first five options available from the Lookup Menu search the database using criteria set up for you by the μRSTAR Administrator.

*Mine Not Looked At* searches the database for all exams in your default modality which have not been marked as dictated. *Teaching Files* is currently unimplemented.

The *Canned Searches* use criteria stored in your Defaults File on the VAX. Examples of canned searches could include:

- All CT exams before January 15, 1989
- All exams for patients born after 1961
- All MRI exams for attending physician Dr. Johnston.

If you will be regularly searching the database using a certain criterion, ask the μRSTAR system manager to store it in a canned search.
Searching the database manually

To search the database yourself, choose Simple Exam Search, or Complex Exam Search if your search requires more than two search keys.

Simple exam search

Choosing Simple Exam Search brings up the following dialog box.

Simple Exam Search dialog box.

1. Click One Key or Two Keys.

Two Keys is highlighted as the default.

2. Enter the criteria for Key One.

Click on a button — Name, Date, MRN (Medical Record Number), Type (Exam Type), or Doctor (Attending).

Name is highlighted as the default.

Then type the criteria you wish to use. The "*" functions as a "wildcard" in searches.

Example: To look up exams for a patient named Smith, type "Smith*" as Key one.
Dates can be entered in many formats, including

- 2-22-89
- 22-Feb-89
- 2/22/89
- today
- from 2-22-89 to 2-25-89
- before 1-24-89
- since 2-22-89
- after 2-22-89
- past_week
- since today--2 (i.e., the past two days)

3. If you're using two keys, click a logical operator button. (AND is highlighted as the default.)

   AND finds exams which match both keys;

   OR finds exams which match either the first key or the second;

   AND-NOT finds exams which match the first key and do not match the second.

4. Enter the criteria for Key two, if needed.

5. Press Return, or click the Do Search button.

   Note: Be sure to click the One Key button if you are using only one key to search the database.
Choosing Complex Exam Search brings up the following dialog box.

**Complex Database Search**

---FIELD---  ---KEY---  ---FIELD---  ---KEY---
Patient Name  PNAME  Attending Physician  ANAME
Date of Birth  DOB  Radiologist  RNAME
Medical Record No.  MN  Date Dictated  DICT
Modality  MODE  Exam Code  ECODE
Scanner Type  SCAN  Exam Name  ENAME
          Exam Date  DATE

Use the KEYS with the logicals AND or NOT to form Database searches
Example: mode"ct*" AND pname"jones*" AND aname"jones*"
          Dict"NotDone" And PName"Smith*" And Mode"MRI*"
          Rname"Harris" And (Mode"CT" or Mode"MRI") And Dict"Not Done"

**Action**

Do Search  Cancel

Complex Exam Search dialog box.

1. Enter the criteria.

Follow the format shown in the examples below when typing in the criteria, using quotation marks, parentheses, and wildcards as needed. You may use upper or lower case.

**Examples:**

- mode"ct*" AND pname"jones*" AND date"since 3-24-89"

This would search for all CT exams since March 24, 1989 for patients named Jones.

- Dict"NotDone" And PName"Smith*" And Mode"MRI*"

This would search for all MRI exams for patients named Smith which have not been marked as dictated.

- Rname"Harris" And (Mode"CT" or Mode"MRI") And Dict"Not Done"

This would search for all CT and MRI exams for radiologist Dr. Harris which have not been marked as dictated.

2. Press Return, or click the Do Search button.
Bringing exams to the workstation

Upon completion of a search, a text window appears summarizing the search results:

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>MRN</th>
<th>Exam Code</th>
<th>Mode</th>
<th>Date</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAYO, JAMES</td>
<td>900-00-00</td>
<td>CO2 PET</td>
<td>20-MAY-80</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>SMITH, JOHN</td>
<td>123-45-67</td>
<td>MRI</td>
<td>15-JUN-88</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

EXAMS MATCHED IN SEARCH

- Select this line to get ALL ITEMS.
- Select this line to get only the HIGHLIGHTED ITEMS.
- Select this line to CANCEL the request.

Database Search Results

- To bring all exams matched by the search to the workstation, click the line that says "Select this line to get ALL EXAMS"

- To get only some of the exams, highlight the desired exams by clicking the text line describing each exam, and then click the line that says "Select this line to get only the HIGHLIGHTED EXAMS"

Displaying the exams:

- Choose Exam Review Mode from the Select menu and click the Display Current button.

Forgetting exams

At any one time, about fifty exams with up to 200 corresponding images can be "at the workstation". As the number of images at the workstation approaches this limit, the workstation slows down. The Forget commands should be used in this case to increase the efficiency of the workstation.

All Exams and Images: Clears all exams and images from the workstation.

Displayed Exams: Clears all displayed images and their parent exams from the workstation.

Selected Exams: Clears all exams selected in the Summary of Exams text window from the workstation.
Using Image Placement Mode

Image Placement Mode allows you to place images on the display screens; clear images from the screens; and partition the screens. Image Placement Mode allows for multi-modality or simultaneous comparison exam display of µRSTAR exams.

