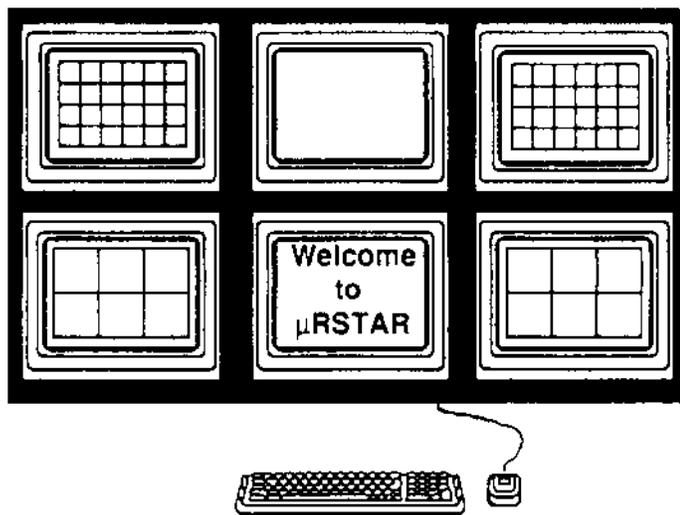


The
Massachusetts General Hospital



User Guide
Version 3.01



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Contents

Chapter 1 — Workstation Basics

Mousing.....	1-2
Moving the pointer by moving the mouse	1-2
Selecting by clicking.....	1-2
Dragging	1-2
Windows.....	1-3
Changing the size of a window	1-4
Moving a window	1-4
Undoing your last window action	1-4
Making a window active	1-4
Closing a window	1-4
Using the scroll bar.....	1-4
Menus	1-5
Dialog Boxes	1-6
Entering text	1-6
Selecting with buttons.....	1-6
Confirming actions with buttons.....	1-7
Getting Help.....	1-8
Selecting Help from the main menu	1-8
Using the <ALT> key and the mouse	1-8

Chapter 2 — Logging Onto μ RSTAR

The six steps.....	2-1
Troubleshooting.....	2-4
Incorrect Password	2-4
Network Error.....	2-4

Chapter 3 — The Modes and Fixed Menus of μ RSTAR

The modes	3-1
The fixed drop-down menus	3-2
UR.....	3-2
Info	3-3
I/O	3-3
μ RSTAR functions at a glance	3-4
μ RSTAR mouse techniques at a glance	3-5

Chapter 4 — Using Exam Review Mode

Introduction.....	4-1
Searching the Database.....	4-2
Selecting Exams.....	4-2
Selecting and Displaying One Exam.....	4-2
Selecting Multiple Exams.....	4-3
Selecting All Exams.....	4-3
Viewing an Exam with many images.....	4-3
Using Other Exam Review Mode Functions.....	4-4

Chapter 5 — Using Image View Mode

Introduction.....	5-1
Selecting Images to Manipulate.....	5-2
Manipulating Images with Buttons.....	5-2
Windowing and Centering Images.....	5-3
Using the presets.....	5-3
Using the slider.....	5-3
Using the mouse.....	5-3
Displaying Ciné loops.....	5-4
Performing Measurements with the Tools Menu.....	5-5
Processing Images with the HeadEnd Menu.....	5-6

Chapter 6 — Using Database Mode

Introduction.....	6-1
Using Canned Searches.....	6-2
Searching the Database Manually.....	6-3
Simple Exam Search.....	6-3
Complex Exam Search.....	6-5
Bringing Exams to the Workstation.....	6-6
"Forgetting" Exams.....	6-6

Chapter 7 — Using Image Placement Mode

Introduction.....	7-1
Using Virtual Displays.....	7-1
Selecting or Deselecting Screens.....	7-1
Copying a Screen to Another Screen.....	7-1
Copying One Image.....	7-2
Displaying an Exam from Image Placement Mode.....	7-3
Displaying Two Exams Simultaneously.....	7-4
Partitioning the Displays.....	7-6
Keeping the Images.....	7-6
Clearing the Images.....	7-7
Clearing Partitions and Displays.....	7-7
Manipulating Screens.....	7-7

Workstation Basics

This chapter teaches you five basic skills you will need to use the μ RSTAR 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 μ RSTAR 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

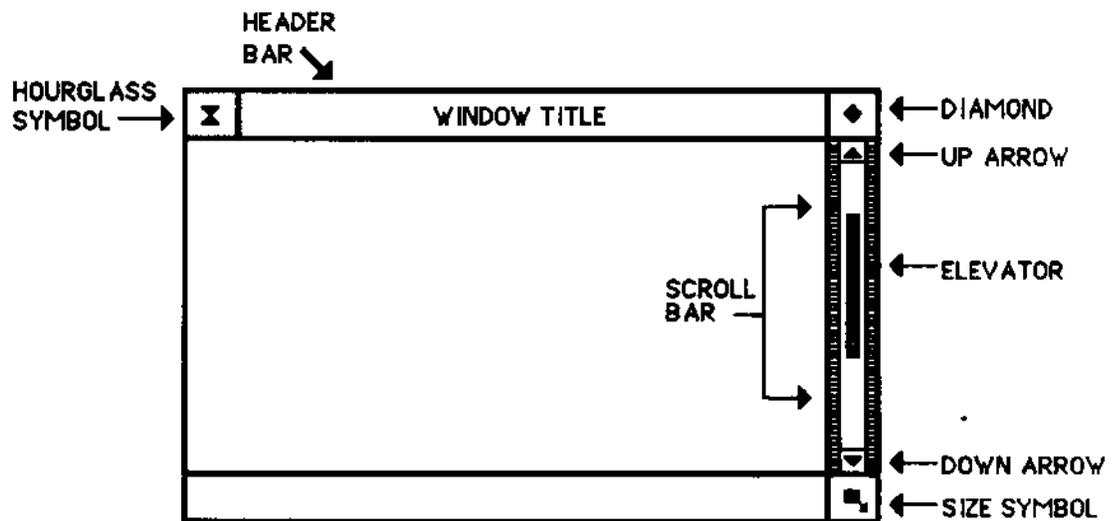
Some objects that you select can be moved on the screen with a technique called **dragging** — **pressing** and **holding** the left mouse button while you move the mouse.

