

# USER'S GUIDE

## EXDIFF

Version 4

Extended Differencing System for the  
X Window System



SOFTWARE RESEARCH, INC.

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# Preface

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## **Congratulations!**

By choosing the TestWorks integrated suite of testing tools, you have taken the first step in bringing your application to the highest possible level of quality.

Software testing and quality assurance, while becoming more important in today's competitive marketplace, can dominate your resources and delay your product release. By automating the testing process, you can assure the quality of your product without needlessly depleting your resources.

Software Research, Inc. believes strongly in automated software testing. It is our goal to bring your product as close to flawlessness as possible. Our leading-edge testing techniques and coverage assurance methods are designed to give you the greatest insight into your source code.

TestWorks is the most complete solution available, with full-featured regression testing, coverage analyzers, and metric tools.

## **Audience**

This manual is intended for software testers who are using the EXDIFF Extended Differencing System on an X Windows platform. You should be familiar with the X Window System and your workstation.

## Content of Chapters

Chapter 1	<i>INTRODUCTION</i> describes EXDIFF's role in automated testing.
Chapter 2	<i>QUICK START</i> shows how to set up EXDIFF and provides a step-by-step run-through of a basic EXDIFF session.
Chapter 3	<i>EXDIFF GRAPHICAL USER INTERFACE</i> provides a summary of <i>EXDIFF</i> windows, menus, and commands.
Chapter 4	<i>COMMAND LINE PROCESSING</i> examines the run-time options for <b>exdiffX</b> , <b>Xexdiff</b> , <b>Xmask</b> , and <b>EX</b> utilities.
Chapter 5	<i>CONFIGURATION FILE PROCESSING</i> examines establishing run-time options for <b>exdiff</b> within a configuration file.

## Typefaces

The following typographical conventions are used in this manual:

**boldface** Introduces or emphasizes a term that refers to the *EXDIFF* window, its sub-menus and its options.

*italics* Indicates the names of files, directories, pathnames, variables, and attributes. Italics is also used for manual and book titles.

"Double Quotation Marks"

Indicates chapter titles and sections. Words with special meanings may also be set apart with double quotation marks the first time they are used.

`courier` Indicates system output such as error messages, system hints, file output, etc.

**Boldface Courier**

Indicates any command or data input that you are directed to type. For example, prompts and invocation commands are in this text. (For instance, **stw** invokes TestWorks.)

# Introduction to EXDIFF

This chapter provides an overview of the automated testing process and describes *EXDIFF*'s role in Quality Assurance, along with *EXDIFF*'s basic functions and benefits.

---

## 1.1 Automated Testing — An Overview

In the past, application and operating environments were relatively simple. Manual testing or a few written test scripts stored in batch files were usually sufficient to fully exercise the product. Today's applications, however, are much more complex, as are the environments in which they run.

The stages of software production realistically involve multiple versions. Over a single production cycle, a product may have to be tested several times. Performing these tests manually usually involves a large investment of time and money.

If an application is automated, each test can be performed automatically, accurately, and often un-manned each time developers create a new version of the software. Although it does take some time to develop the test operation, this time is more than compensated during the middle-to-later stages of testing. Considering the resources involved, automating test operation can drastically reduce the overall time needed to test a software product.

## 1.2 The STW/Regression Solution

Software Research, Inc. offers a solution, *STW/Regression*<sup>™</sup>, that automates software testing. *STW/Regression* is designed to overcome the laborious and error-prone process of manual testing by automating the execution, management and verification of a suite of tests. Test outcomes are recorded and compared automatically with baselines. Any discrepancies are recorded and stored for further analysis. Extraneous or irrelevant discrepancies, however, can be discarded in the comparison process. Finally, test execution, reports and statistics are available for viewing.

*STW/Regression* improves the overall quality of testing by providing technically sophisticated support for full automation of regression testing, test capture/replay, and results comparison. Using *STW/Regression*,

the execution time of the regression testing process can be reduced by 70 to 90 percent.

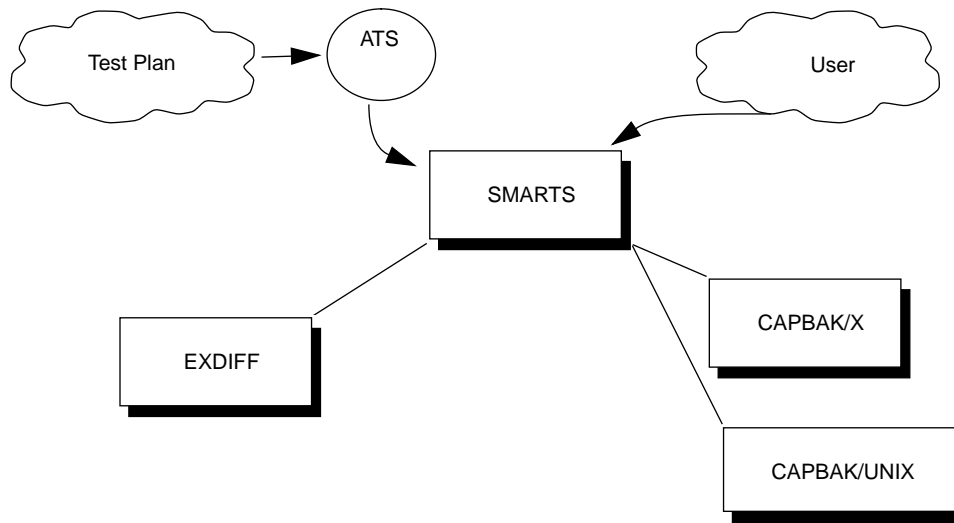
Although functionality varies slightly, *STW/Regression* products can be invoked either via an X Window System graphical user interface (GUI) or from the command line. *STW/Regression* includes the following products:

- *SMARTS*<sup>™</sup> automates the work of controlling, executing, re-executing, and analyzing the results of complex sets of tests.
- *CAPBAK/X*<sup>™</sup> is an automated capture and playback tool for the X Window System that creates automated tests. All user activities during the testing process are recorded, including keystrokes, mouse movements, and captured bitmap images and ASCII values. The images and ASCII characters provide baselines of expected behavior against which future runs of the tests can be compared.
- *CAPBAK/UNIX*<sup>™</sup> is an automated capture and playback tool for the UNIX environment. *CAPBAK/UNIX* allows users to interact with a remote machine and permits keystrokes entered by the user to be recorded to a keysave file and played backed to simulate an interactive user session. ASCII characters provide baselines of expected behavior against which future runs of the tests can be compared.
- *EXDIFF*<sup>™</sup> compares corresponding bitmap image, ASCII or *CAPBAK/UNIX* keysave files. Irrelevant discrepancies can be masked during the differencing process.

*EXDIFF* is the focus of this manual. For complete information on use of the other *STW/Regression* products, please consult the proper manuals.

A *STW/Regression* flow chart is indicated below. Boxes with darkened backgrounds represent the main components of *STW/Regression*.

*SMARTS* is the central component to the *STW/Regression* process, controlling test executions and results. *SMARTS* can run a vast variety of tests, including playing back hundreds of test scripts created from *CAPBAK* or *CAPBAK/UNIX*. *SMARTS* can also determine whether *CAPBAK/X*'s or *CAPBAK/UNIX*'s tests passed or failed by making a simple call to *EXDIFF* to compare the baseline and response files.



### 1.3 EXDIFF's Role

Most systems are supplied with a standard file differencing utility. The utility reports the compared files as either the same or different. It is left to the user to determine whether the registered differences are of any significant value. For regression testing, such a restrictive and manual evaluation process can become quite cumbersome.

As a stand-alone tool, or within the *STW/Regression* tool set, *EXDIFF* is a test evaluation facility that extends commonly-available file comparison utilities. Executable from either a GUI or the command line, *EXDIFF* compares files of various logical structures:

- Byte-oriented files
- Line-oriented files
- Bitmap image files
- *CAPBAK/UNIX* keysave files

A typical differencing utility will register extraneous differences, such as changed dates and processing information, and flag the files as different. *EXDIFF* provides masking options which allow the user to specify areas within ASCII or image files to be ignored during the differencing process.

### 1.3.1 Byte-Oriented and Line-Oriented Files

The *EXDIFF* default mode **exdiff** differences two ASCII files as byte-oriented or line-oriented files.

Byte-oriented files are typically binary or character-based files. When processing files in byte mode, the **exdiff** utility compares two ASCII or binary files for byte equivalence.

Line-oriented files are ASCII text files such as manuals, letters and source programs. *EXDIFF* incorporates many features of the standard UNIX **diff** utility and has a compatible syntax and subset of options. Comparison output can also be formatted as a more comprehensively annotated listing, including pathnames and execution date for the compared files.

Prior to executing the **exdiff** utility, an ASCII file can be reformatted and/or divided (based on user-specified byte numbers, line numbers or character strings) using the **EX** command line utilities. Alternatively, extensive masking commands can be established in an **exdiff** resource configuration (RC) file to allow extraneous differences to be ignored during the comparison process.

### 1.3.2 Bitmap Image Files

**Xexdiff**, the X Window system version of *EXDIFF*, performs a pixel-by-pixel comparison of two saved image files and displays compared or differenced images to the screen.

User-specified areas to be ignored during differencing process are established using the **Xmask** utility. While masking is concerned with positive masks (i.e. ignoring regions within specified boundaries), the **Xmask** reverse mask option enables negative masks to be differenced. In this mode, **Xexdiff** compares only the areas contained within the masked boundaries.

### 1.3.3 CAPBAK/UNIX Keysave Files

During a recording session, the *CAPBAK/UNIX* capture/playback tool automatically generates input statements that represent user input directed to the application under test (AUT). The test input statements are then stored, in binary format, as a keysave file.

When processing files in keysave mode, the **exdiff** utility lists the command line number and key number where difference occurs.

For further information on *CAPBAK/UNIX* keysave files, please refer to the *CAPBAK/UNIX User Manual*.