**Image Selection and Placement Control**

The Image Selection and Placement Control Screen displays icons representing both the workstation displays and the "virtual displays" comprising the µRSTAR workstation. (Note: The figure above illustrates a four-display workstation. If your workstation has only two screens, then your control screen would display only two workstation display icons.) Virtual screens can serve as placeholders for exams. After displaying an exam on a workstation screen, you can store the exam temporarily on a virtual display, and quickly retrieve it for redisplay at a later point. Many of the commands in this mode operate on "selected screens", represented on the Control Screen by a highlighted screen icon (filled in black).

Selecting or Deselecting Screens:

To select or deselect a screen, click the icon representing that screen. To select or deselect several contiguous screens, click in the white region between the desired screens.

Copying a Screen to Another Screen:

To copy all the images on one screen to another, click the source screen icon, drag it to the destination screen icon, and release the mouse button.
Copying one image:

To copy one image at a time, click the source image, drag it to the desired partition, and release the mouse button. μRSTAR will overwrite the destination partition with the source image. To exchange images between partitions, hold down the shift key as you click and drag.

The Image Placement Mode commands are available from the four right-hand menus:

**Next-6**
- F1 Goto Next Exam In Stack
- F2 Display Chosen Exam

**Clear-7**
- F1 Selected Partition
- F2 Selected Display
- F3 All Displays
- F4 All Real Displays
- F5 All Virtual Displays

**Screens-8**
- F1 Compact
- F2 Rotate Left 2..10
- F3 Rotate Right 2..10

**Partition-2**
- F1 Select Partition (clear)
- F2 Select Partition (keep)
- F3 Create New Partition

Image Placement Mode Menus
Displaying an exam from Image Placement Mode

1. Select Summary of Exams from the Info menu.

2. Select an Exam.
   Click on a text line describing an exam.

4. Select Display Chosen Exam from the Next menu.
   The following dialog box appears.

   Choose the mode of image placement upon the screens.
   ![Dialog Box]

   - **Start at 1**: Will display the exam beginning at the upper left partition.
   - **Next avail**: Will display it beginning at the first blank partition.
   (NOTE: The **Automatic** option is not currently implemented.)

5. Click on a button to display the exam.
Displaying two exams simultaneously

1. Display the first exam.

You may wish to display the exam from Exam Review Mode — the fastest way to select and display a new exam.

2. Select Image Placement Mode from the Select menu.

An arrowhead will appear on any icon representing a workstation display which contains images.

3. Copy the images from a workstation display to a virtual display.

Click the icon representing the workstation display to highlight it.

As you click the icon again, the pointer will change to a hand in an outlined rectangle.

Drag the hand-within-outlined-rectangle to a virtual display.

As you release the mouse button, the virtual display icon will be highlighted and an arrowhead will appear, indicating that the images have been copied.
4. Display another exam.

Once again, you may wish to select and display an exam from Exam Review Mode.

The images from this new exam will replace the images from the first exam.

5. Return to Image Placement Mode to retrieve the first exam's images from the virtual display.

Click the virtual display icon with the arrowhead and drag the hand-within-outlined-rectangle to a workstation display icon.

The images will be copied back to the workstation display.
Partitioning the displays

µRSTAR partitions the screen when you first login according to your default modality. The Partition menu allows you to change the displays so that you may

- view more images on each screen;
- view fewer images at higher magnification;
- display cine loop images dynamically.

Generally, you will want to partition your displays so that one screen serves as a catalog overview of all the images of an exam, while the others display larger individual images from the exam.

NOTE: The Create New Partition option is currently unimplemented.

Keeping the images

To repartition a screen without clearing the images already displayed, select a screen and choose Select Partition Keep from the Partition menu. The following dialog box is displayed.

```
***** System Partitions *****
Catalog - CT, MRI, PET, NUCLEAR
  2 x 2 4 x 4 6 x 6 8 x 8
Catalog - Plain film
  1 x 2 2 x 3 3 x 5 4 x 7 6 x 10
View - CT, MRI, PET, Nuclear
  1 x 1 2 x 2 4 x 4 8 x 8 1 x 3 3 x 1
View - Plain Film
  1 x 1 1 x 2 2 x 3
View - Special
  bone  gallium  renal  SPECT  V/Q
View - Cine
  4F  16F  36F  64F  CANCEL
```

Choose a partitioning configuration by clicking one of the buttons. The images will reappear after each screen is repartitioned.
Clearing the Images

To repartition a screen and clear it, select a screen and choose Select Partition Clear from the Partition menu.

Choose a partitioning configuration. The screen will be cleared and repartitioned.

Clearing partitions and displays

The five options available from the Clear menu erase images from the displays.

Selected Partition: Clears images from all selected partitions.

Selected Display: Clears images from screens with selected images.

All Displays: Clears images from all screens.

All Real Displays: Clears images from all real screens.

All Virtual Displays: Clears images from all virtual displays.

Manipulating screens

The three options available from the Screens menu are currently unimplemented.