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

μ RSTAR 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.

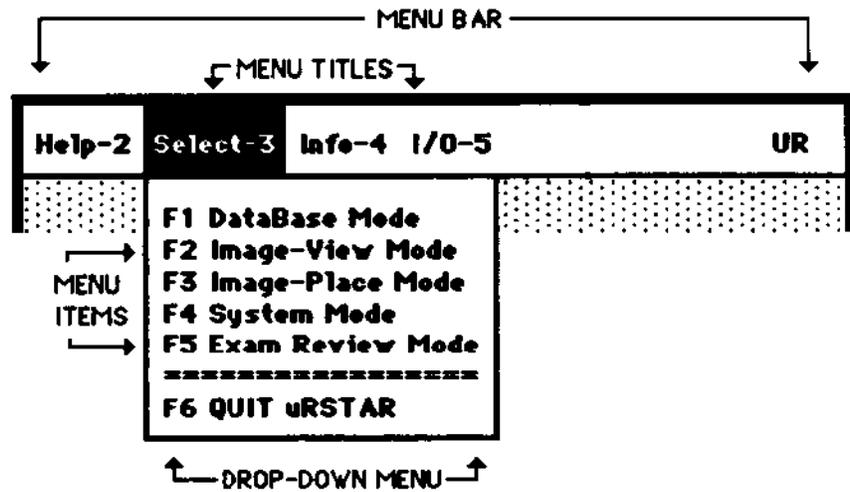
The white rectangle in the middle of the scroll bar is the **elevator**. To move quickly through the document, click and drag the elevator up or down. When you release the mouse button, the text will move proportionately.

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

Menus

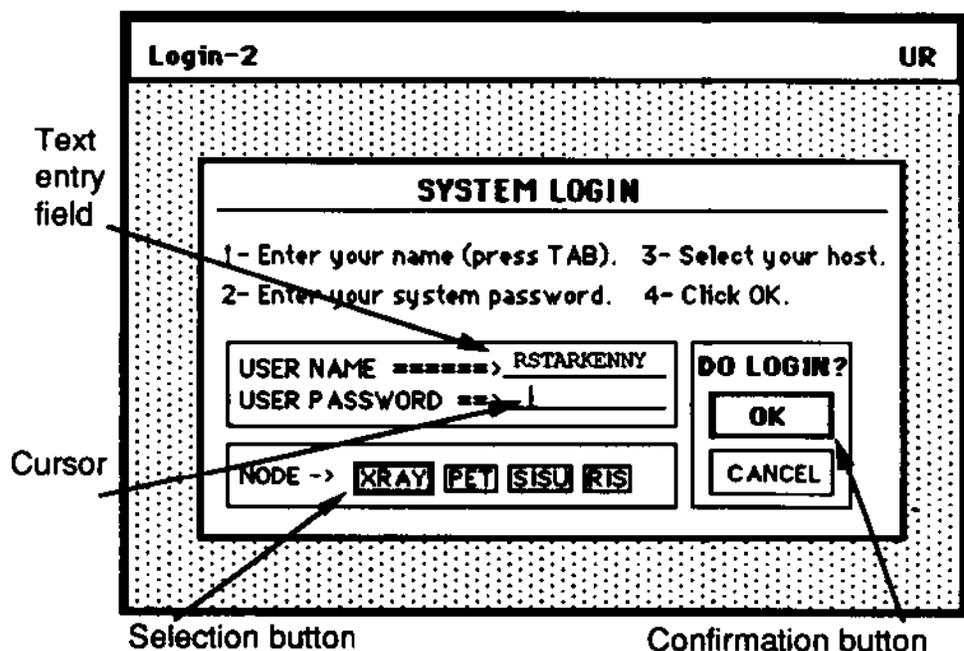
Each of the five primary μ RSTAR screens has a **menu bar** — a horizontal list of menu titles shown at the top of the screen. When you position the pointer over one of the titles, a vertical list of menu items drops down. This is a **drop-down menu**. Click one of the menu items to select its indicated 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, μ RSTAR 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, μ RSTAR 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, μ RSTAR will respond to the following keys:

<Esc>	Escape Key	Erase field.
<Backspace>	Backspace Key	Backspace 1 character.
<Tab>	Tab Key	Advance to next field.
<Shift><Tab>	Shift & Tab Key	Go to preceding field.
<Left>	Left cursor key	Move left 1 character.
<Right>	Right cursor key	Move right 1 character.
<Up>	Up cursor key	Move up 1 field.
<Down>	Down cursor key	Move down 1 field.
<Enter>	Enter/Return key	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 μ RSTAR proceed with the dialog box action.