## 1.4 Main Features

The following list indicates the more significant features of the *EXDIFF* application:

- Allows comparison and masking procedures to be executed from either a window-based graphical user interface or the command line.
- Displays either a comparison or differenced image to the screen.
- Performs differencing on-the-fly during *CAPBAK/X*'s playback.
- Enables differencing process to be executed either manually or as a batch process within a *SMARTS* testing script.
- Performs a pixel-by-pixel comparison of two saved bitmap image files with the **Xexdiff** utility. Differences between image file colors are indicated.
- Ignores user-specified areas (positive masks) of an image file during the differencing process with the **Xexdiff** utility. Unlimited, overlapping positive masks can be set for an individual image.
- Enables inverse processing (reverse masking) of an image file, where *only* the user-specified area is compared during the differencing process.
- Provides line and byte comparisons of two saved ASCII files with the **exdiff** utility. Trailing blanks (spaces and tabs) can be ignored and strings of blanks can be compared as equal.
- Allows ASCII comparison output to either resemble output for the UNIX **diff** utility or to be formatted as a comprehensively annotated listing.
- Reformats and/or divides an ASCII file (based on user-specified byte numbers, line numbers or characters strings) with the **EX** utility, preparing the files for more thorough differencing with the **exdiff** utility.
- Allows extensive masking restrictions for similar ASCII files to be established in an **exdiff** resource configuration (RC) file.





# Quick Start

This chapter presents a step-by-step run through of a basic *EXDIFF* test session executed using the graphical user interface (GUI).

---

## 2.1 Overview

The instructions provided in this chapter are to be completed *before* going on to other chapters.

On completion of this chapter, you should be familiar with the main activities involved in executing a *EXDIFF* test session, including invoking *EXDIFF*, comparing similar ASCII text files or bitmap image files, and creating positive and negative masks for image files.

For in-depth information on the GUI, please refer to another chapter (See CHAPTER 3 - Understanding the GUI” on page 45.).

**2.1.1 STEP 1: Setting up EXDIFF**

1. Initialize an xterm-type window to serve as the *EXDIFF* invocation window.

---

**Note:** Initialization is dependent on the window manager being used. Please contact your system administrator if you are unsure about your windowing system.

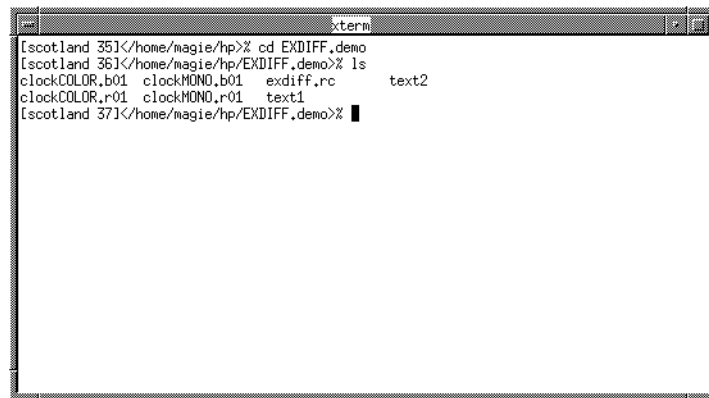
---

2. Move the window to the upper left corner of the screen. Windows are moved by clicking on the window's title bar and dragging the window to the desired location.
3. Change to the *SSR/demos/regression/exdiff.demo* directory and display its contents. The *exdiff.demo* directory is provided with the *EXDIFF* product and consists of the following files:
  - Two bitmap image files which were recorded from a monochrome (black and white) display screen using the capture/playback tool *CAPBAK/X*. The baseline and response files are named *clockMONO.b01* and *clockMONO.r01*.
  - Two bitmap image files which were recorded from a color display screen using the capture/playback tool *CAPBAK/X*. The baseline and response files are named *clockCOLOR.b01* and *clock-COLOR.r01*.
  - Two ASCII text files named *text1* and *text2*.
  - A resource configuration (RC) file named *exdiff.rc*. The RC file consists of pre-established runtime parameters, such as data to be ignored during the comparison of two files.

### 2.1.1.1 Analyzing the EXDIFF Setup

For the purposes of this demonstration, two sets of *CAPBAK/X* response and baseline bitmap image files have been provided. The *clockMONO.b01* baseline and *clockMONO.r01* responses files are to be used if the tutorial demonstration is run on a monochrome monitor. If the tutorial demonstration is run on a color monitor, however, the *clockCOLOR.b01* baseline and *clockCOLOR.r01* response files are selected instead.

The screen display should look like this:



```
xterm
[scotland 35]~/home/wagie/hp>% cd EXDIFF_demo
[scotland 36]~/home/wagie/hp/EXDIFF_demo>% ls
clockCOLOR,b01  clockMONO,b01  exdiff.rc      text2
clockCOLOR,r01  clockMONO,r01  text1
[scotland 37]~/home/wagie/hp/EXDIFF_demo>% █
```

---

**FIGURE 1** Setting Up the Display

### 2.1.2 STEP 2: Invoking EXDIFF

To invoke the GUI-version of *EXDIFF*:

1. Position the mouse so that it is located in the invocation window.
2. Activate the invocation window by clicking the left mouse button on it.

The activated window now becomes the main control window. During the test session, all status messages and warnings are displayed in this window.

3. Invoke *EXDIFF* from the working directory by typing:

```
exdiffX
```

The **Main** window pops up. The two activation buttons (**exdiff** and **Xediff**) contained within the **Main** window invoke the GUI-versions of the *EXDIFF* utilities.

The **exdiff** button initializes the ASCII line-oriented or byte-oriented differencing utility. *CAPBAK/UNIX* binary keysave files can also be compared from this window. The **exdiff** window is examined in **STEP 3**, of another section (See Section 2.1.3 - “STEP 3: Opening the exdiff Window” on page 12.).

The **Xediff** button initializes the **Xediff** window. This window supports two *EXDIFF* utilities: **Xediff** and **Xmask**. The **Xediff** utility performs a pixel-by-pixel comparison of the two saved bitmap image files and displays comparison or differenced images to the screen. User-specified areas to be ignored during the differencing process are established using the **Xmask** utility. The **Xediff** window is examined in **STEP 9**, of another section (See Section 2.1.9 - “STEP 9: Opening the Xediff Window” on page 22.).

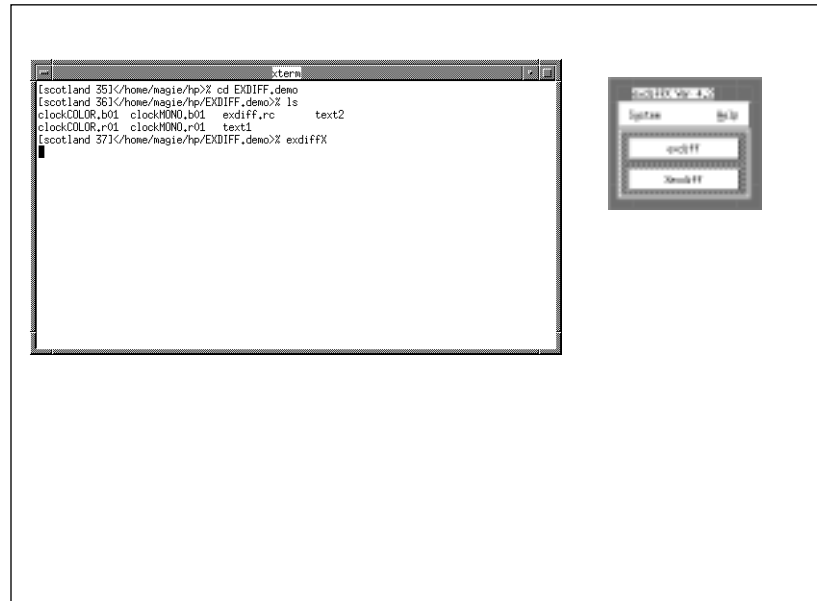
4. Move the **Main** window to the upper right corner of the screen by clicking on the window’s title bar and dragging the window to the desired location.

### 2.1.2.1 Re-Starting EXDIFF

Re-start a test session as follows:

1. Terminate the current test session from the **Main** window by clicking on the **System** menu.
2. Select the **Exit** option.
3. Perform the steps for invoking the GUI-version of *EXDIFF*, described in another section (See Section 3.3 - “The EXDIFF Main Window” on page 53.).

After invoking the GUI and relocating the **Main** window, the screen display should look like this:



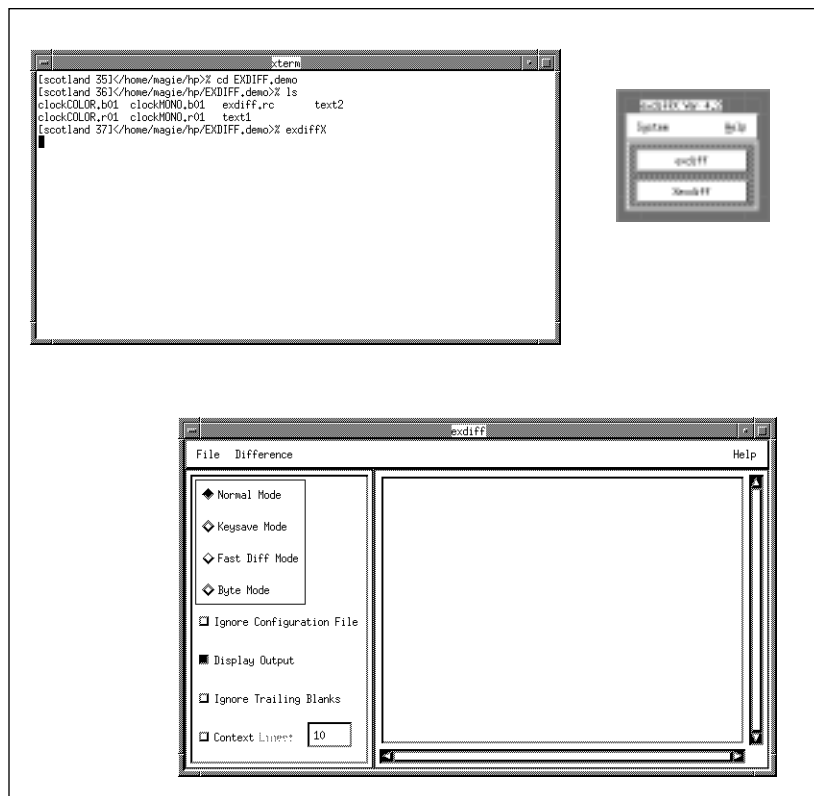
**FIGURE 2** Invoking the GUI

### 2.1.3 STEP 3: Opening the exdiff Window

To invoke the **exdiff** window:

1. From the **Main** window, click on the **exdiff** activation button. The **exdiff** window pops up.
2. Drag the **exdiff** window to the lower right corner of the screen.