The second confirmation button is **Cancel**. Click **Cancel** if you do not want μ RSTAR to carry out the dialog box action.

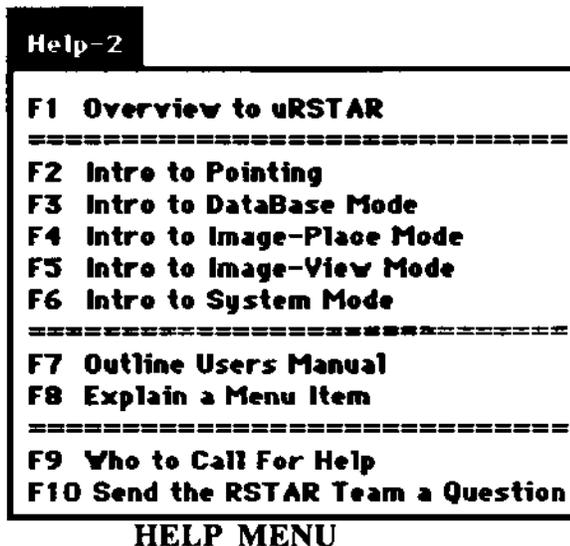
Getting Help

μ RSTAR 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 μ RSTAR, click the title *Help* in the menu bar. μ RSTAR will present a list of help topics to review. Choose a topic and μ RSTAR will present the complete text for that subject.



Using the mouse and the <ALT> key

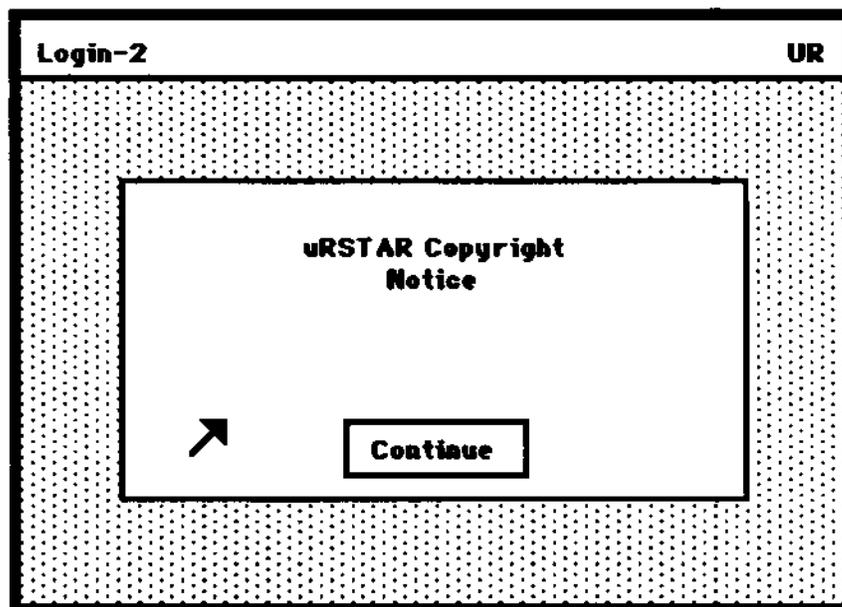
If you want an explanation about a specific menu item, hold down the <ALT> key as you click a menu item. μ RSTAR will respond with a brief help screen to describe the item further.

Logging Onto μ RSTAR

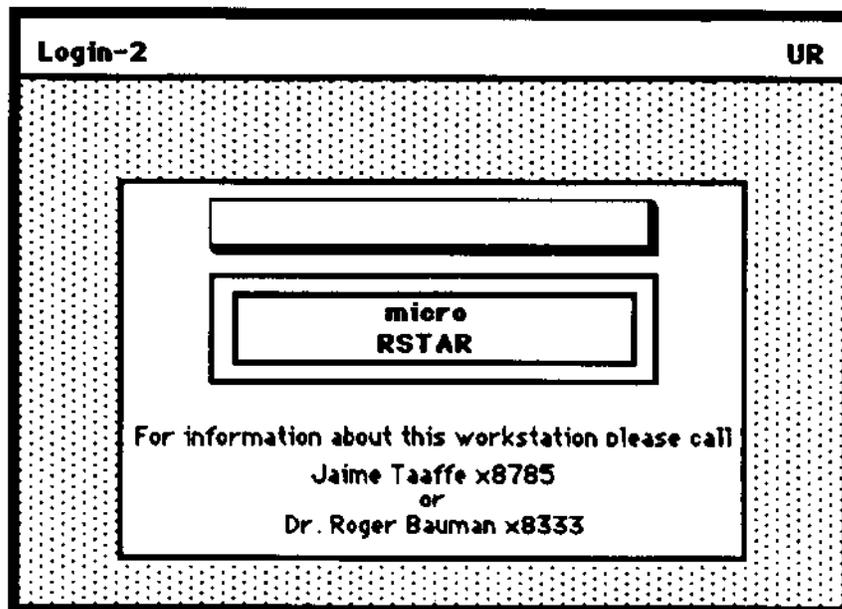
1. Type 'rstar' at the C: > prompt.

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 μ RSTAR is initializing the system. Finally, the copyright notices will appear on the screen.

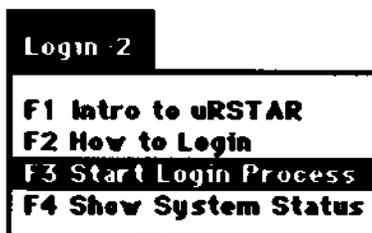
2. Click Continue (or press the *Return* key) at each of the two copyright notices.



3. Select *Start Login Process* from the Login menu

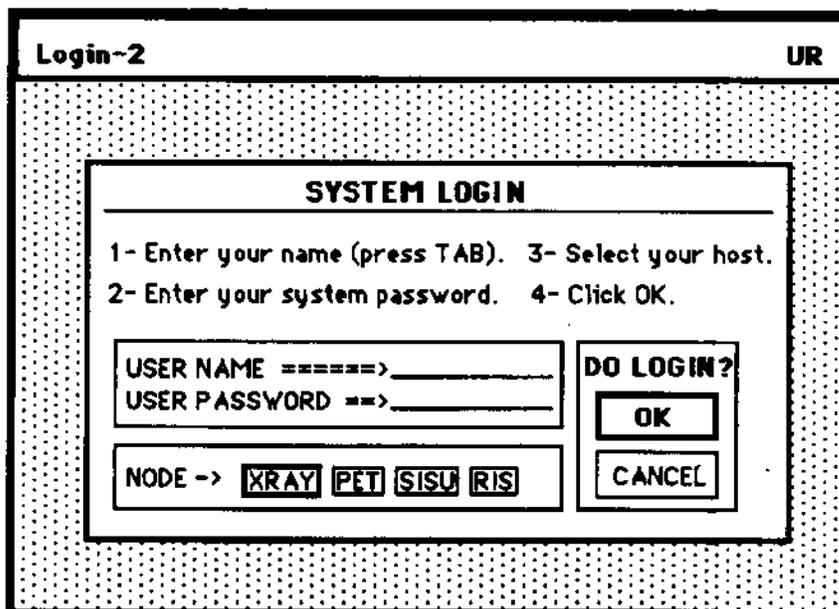


μRSTAR Startup Screen



Login Menu

This will bring up the System Login dialog box.



System Login Dialog Box

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 μ RSTAR system manager. It identifies you to the μ RSTAR System.

5. Type your password.

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

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 μ RSTAR Startup Screen.

Logging onto μ RSTAR 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 μ RSTAR. If you need an account, please see the μ RSTAR system manager.

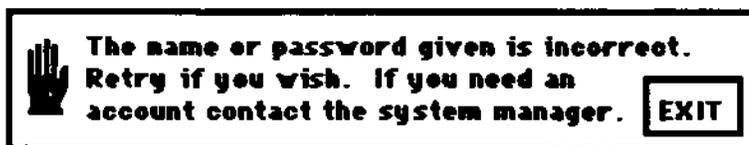
If you have questions about μ RSTAR, refer to the μ RSTAR Overview, or feel free to call

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

Troubleshooting

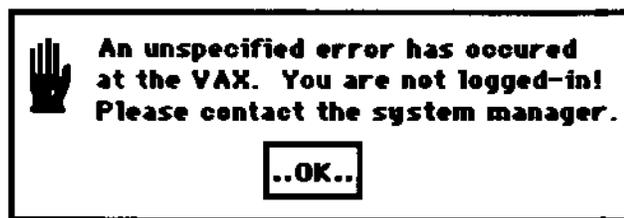
If there are any problems with the connection to the VAX or with your login, μ RSTAR will display alert messages describing the problem and your course of action.

1. Incorrect Password



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 μ 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 μ RSTAR system manager if you continue having problems.

2. Network Error



If the connection between the workstation and the VAX is not working, μ RSTAR will present the alert box above. Click the *OK* button. This will bring you back to the μ RSTAR Startup Screen. Try to login again. If you continue to have problems, contact the μ 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 μ RSTAR

The Modes

Due to memory restrictions on the PC workstations, μ 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 μ RSTAR by choosing **Quit μ RSTAR**.

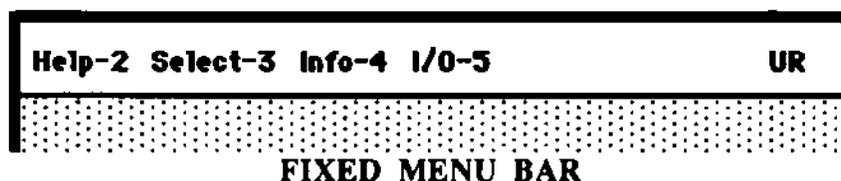
```
Select-3
F1 DataBase Mode
F2 Image-View Mode
F3 Image-Place Mode
F4 System Mode
F5 Exam Review Mode
=====
F6 QUIT  $\mu$ RSTAR
SELECT MENU
```

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.