After initializing and relocating the **exdiff** window, the screen display should look like this:



---

**FIGURE 3** Initializing the exdiff Window

#### 2.1.4 STEP 4: Selecting Files for **exdiff** Execution

The **exdiff** utility differences two ASCII files as line-oriented or byte-oriented files. *CAPBAK/UNIX* binary keysave files can also be compared from this window. The comparison files accessed by the **exdiff** utility are set from the **File** menu.

1. Click on the **File** menu.
2. Drag the mouse down and select the **Set File 1** option.

A file selection window similar to the one indicated in the following figure will appear.

3. From the file selection window, choose *text1* as the first ASCII text file for comparison by either:
  - Typing the filename in the **Selection** entry box and then clicking on the **OK** button, or
  - Clicking on the filename in the **Files** list box and then clicking on the **OK** button, or
  - Double clicking on the filename in the **Files** list box.

The file selection window disappears.

---

**Note:** As long as either corresponding ASCII or *CAPBAK/UNIX* binary keysave files is established as a comparison file, it is irrelevant which file is set first.

---

4. Having selected the first comparison file, establish the second ASCII text file by:
  - Activating the **Set File 2** option of the **File** menu.
  - Selecting *text2* from the file selection window using any of the previously indicated methods.

---

**Note:** The names of the selected files are indicated across the top of the **exdiff** window frame and will remain active until re-set.

---

When selecting a file for comparison from a file selection window, the screen display should look like this:

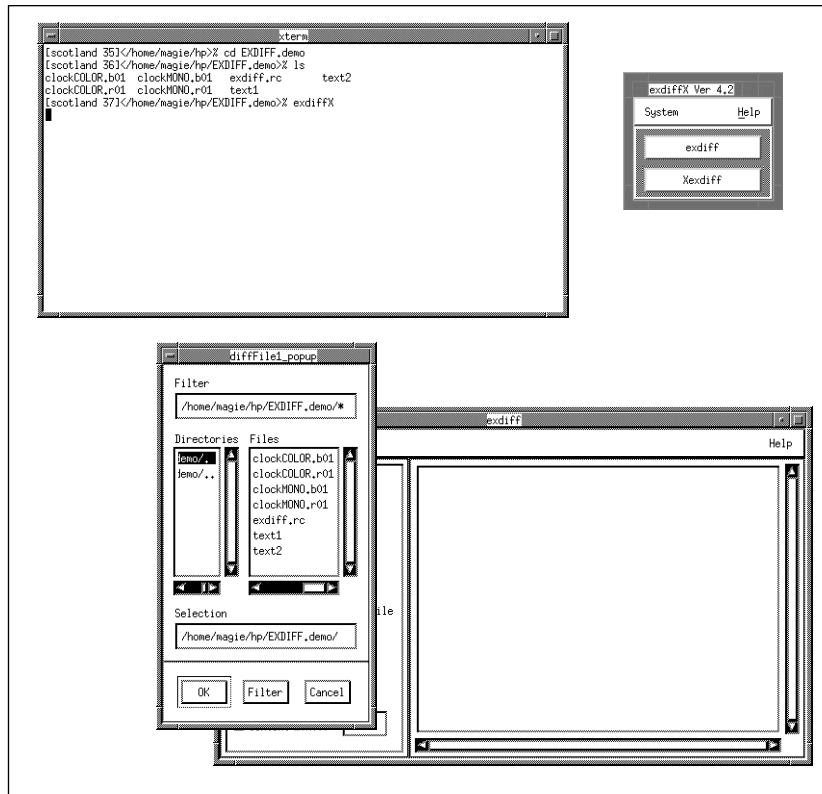


FIGURE 4 exdiff File Menu



## 2.1.5 **STEP 5: Setting Up the Exdiff Utility**

The **exdiff** utility can be executed using a variety of comparison modes and options, several of which are described in the following sub-sections.

### 2.1.5.1 **Selecting a Comparison Mode**

File type (ASCII or *CAPBAK/UNIX* keysave) and **exdiff** processing methods are specified via the **exdiff** comparison mode radio buttons, which are located in the upper left corner of the **exdiff** window, beneath the title bar's **File** menu.

Having selected two ASCII text files for comparison in the previous step, perform the following:

- Confirm that the **Normal Mode** button is activated. Comparison modes and options are activated when the radio button is darkened.

The **Normal Mode** is the default **exdiff** comparison mode and provides a line-by-line comparison of two ASCII files, fully compatible with the standard UNIX **diff** utility.

---

**NOTE:** When the **Normal Mode** is used in tandem with the **Ignore Trailing Blanks** option, the **exdiff** utility disregards trailing spaces and tabs and compares strings of blanks as equal.

---

### 2.1.5.2 Selecting the Display Output Comparison Option

The **exdiff** comparison options are located in the lower left corner of the **exdiff** window, beneath the **exdiff** comparison mode radio buttons.

- Confirm that the **Display Output** option is activated.

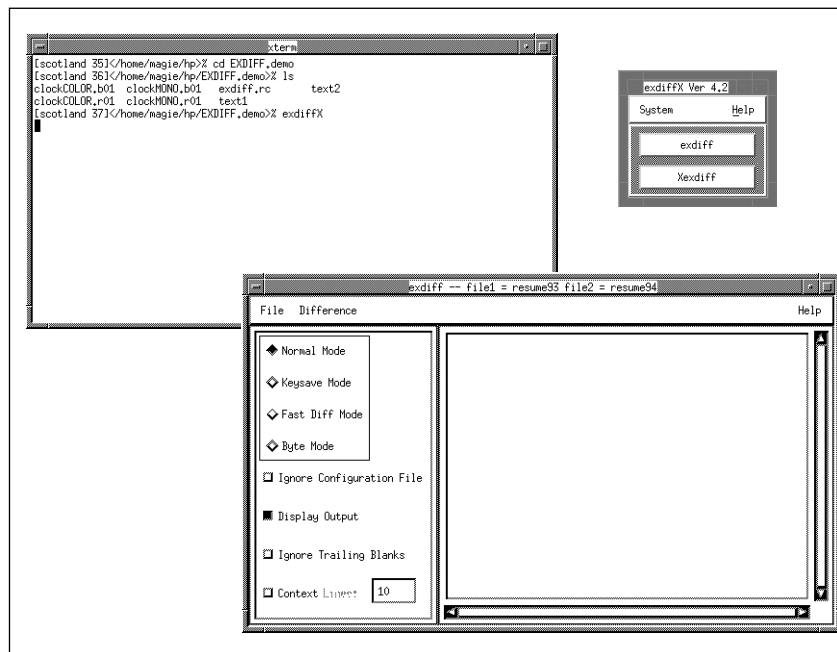
When activated, the **Display Output** option lists comparison output in the **exdiff** window's scroll display following **exdiff** execution. The **Display Output** option is the default **exdiff** output option.

---

**NOTE:** Comparison output can also be saved to a file specified via the **Set Output File** option of the **File** menu.

---

After selecting the **Normal Mode** and **Display Output** option for the **exdiff** utility, the screen display should look like this:



---

**FIGURE 5** Activated Normal Mode and Display Output Option

---

**2.1.6 STEP 6: Executing the exdiff Utility**

To execute the **exdiff** utility, perform the following:

1. After selecting the files to be differenced and establishing the comparison modes and options, click on the **Difference** menu.
2. Select the **Difference Now** option.

A message box will pop-up to indicate differences have been found:



3. Click on the box's **OK** button.

As the **Display Output** option was selected, the comparison output is now listed in the scroll display of the **exdiff** window.

The default format of the **exdiff** comparison output resembles that of the UNIX **diff** utility. Here is the syntax for the **exdiff** utility output:

```
line# [c/a/d] line#
<
---
>
```

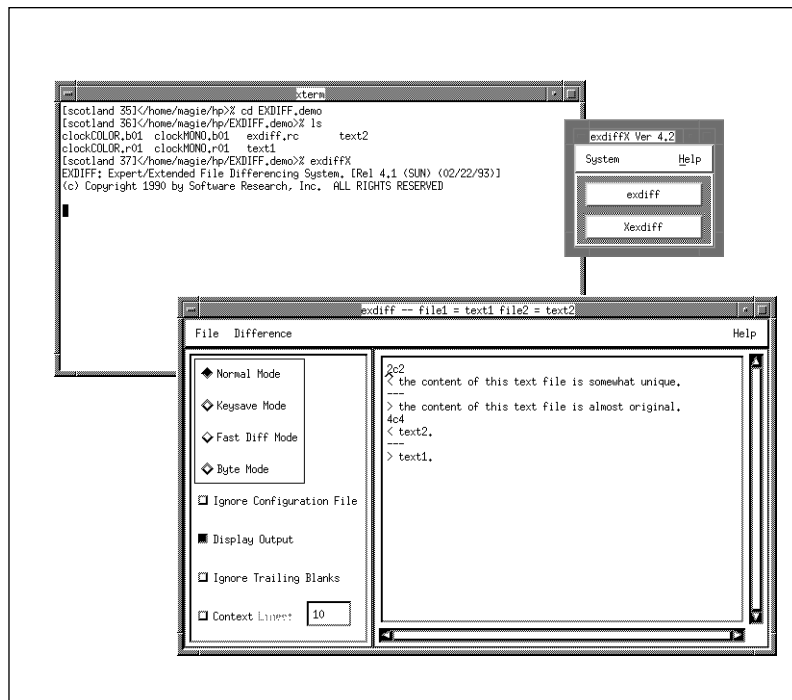
where the first `line#` indicates the range of lines in *filename1* which are different from the range of lines specified by the second `line#` in *filename2*. The letters `c`, `a`, and `d` are standard editor commands (for example, UNIX **ed**) which can be used to make the two files equal:

<code>c</code>	Change
<code>a</code>	Append
<code>d</code>	Delete

The redirection symbols are used as follows:

<code>&gt;</code>	Precedes a text line from <i>filename1</i>
<code>&lt;</code>	Precedes a text line from <i>filename2</i>

The displayed text can be traversed either by clicking on the text and dragging the mouse or using the vertical and horizontal scroll bars. After executing the **exdiff** utility, the screen display should look like this:



---

**FIGURE 6** Screen Display Following Standard exdiff Execution

### 2.1.7 STEP 7: Executing exdiff Using the Context Lines Comparison Option

Having selected two ASCII text files for comparison in a previous step, perform the following:

1. Click on the **Context Lines** option activation button (in the lower-left corner of the **exdiff** window).

---

**Note:** The number of lines printed before and after each difference can be set in the **Context Lines** specification field prior to executing the **exdiff** utility (the default is 10). The **Context Lines** option is available for **Normal Mode** only.