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

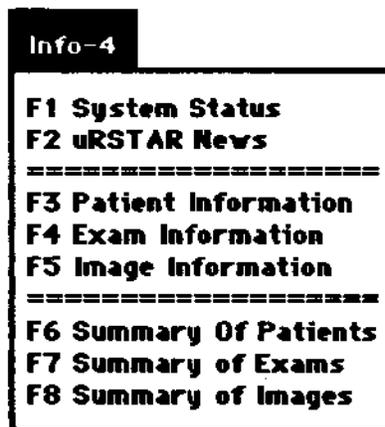
The **UR** drop-down menu contains desktop accessories such as a calculator and clock. The calculator is fully functional. Pressing the <num lock> key on the numeric key pad on the right side of the keyboard will make it easier to operate. To remove the calculator or the clock from the screen, close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

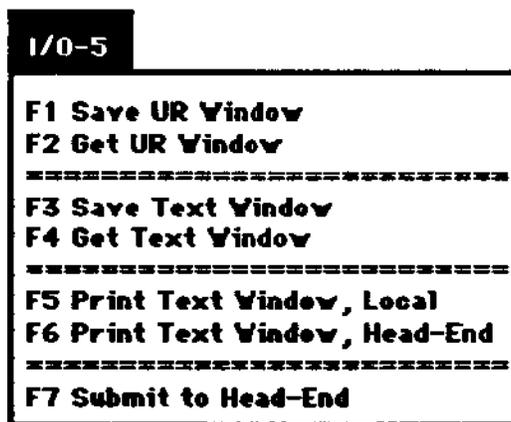
The **Info** drop-down menu gives you information about the current status of the workstation. When you choose one of the items by moving the pointer on top of the item with the mouse and clicking the left hand mouse button, a window will appear in the middle of the screen with the information. To close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



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.



INPUT/OUTPUT MENU

μRSTAR Functions at a Glance

Function	Mode	Actions
Cinéing images	Image View	Click <i>Start A</i> button
Change partitioning of displays	Image Placement	Choose <i>Select Partition Keep</i> or <i>Select Partition Clear</i> from <i>Partition</i> menu
Display an exam	Exam Review	Click <i>Display current</i> button after choosing exam from Exam Summary Window
Manipulate images		
Zoom	Image View	Click <i>Zoom/Pan</i> button
Flip horizontally	Image View	Click <i>Flip H</i> button
Flip vertically	Image View	Click <i>Flip V</i> button
Rotate 90° clockwise	Image View	Click <i>Rcw 90</i> button
Rotate 90° counterclockwise	Image View	Click <i>Rccw 90</i> button
Invert	Image View	Click <i>Invert</i> button
False colorize	Image View	Click <i>Color</i> button
Zoom all selected images	Image View	Click <i>Undefn4</i> button
Clear graphics from images	Image View	Click <i>ClrGraph</i> button
Return images to original state	Image View	Click <i>Normal</i> button
Mark an exam as dictated	Exam Review	Click <i>Mark dictated</i> button
Measuring images		
Distance	Image View	Choose <i>Ruler</i> from <i>Tools</i> menu
Angle	Image View	Choose <i>Protractor</i> from <i>Tools</i> menu
Area	Image View	Choose <i>Area</i> from <i>Tools</i> menu
Point	Image View	Choose <i>Point</i> from <i>Tools</i> menu
Region of Interest	Image View	Choose <i>ROI</i> from <i>Tools</i> menu
Search database		
By Medical Record Number	Exam Review	Click <i>By unit#</i> button
By Name	Exam Review	Click <i>By name</i> button
By Today's date (and default modality)	Exam Review	Click <i>Todays</i> button
Last 7 days (and default modality)	Exam Review	Click <i>Last 7 days</i> button
Canned Search	Database	Choose <i>Canned</i> from <i>Lookup</i> menu
Manual Search	Database	Choose <i>Simple Exam Search</i> or <i>Complex Exam Search</i> from <i>Lookup</i> menu
Window and center images	Image View	Click one of the preset buttons OR Adjust using slider OR Hold down left and right mouse buttons

μRSTAR Mouse Techniques at a Glance

Function

Actions

Select one image

Click left mouse button

Select all images on a screen

Click right mouse button

Copy an image from one partition to another

Click left mouse button and drag

Copy all images from one screen to another

Click right mouse button and drag

Exchange images between partitions

Click left mouse button and <SHIFT> drag

Exchange all images between screens

Click right mouse button and <SHIFT> drag

Copy images from one screen to the
empty partitions on another

Click right mouse button and <CTRL> drag

Get help about a menu item

<ALT> Click menu item with left mouse button

Change window and center of all images
on a screen

1. Move the mouse over any image on the screen
2. Click both mouse buttons at the same time
3. Move mouse side to side to change center
4. Move mouse up and down to change window
5. Click both mouse buttons at same time to exit

Using Exam Review Mode

Exam Review Mode is the easiest method for selecting and displaying exams on the μ RSTAR workstation. Using "default" settings set up for you by the μ RSTAR Administrator, μ RSTAR 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 μ RSTAR 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.

Help-2 Select-3 Info-4 I/O-5 UR

Exam Review Control

GET EXAMS

PATIENT'S EXAM SELECTION

IMAGE SELECTION

DISPLAYED EXAM DISPOSITION

Exam Review Control Screen

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:

X	EXAMS MATCHED IN SEARCH	◆			
Patient Name	MRN	Exam Code	Mode	Date	N
Select this line to get ALL ITEMS.					
Select this line to get only the HIGHLIGHTED ITEMS.					
Select this line to CANCEL the request.					
MAYO, JAMES	900-00-00	C02 PET	20-MAY-80	10	
SMITH, JOHN	123-45-67	MRI	15-JUN-88	32	

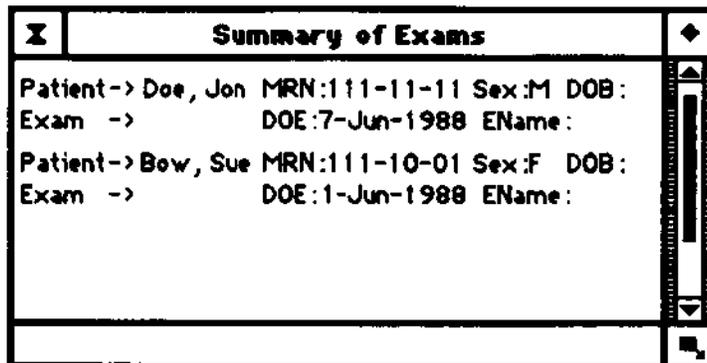
To select and display one exam:

- 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., cinéd, 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. μ RSTAR 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 μ RSTAR database.

Exams that are "at the workstation" can be displayed more easily since the μ RSTAR 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 μ RSTAR 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.

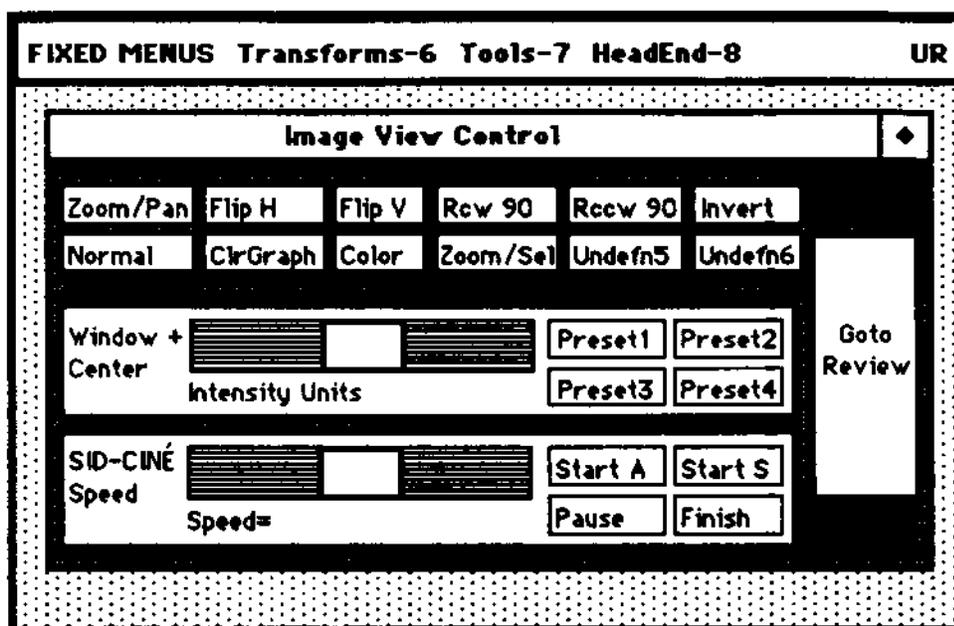


Image View Screen

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).

Transforms-6	Tools-7	HeadEnd-8
<p>F1 To Be Determined F2 To Be Determined F3 To Be Determined F4 To Be Determined</p>	<p>F1 Ruler F2 Protractor F3 Area F4 Point F5 ROI</p>	<p>F1 Options F2 Exam Information F3 Patient Information F4 Image Information ===== F5 Put Text F6 Put Integer Number F7 Put Real Number F8 Put Terminate ===== F9 Return Message</p>

Image View Mode Menus

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

μ RSTAR allows you to "window and center" images, mapping the range of recorded pixel values (from 0 to 4096) to displayed gray-scale 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 μ RSTAR 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.

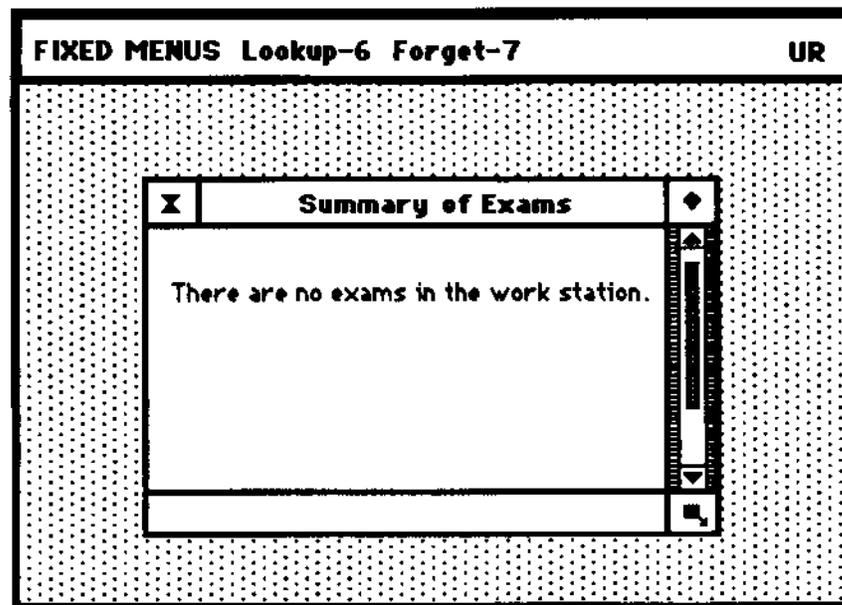
- Options:* Displays a dialog box that allows you to set the verbosity level for the results of the use of the image measurement tools, i.e., the higher the level, the more detailed the results. It also allows you to clear all or part of the measurement results window.
- Exam Information:* Not currently 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 an real number that will be inserted into the measurement results window.
- Put Terminate:* Puts a "Terminate" signal into the measurements 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 μ RSTAR 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 μ RSTAR 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.