---

2. Change the default line setting for the **Context Lines** option by typing **1** in the **Context Lines** specification field.
3. Click on the **Difference** menu.
4. Select the **Difference Now** option.

A message box will pop-up to indicate differences have been found:



5. Click on the **OK** button.

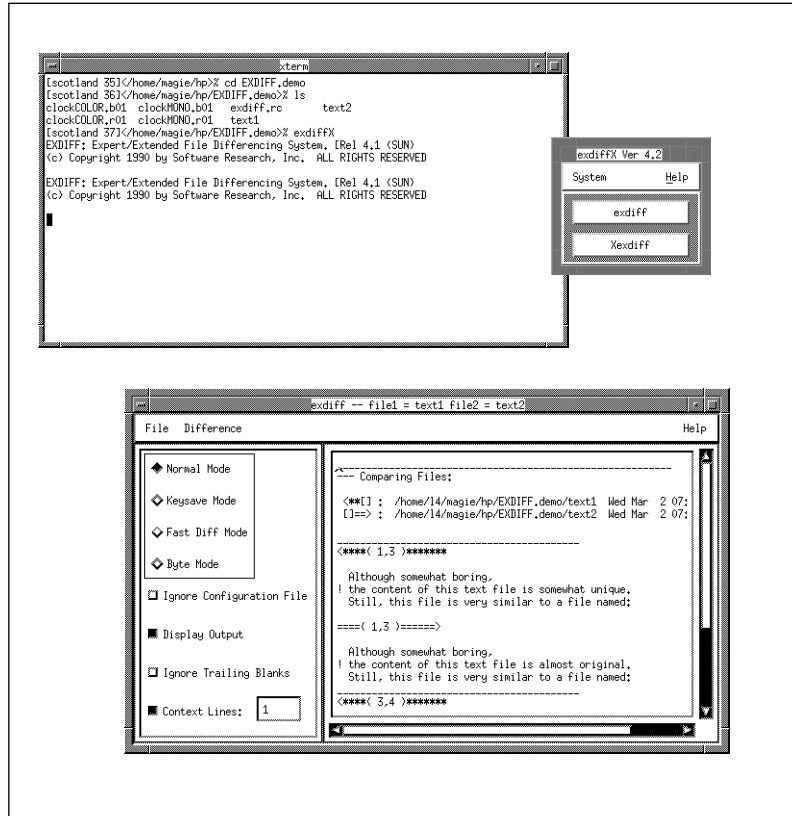
Because the **Display Output** option is still activated, the output is listed in the scroll display of the **exdiff** window. The **Context Lines** option output provides more details than the default output; the pathnames and dates for the compared files are indicated and lines which are different are preceded by an exclamation point (!).

The file set using the **Set File 1** option of the **File** menu is represented throughout the listing by these symbols: < \* \* [ ]

The file set using the **Set File 2** option of the **File** menu is represented throughout the listing by these symbols: [ ] ==>

The displayed text can be traversed either by clicking on the text and dragging the mouse or using the vertical and horizontal scroll bars.

After executing the **exdiff** utility using the **Normal Mode** and **Context Line** option, the screen display should look like this:



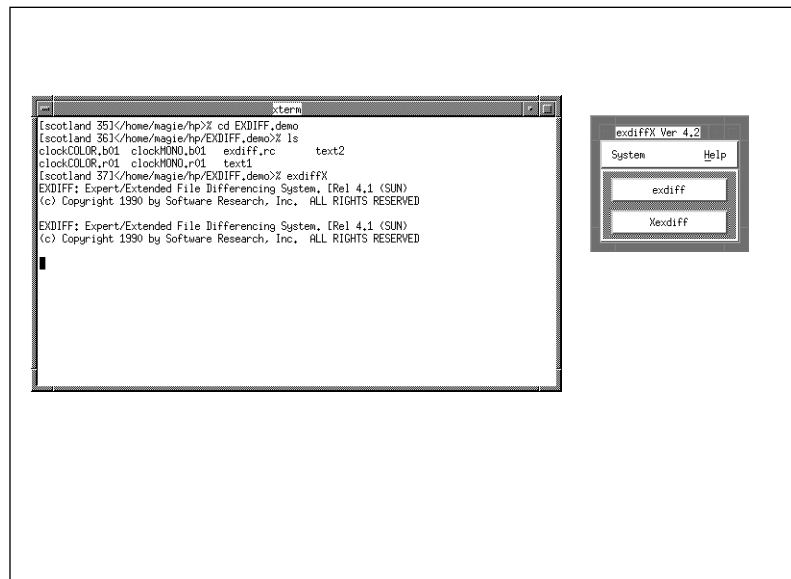
**FIGURE 7** Screen Display Following exdiff Execution Using the Context Lines Option

**2.1.8 STEP 8: Closing the exdiff Window**

1. Click on the **File** menu.
2. From the displayed **File**, select the **Exit** option.

The **exdiff** window is closed.

After exiting the **exdiff** window, the screen display should look like this:



**FIGURE 8** Completing an EXDIFF session

### 2.1.9 STEP 9: Opening the Xexdiff Window

The **Xexdiff** window supports two utilities: **Xexdiff** and **Xmask**. The **Xexdiff** utility performs a pixel-by-pixel comparison of the two bitmap image files saved either with the capture/playback tool *CAPBAK/X* or the standard X Window Dump utility (*xwd*). The **Xexdiff** utility then displays comparison or differenced images to the screen. User-specified areas to be removed from consideration during the differencing process are established using the **Xmask** utility.

Screen fragments, complete windows or full screens can all be saved as image files. When images are captured during the *CAPBAK/X* recording process, they are referred to as baseline files. The *CAPBAK/X* naming convention for baseline files is *basename.bnn*, where *basename* is the name of the keysave file, **b** indicates baseline and *nn* indicates the original number sequence in which the window was captured. When these images are re-captured during *CAPBAK/X* playback, they are saved as response files of the same name as the baseline files. The *CAPBAK/X* naming convention for response files is *basename.rnn*, where *basename* is the name of the keysave file, **r** indicates response and *nn* indicates the original number sequence in which the window was captured. Though they are given the same filenames, baseline and response files reside in different subdirectories (BSL and RSP respectively). Please refer to the *CAPBAK* manual for more detailed information. Images captured using the *xwd* utility are usually saved as *filename.xwd*.

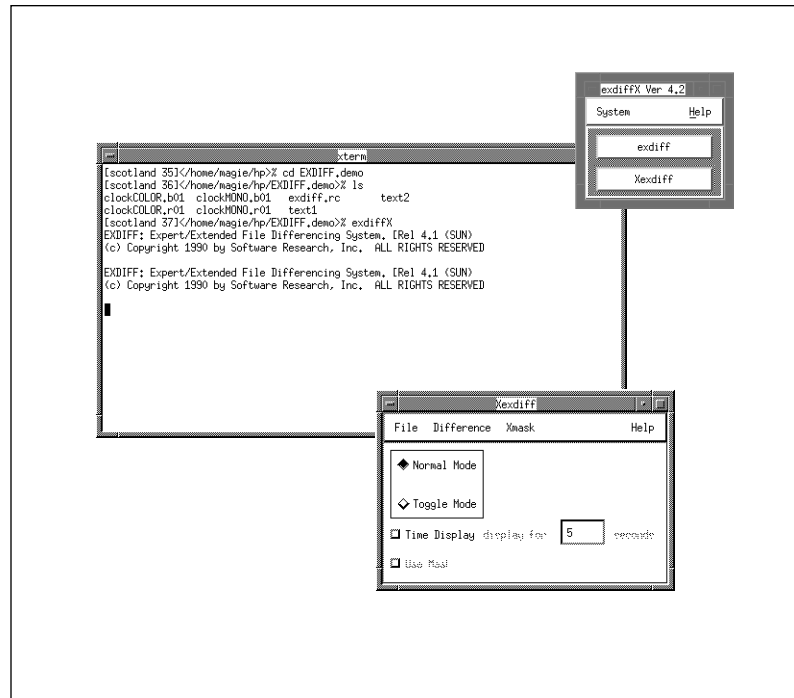
The **Xmask** utility is further examined in **STEP 14** through **STEP 17**.

To display the **Xexdiff** window:

1. From the *EXDIFF Main* window, click on the **Xexdiff** button. The **Xexdiff** window pops up.
2. Drag the **Xexdiff** window to the lower right corner of the screen.



After initializing and relocating the **Xexdiff** window, the screen display should look like this:



---

**FIGURE 9** Xexdiff Window

**2.1.10 STEP 10: Selecting Files for Xexdiff Execution**

The **Xexdiff** utility performs a pixel-by-pixel comparison of the two bit-map image files saved either with the capture/playback tool *CAPBAK/X* or the standard X Window Dump utility (*xwd*). The default comparison files accessed by the **Xexdiff** utility are set from the **File** menu.

1. Click on the **File** menu.
2. Drag the mouse down and select the **Set File 1** option.

A file selection window similar to the one indicated in the following figure will appear.

3. Depending on the type of monitor used throughout this tutorial demonstration, choose either *clockMONO.b01* (for a monochrome monitor) or *clockCOLOR.b01* (for a color monitor) from the displayed file selection window using one of the following methods:
  - Typing the filename in the **Selection** entry box and then clicking on the **OK** button, or
  - Clicking on the filename in the **Files** list box and then clicking on the **OK** button, or
  - Double clicking on the filename in the **Files** list box.

The file selection window disappears.

---

**Note:** As long as corresponding image files are established as comparison files, it is irrelevant which file is set first.