Database Mode

The Database mode commands are available from the menus *Lookup* and *Forget*:

Lookup 6 F1 Mine Not Looked At.. F2 Teaching Files =====	Forget 7 F1 All Exams and Images F2 Displayed Exams F3 Selected Exams
F3 Canned-1 F4 Canned-2 F5 Canned-3 =====	
F6 Simple Exam Search F7 Complex Search	

Database Mode Menus

Using canned searches

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

The dialog box is titled "Simple Exam Search". It features a "Number of Search Keys" section with two buttons: "One Key" and "Two Keys", with "Two Keys" being the selected option. Below this is the "Key one" section, which includes five buttons: "Name", "Date", "MRN", "Type", and "Doctor", with "Name" selected. A text field below these buttons contains "Smith*". The "Logical operation between keys" section contains three buttons: "AND", "OR", and "AND-NOT", with "AND" selected. The "Key two" section also has five buttons: "Name", "Date", "MRN", "Type", and "Doctor", with "Name" selected. A text field below these buttons contains "CT". At the bottom, the "Action" section contains two buttons: "Do Search" and "Cancel".

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.

Complex exam search

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 Data Base searches
Example: mode"ct*" AND pname"jones*" AND aname"jones*"
 Dict"NotDone" And PName"Smith*" And Mode"MRI*"
 Rnam"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, parantheses, 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.

- Rnam"Harris" And (Mode"CT" or Mode"MRI") And Dict"NotDone"

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:

X	EXAMS MATCHED IN SEARCH					◆
Patient Name	MRN	Exam Code	Mode	Date	N	
Select this line to get ALL ITEMS.						
Select this line to get only the HIGHLIGHTED ITEMS.						
Select this line to CANCEL the request.						
MAYO, JAMES	900-00-00	CO2 PET	20-MAY-80	10		
SMITH, JOHN	123-45-67	MR1	15-JUN-88	32		

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 μ RSTAR exams.

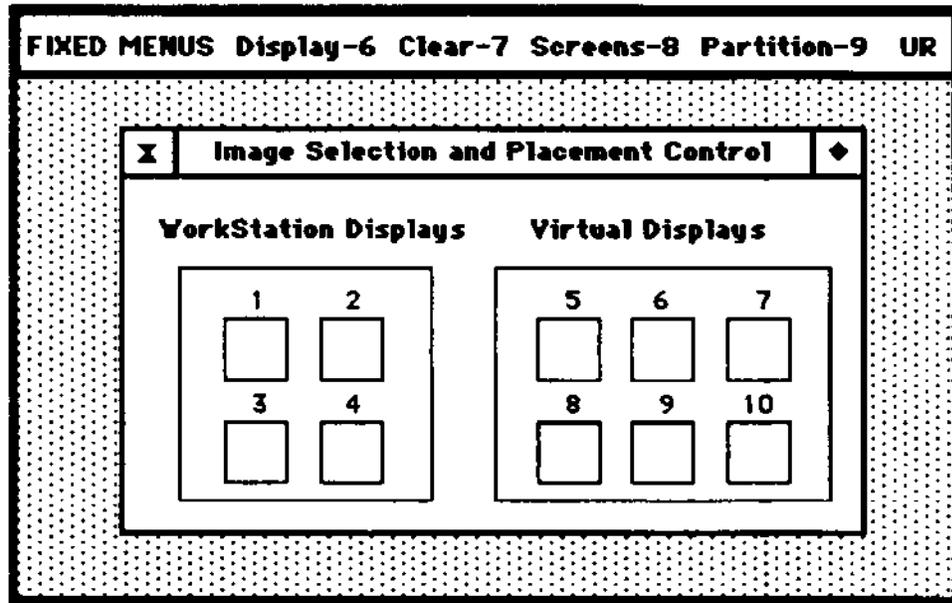


Image Selection and Placement Control Screen

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 μ RSTAR workstation. (Note: The figure above illustrates a four-display workstation. If your workstation has only two screens, than 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. μ RSTAR 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 9 F1 Select Partition (clear) F2 Select Partition (keep) ----- F3 Create New Partition