---

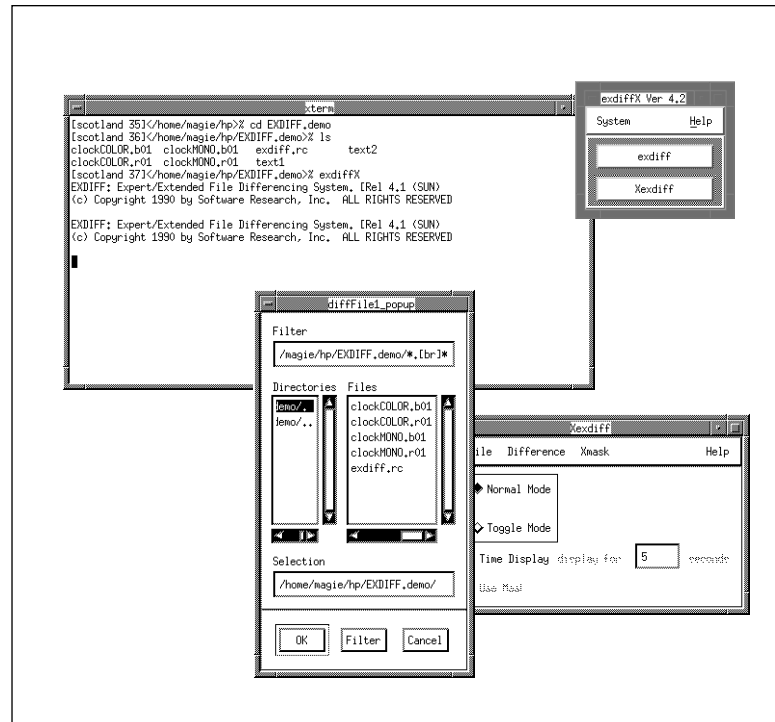
4. Having selected the first comparison file, establish the second file by:
  - Activating the **Set File 2** option of the **File** menu.
  - Depending on the type of monitor used throughout this tutorial demonstration, choose either *clockMONO.r01* (for monochrome monitor) or *clockCOLOR.r01* (for a color monitor) using any of the previously indicated methods.

---

**Note:** The names of the selected files are indicated across the top of the **Xexdiff** window frame and will remain active until re-set. (The **Xexdiff** window may have to be enlarged slightly, however, to view the filenames in their entirety.)

---

When selecting an image file for comparison from a file selection window, the screen display should look like this:



**FIGURE 10** exdiff File Menu and File Difference Selection Window

**2.1.11 STEP 11: Executing Xexdiff Using Normal Mode**

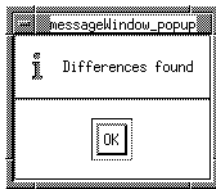
The **Xexdiff** utility is executed using one of two comparison modes, which are located in the upper-left corner of the **Xexdiff** window, in the **File** pull-down menu. The **Normal Mode** is examined in this section.

When activated, the **Normal Mode** displays *only* the image file differences to the screen. Having selected two bitmap image files for comparison in the previous step, perform the following:

1. Confirm that the **Normal Mode** button is activated. (The **Normal Mode** is the default **Xexdiff** comparison mode.)
2. Click on the **Difference** menu.
3. Activate the **Difference Now** option. The contrasting elements of the compared bitmap image files are displayed as indicated in the following figure.

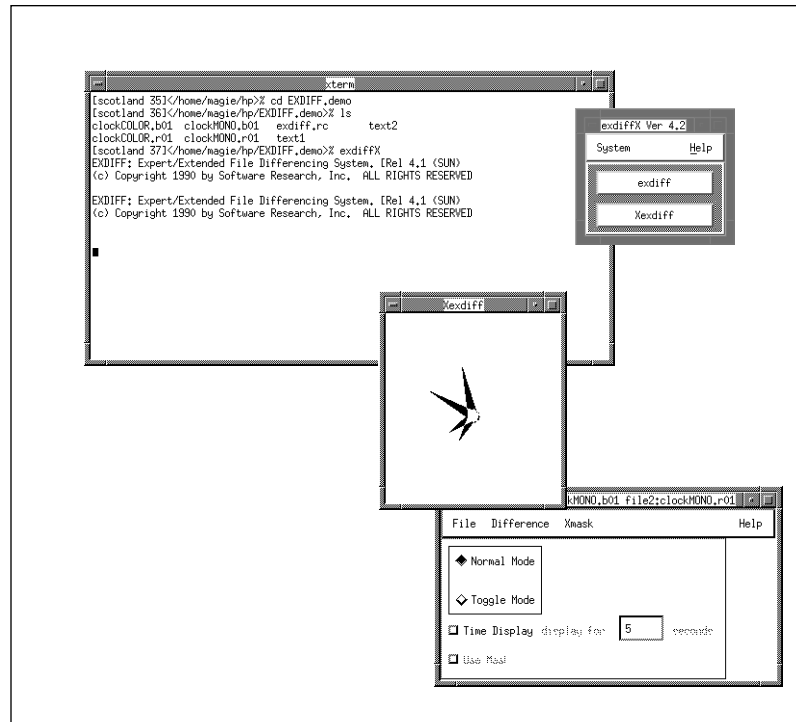
Until the displayed image is clicked on, **Xexdiff** functions cannot be accessed.

4. Click on the displayed image. The image disappears and the following message box is displayed:



5. Click on the **OK** button within the message box to resume **Xexdiff** activity.

When comparing selected image files using the **Normal Mode**, the screen display should look like this:



**FIGURE 11** Xexdiff Normal Mode Differencing

**2.1.12 STEP 12: Executing Xexdiff Using Toggle Mode**

The **Toggle Mode** toggles between the two alternate images. Having selected two bitmap image files for comparison in a previous step, perform the following:

1. Click on the **Toggle Mode** button.
2. Click on the **Difference** menu.
3. Select the **Difference Now** option. The first image file set using the **Set File 1** option of the **File** menu is displayed.
4. To view the image file set using the **Set File 2** option of the **File** menu, press any key. The first image disappears and is replaced with the second. Until a displayed image is clicked on, however, **Xexdiff** functions cannot be accessed.
5. Click on the displayed image. The image disappears.

---

**Note:** In addition to the comparison modes, *EXDIFF* also has a **Time Display** option which allows an bitmap image file to be displayed (either in **Normal Mode** or **Toggle Mode**) for a specified number of seconds. For details, please refer to Section 3.1.4.3

---

When comparing selected image files using the **Toggle Mode**, the screen display should look like this:

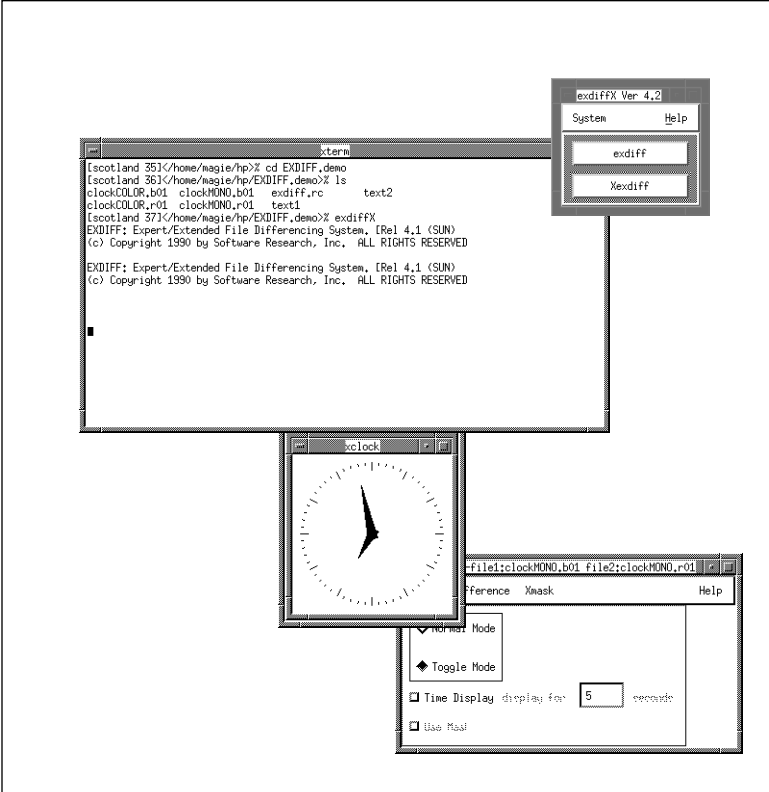


FIGURE 12 Xexdiff Toggle Mode Differencing

**2.1.13      STEP 13: Using the View File Option**

The **View File** options of the **Difference** menu allow **Xexdiff** functions to be accessed while the selected compared images are displayed.

Perform the following after comparing two bitmap image files:

1. Click on the **Difference** menu.
2. Select the **View File 1** option. The first image file set using the **Set File 1** option of the **File** menu is displayed.

---

**Note:** The **Xexdiff** window menus and options are still accessible while the image is displayed.

---

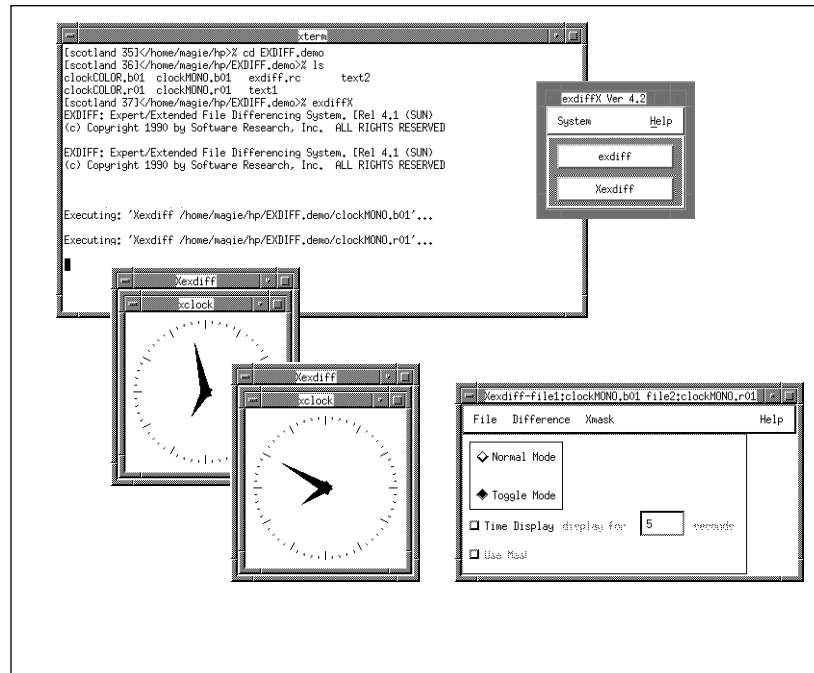
3. Click on the **Difference** menu and select the **View File 2** option.

The second image file set using the **Set File 2** option of the **File** menu now appears directly over the first image displayed using the **View File 1** option.

4. To view both images, relocate the second displayed image as in the following figure.
5. To remove image files displayed using the **View File** option, click on the displayed images.



When both comparison bitmap image files are displayed using the **View File** options, the screen should look like this:



**FIGURE 13** Image File 1 and Image File 2 Displayed using the View Option

**2.1.14      STEP 14: Setting Up the Xmask Facility**

The **Xmask** utility is invoked to establish positive or negative masks for bitmap image files, allowing user-specified areas to be removed from consideration during the differencing process.

Following completion of the masking process, the mask coordinates are saved to a *filename.m\*\** file, where *filename* is the name of the bitmap image file, and *\*\** indicates either the original number sequence in which the window was captured or **xwd** (for X Window Dump file).

1. Although no mask file has been created at this point in the tutorial demonstration, it is recommended to develop the habit of confirming whether a *filename.m\*\** file already exists for the image file to be masked prior to running the **Xmask** utility. If a mask file has already been generated for an image file, then old parameters will be read when the **Run Xmask** option is executed. Previous masks can be deleted by either:
  - Removing the existing mask file, or
  - Pressing the middle mouse button when executing the **Run Xmask** option.
2. In the upper left corner of the **Xediff** window, click on the **Normal Mode** radio button.

---

**Note:** When executing the **Xmask** utility, the **Normal Mode** *must* be activated.

---

3. Click on the **Xmask** menu.
4. Drag the mouse down and select the **Set file to mask** option. A file selection window will appear.
5. Depending on the type of monitor used throughout this tutorial demonstration, choose either *clockMONO.b01* (for a monochrome monitor) or *clockCOLOR.b01* (for a color monitor) as the image file to be masked.

When selecting an image file for the **Xmask** utility from a file selection window, the screen display will be similar to the following:

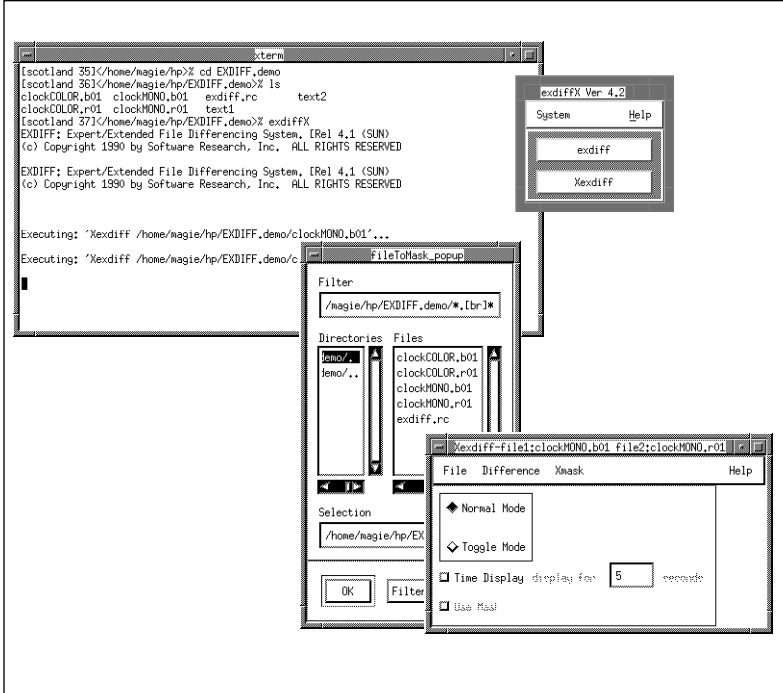


FIGURE 14 Setting Up the Xmask Utility

**2.1.15 STEP 15: Creating a Positive Mask File**

1. From the **Xmask** menu, click on the **Run Xmask** option.

Once **Xmask** is invoked, the bitmap image file selected using the **Set file to mask** option of the **Xmask** menu is displayed and the pointer's cursor will become a crosshair confined to the displayed image.

2. During the masking process, individual mouse buttons are used as follows:

**Left button**                      Outlines areas to be masked or ignored.

Click and hold at one corner of area to be masked, drag the cursor to the opposing corner of area to be masked, and release the left button to complete the mask. An outline will remain, marking the masked area. Subsequent click/drag/release actions will create more masks, with each mask added to an internal stack. Following each addition to the internal stack, a processing message is printed to standard output.

---

**Note:** Unlimited, overlapping masks can be set for each image.

---

**Middle button**                      Deletes an unwanted mask.

Click and release to remove the last mask written to the screen off the internal stack. The deleted mask will disappear from the display. Subsequent clicks will remove masks from the stack until no more masks exist. Following each deletion, a processing message is printed to standard output.

---

**Note:** If your mouse does not have a middle button, this option is not available.

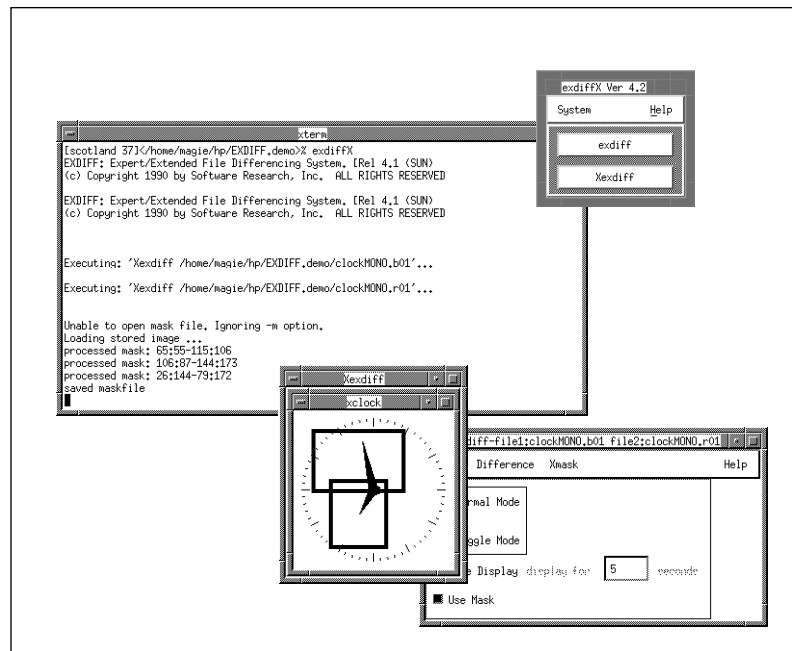
---

**Right button**                      Saves all mask coordinate information for the selected bitmap image file to *filename.m\*\**. A processing message is then printed to standard output.

For the purpose of this tutorial demonstration, mask the displayed image file with rectangular-shaped outlines resembling those depicted in the following figure.

Upon completion of the masking procedure, the mask coordinates are saved to a *filename.m\*\** file, where *filename* is the name of the keysave file, **m** specifies mask file and **\*\*** indicates either the original number sequence in which the window was captured or **xwd** (for X Window Dump file).

When creating masks for a selected image file using the **Xmask** utility, the screen display will look like this:



**FIGURE 15** Creating Masks Using the Run Mask Option

**2.1.16 STEP 16: Setting Default Masking File and Executing the Xmask File**

The **Xmask** utility is executed by performing the following steps:

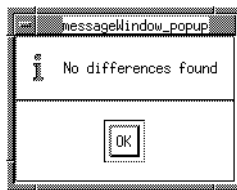
1. Click on the **File** menu.
2. Drag the mouse down and select the **Set Mask File** option. A file selection window is displayed.
3. Depending on the type of monitor used throughout this tutorial demonstration, the mask file generated in the previous step will be named either *clockMONO.m01* (for a monochrome display) or *clockCOLOR.m01* (for a color display). Select the appropriate mask file as the default mask file.

Setting the default mask file ensures that the appropriate mask file is read by the **Xediff** utility.

4. Click on the **Use Mask** option (lower-left corner of the **Xediff** window). By activating the **Use Mask** option, the **Xediff** utility will base comparisons of the two image files on the masking information contained within the default mask file. Click **OK**.
5. Click on the **Difference** menu.
6. Activate the **Difference Now** option.

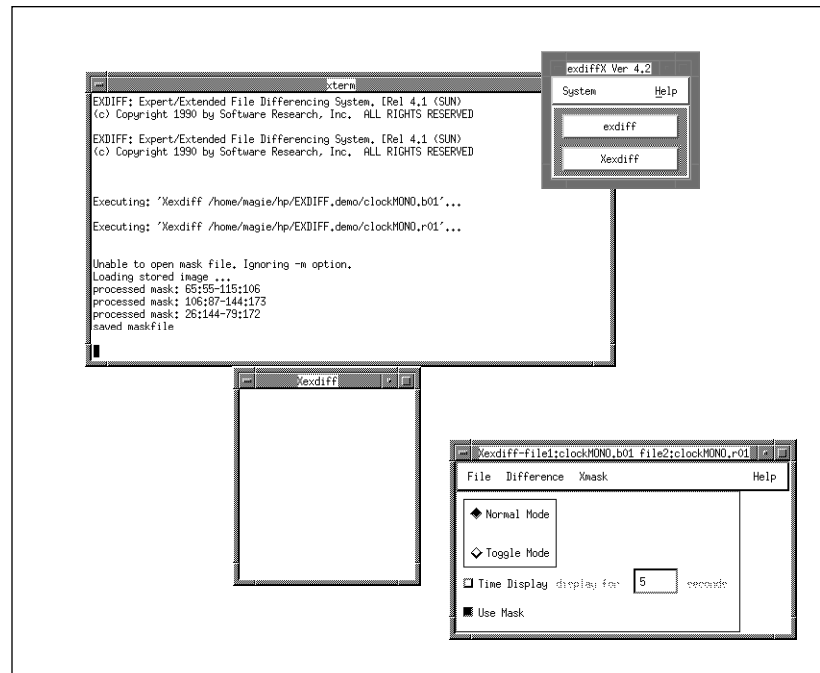
The masked regions specified within the default mask file are ignored during the comparison process.