Image Placement Mode Menus

Displaying an exam from Image Placement Mode

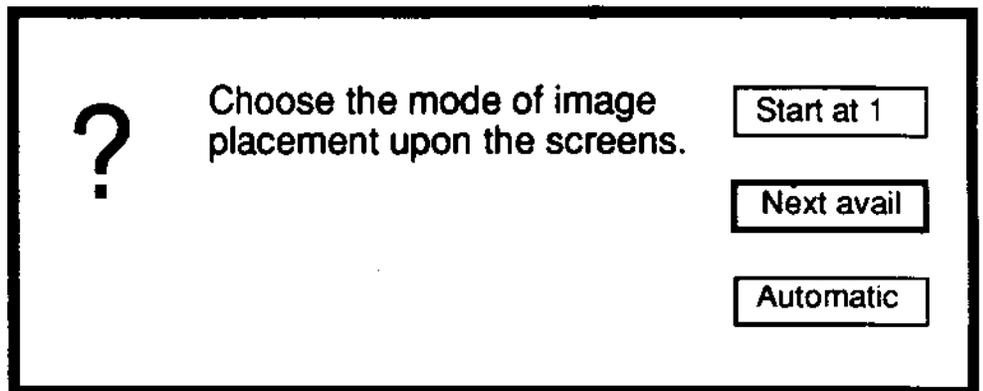
1. Select Summary of Exams from the Info menu.

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.



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.

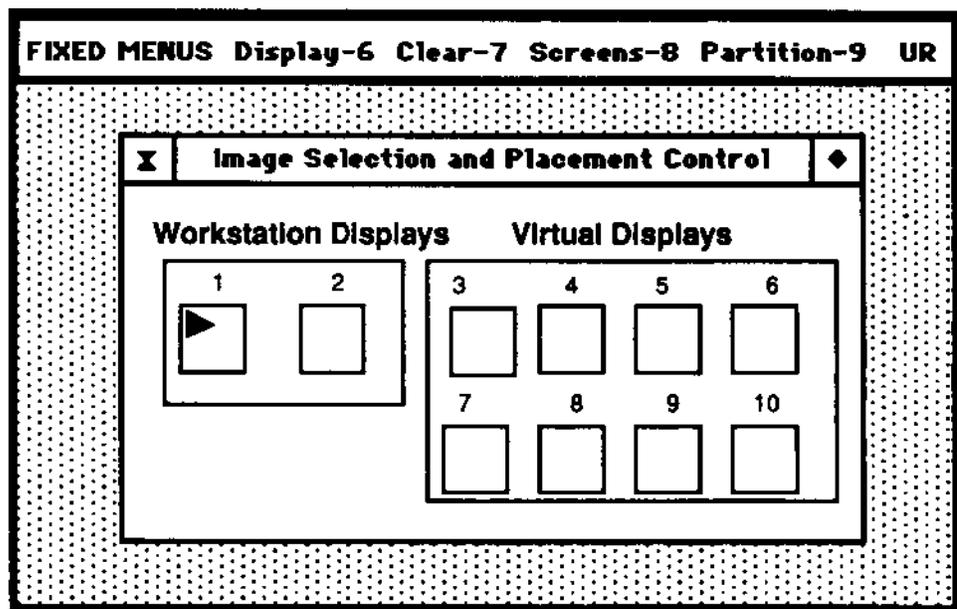
Displaying two exams simultaneously

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.



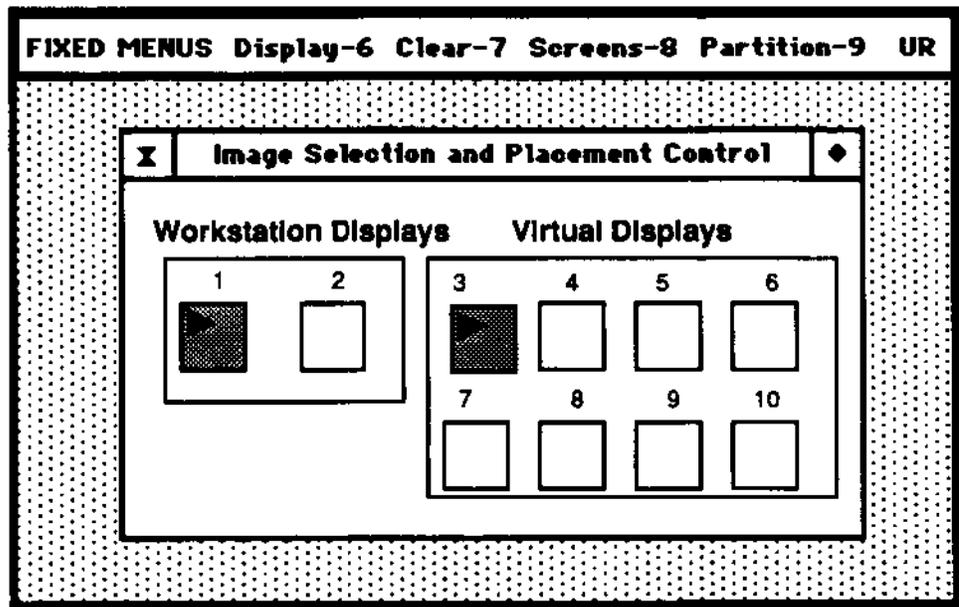
3. Copy the images from a workstation display to a virtual display.

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	galium	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.