7. Click on the displayed image. The image disappears and the following message box is displayed:



8. Click on the **OK** button within the message box to resume **Xediff** activity.

For the purpose of this tutorial demonstration, masks were created to resemble the rectangular-shaped outlines depicted in the previous figure. With the differences masked out, no differences are registered and the screen display will look like this:



**FIGURE 16** Executing Xexdiff Using a Positive Mask

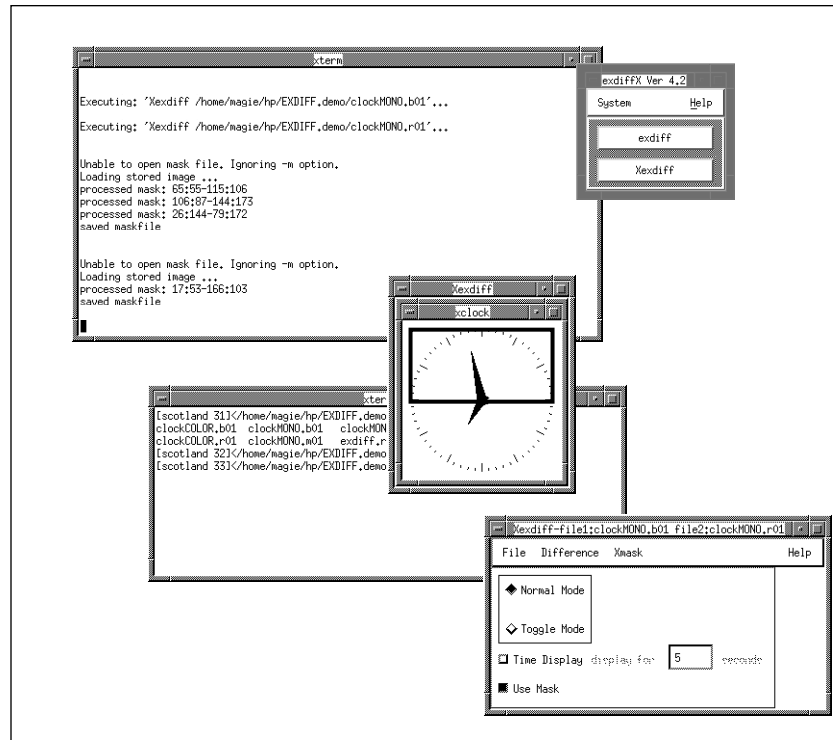
### 2.1.17 STEP 17: Creating a Reverse Mask File

A mask can also be specified as negative (reversed). That is, areas lying within the masked boundaries will be differenced, while those areas beyond the masked boundaries will be ignored. To execute the **Reverse Mask** option, the same steps for executing **Xmask** are performed as described in **STEP 15**, in another section (See Section 2.1.15 - “STEP 15: Creating a Positive Mask File” on page 34.), but with the following exceptions:

- If a mask file already exists for the image file to be selected for reverse masking, it *must* be deleted.
  - Prior to activating the **Run Xmask** option, the **Reverse Mask** option is selected from the **Xmask** menu.
  - Remember, you must be in **Normal Mode** to execute this option.
1. Initialize an xterm-type window and delete the mask file created in the previous step. Depending on the type of monitor used throughout this tutorial demonstration, the mask file was named either *clockMONO.m01* (for a monochrome monitor) or *clockCOLOR.m01* (for a color monitor).
  2. From the **Xmask** menu, activate the **Reverse Mask** option and then choose the **Set file to mask** option from the **Xmask** menu. A file selection window is displayed.
  3. Depending on the type of monitor used throughout this tutorial demonstration, set either *clockMONO.b01* (for monochrome monitor) or *clockCOLOR.b01* (for a color monitor) as the image file to be masked.
  4. From the **Xmask** menu, activate the **Run Xmask** option. As the mask file created in a previous step for the selected image file has been deleted, the old parameters (or masking coordinate information) no longer exist and a “mask-less” image is displayed when the **Run Xmask** option is executed.
  5. For the purpose of this tutorial demonstration, mask the displayed image file with a single, rectangular-shaped outline which resembles the one depicted in the following diagram.



When creating a reverse mask for a selected image file using the **Reverse Mask** option **Xmask** utility, the screen display will look like this:



**FIGURE 17** Creating a Reverse Mask

**2.1.18      STEP 18: Executing a Reverse Mask File**

To execute the **Reverse Mask** option, the same steps for executing **Xmask** are performed as described in **STEP 15 (See Section 2.1.15 - “STEP 15: Creating a Positive Mask File” on page 34.)**

1. From the **File** menu, select the **Set Mask File** option to set the default mask file and ensure that the appropriate mask file is read by the **Xexdiff** utility. Depending on the type of monitor used throughout this tutorial demonstration, re-set either *clockMONO.m01* (for a monochrome monitor) or *clockCOLOR.m01* (for a color monitor) as the default mask file.
2. Confirm that the **Use Mask** option is activated and execute the **Xexdiff** utility by activating the **Difference Now** option. As the **Reverse Mask** option was selected before creating the mask, the masked region is the *only* area compared during the differencing process.
3. Click on the displayed image. The image disappears and a message box is displayed.
4. Click on the **OK** button within the message box to resume **Xexdiff** activity.

As the **Reverse Mask** option was selected prior to creating the mask, the masked region is the *only* area compared during the differencing process. For the purpose of this tutorial, a reverse mask was created, like the single, rectangular-shaped outline shown on the previous page. When the **Xexdiff** utility is executed, the screen display will look like this:

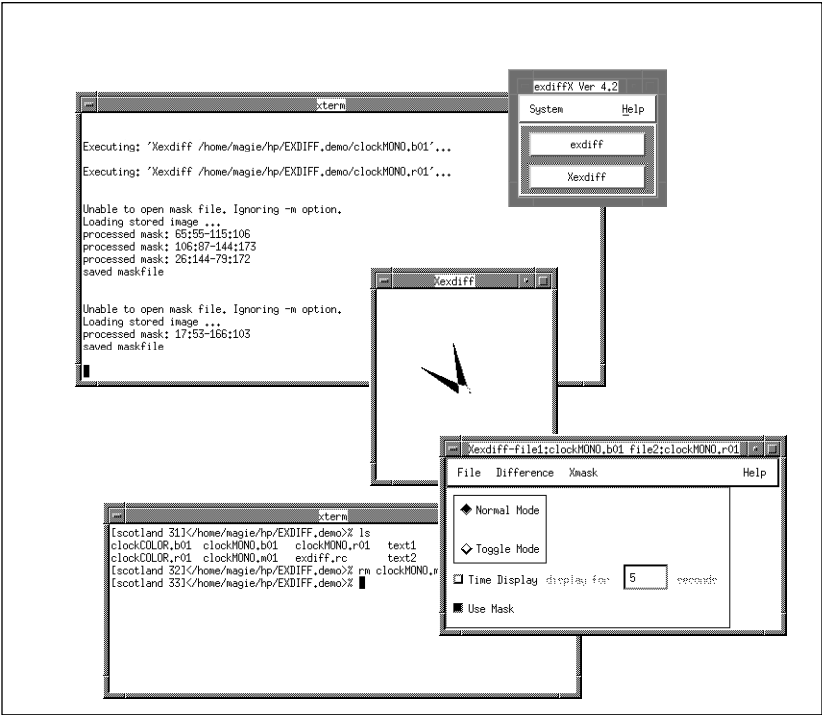


FIGURE 18 Executing Xdiff Using a Reverse Mask

**2.1.19**

**STEP 19: Closing the Xeddiff Window**

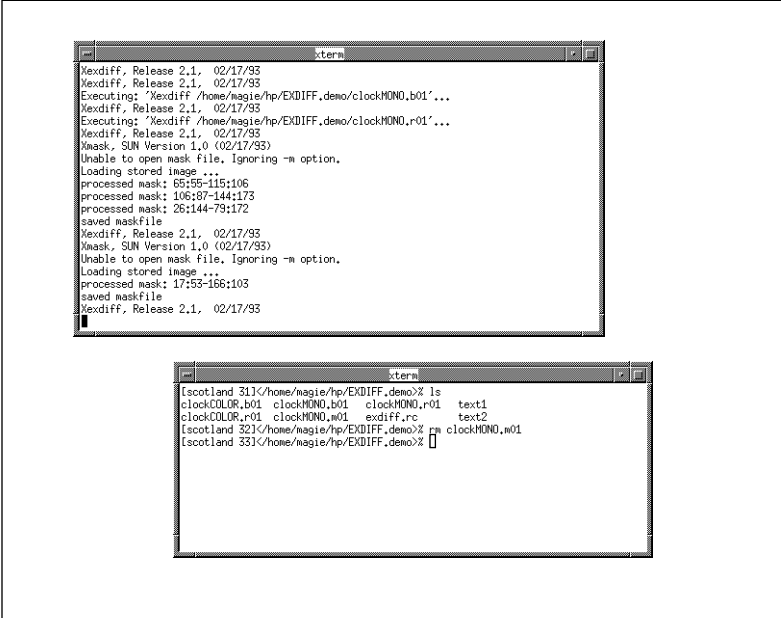
1. Click on the **File** menu.
2. From the displayed **File** menu, select the **Exit** option to close the **Xeddiff**.

**2.1.20 STEP 20: Exiting the EXDIFF Product**

To exit *EXDIFF*:

1. From the **Main** window, click on the **System** menu.
2. Select **Exit** from the displayed **System** menu to terminate the current *EXDIFF* session.

After exiting *EXDIFF*, the screen display should look like this:



The figure shows two terminal windows. The top window displays the output of the EXDIFF program, including version information, execution commands, and mask processing details. The bottom window shows the shell prompt and the execution of the 'ls' command, listing files in the current directory.

```
xterm
Xexdiff, Release 2.1. 02/17/93
Xexdiff, Release 2.1. 02/17/93
Executing: 'Xexdiff /home/magic/hp/EXDIFF.demo/clockMONO.b01'...
Xexdiff, Release 2.1. 02/17/93
Executing: 'Xexdiff /home/magic/hp/EXDIFF.demo/clockMONO.r01'...
Xexdiff, Release 2.1. 02/17/93
Xmask, SUN Version 1.0 (02/17/93)
Unable to open mask file. Ignoring -m option.
Loading stored image ...
processed mask: 65:56-115:106
processed mask: 106:87-144:173
processed mask: 26:144-79:172
saved maskfile
Xexdiff, Release 2.1. 02/17/93
Xmask, SUN Version 1.0 (02/17/93)
Unable to open mask file. Ignoring -m option.
Loading stored image ...
processed mask: 17:53-166:103
saved maskfile
Xexdiff, Release 2.1. 02/17/93

[scotland 311~/home/magic/hp/EXDIFF.demo% ls
clockCOLOR,b01 clockMONO,b01 clockMONO,r01 text1
clockCOLOR,r01 clockMONO,m01 exdiff.rc text2
[scotland 321~/home/magic/hp/EXDIFF.demo% m clockMONO,m01
[scotland 331~/home/magic/hp/EXDIFF.demo% ]
```

**FIGURE 19** Completing an EXDIFF session

## 2.2 Summary

Once you have successfully completed the preceding twenty steps, you have practiced the basic skills necessary to productively use the *EXDIFF* system. In this chapter, you have examined how to compare similar ASCII text files and display the results in either the default format or as a more comprehensively annotated listing. You have also examined how to compare two saved bitmap image files, view compared or differenced images, and create positive and negative masks for image files.

For further practice it is suggested to:

- Repeat **STEPS 1 - 20** without the manual.
- Refer to Chapter 3, “UNDERSTANDING THE GRAPHICAL USER INTERFACE” for complete information regarding the GUI.
- Refer to Appendix A to examine default settings for the GUI.

# Understanding the GUI

This chapter summarizes *EXDIFF*'s windows, menus and commands. Application of each individual command is described in detail in the relevant sections of this guide.

---

## 3.1 Invoking EXDIFF'S GUI

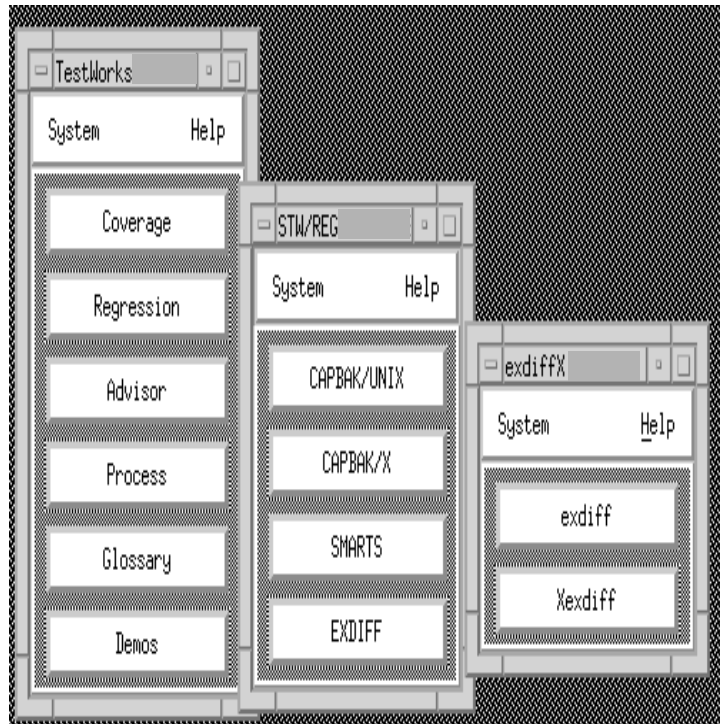
To invoke the GUI version of *EXDIFF* from the working directory, enter the following command:

```
exdiffX
```

The **Main** window pops up as in Figure 20 below.

If the *TestWorks* product bundle is available on the current system, *EXDIFF* can be invoked as follows:

1. From the working directory, type **stw**.
2. The **TestWorks** window pops up.
3. Select the **Regression** button.
4. The **STW/Regression** window pops up.
5. Select the **EXDIFF** button.
6. The **Main** window pops up as in Figure 20 below



---

**FIGURE 20** Invoking EXDIFF with STW

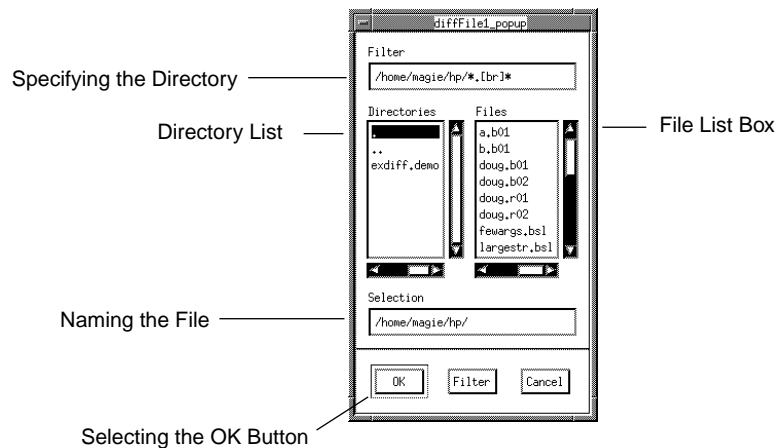


## 3.2 Basic OSF/Motif User Interface

This section demonstrates using file selection dialog boxes, help menus, message dialog boxes, option menus, and pull-down menus. If you are familiar with the basic OSF/Motif graphical user interface (GUI), go on to the next major section (See Section 3.3 - "The EXDIFF Main Window" on page 53.).

### 3.2.1 File Selection Windows

EXDIFF file selection pop-up windows allow various files to be selected.



**FIGURE 21** File Selection Window

Here are the components of the file selection window:

- Filter** entry box      Specifies a directory mask. When the **Filter** button is clicked, the directory mask is used to filter files or directories that match the indicated mask.
- Directories** list box   Lists directories in path defined in the **Filter** entry box.
- Files** list box          Lists files for the path defined in the **Filter** entry box.
- Scroll bars**            Allows vertical and horizontal movement within the **Directories** and **Files** list boxes.
- Selection** entry box   Accepts a file name for selection.

Use the three buttons at the bottom of the window to issue commands:

<b>OK</b>	Accepts the file in the <b>Selection</b> box as the new file or the file to be opened and then exits the window.
<b>Filter</b>	Applies the pattern specified in the <b>Filter</b> box and lists the directories and files that match that pattern.
<b>Cancel</b>	Cancels any entered selections and exits the window.

### 3.2.1.1 Using a File Selection Window

To restrict file selection to a specific directory path, either:

- type a directory path name in the **Filter** entry box, or
- click on a path name in the **Directories** list box.

Then, click on the **Filter** button.

To select a file name, perform one of the following activities:

- Double click on the file in the **Files** list box.
- Highlight the file in the **Files** list box, or type in the file name in the **Selection** entry box and click on **OK**.
- Highlight or type in the file name and press the **Enter** key.

When a procedure requires a file to be created, create a new file by either:

- Double clicking on an existing file in the **Files** list box to be over-written, or
- Entering a new file name in the **Selection** entry box and either clicking on **OK** or pressing the **Enter** key.

### 3.2.2 Help Windows

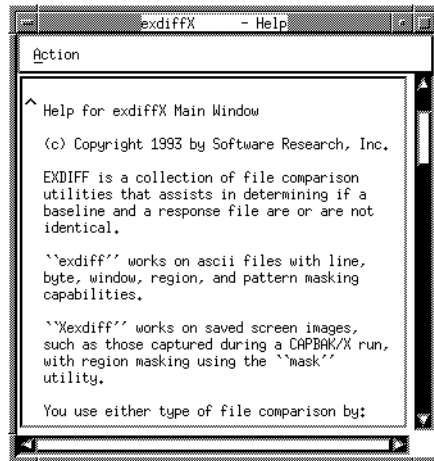
*EXDIFF* provides on-line information for each of its windows. When a window's **Help** option is activated, an information window containing pertinent text is displayed. In other words, if invoked from the **Main** window, the **Help** window will automatically display information relevant to the **Main** window.

To access on-line help:

1. Click on the window's **Help** option.

The **Help** window pops up, listing informational text corresponding

to the window from which the **Help** option was activated.

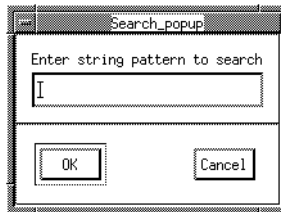


---

**FIGURE 22** Help Window

The displayed text can be traversed either by clicking on the text and dragging the mouse or using the vertical and horizontal scroll bars.

2. Click on the **Action** menu and select the **Search** option to search for specific text. The following dialog box pops up:



---

**FIGURE 23** Search Dialog Box

3. Click the cursor in the **Enter string pattern to search** region and type in the desired pattern string.
4. Either click on **OK** or press the **Enter** key.

If the pattern is found, then the window will automatically scroll to the location of the specified pattern.

If the pattern is *not* found, this message box is displayed:



---

**FIGURE 24** Help Message Box

---

**NOTE:** If the **Help** window is currently displayed and a **Help** option from another window is activated, the **Help** window automatically scrolls to the relevant text for the new window.

---

5. To close the **Help** window, click on the **Action** menu and select the **Exit** option.

### 3.2.3 Message Boxes

Pop-up message boxes serve three purposes:

- Display warnings and error information.
- Prompt for a command.
- Request verification for command execution.

To either remove a message box or execute the current command, click on the **OK** button.

To cancel a command, click on the **Cancel** button.



---

**FIGURE 25** Message Box

### 3.2.4 Pull-Down Menus

Pull-down menus are located within the menu bar (which spans the top of a window) and often contain several options.

To use pull-down menus and their options, perform the following steps:

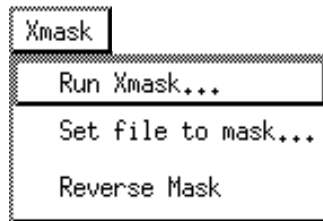
1. In the menu bar, place the mouse pointer over the menu name.
2. Display the menu's options by holding the left mouse button down.
3. While holding down the left mouse button, slide the mouse pointer to the desired menu option. The menu option is highlighted in reverse shadow.

---

**Note:** Three dots to the right of a menu item indicates that selecting the item will display a pop-up window, such as a file selection window.

---

4. To activate a command, release the mouse button while the desired item is highlighted. To exit without selecting an item, simply drag the mouse pointer off the menu before releasing the mouse button.



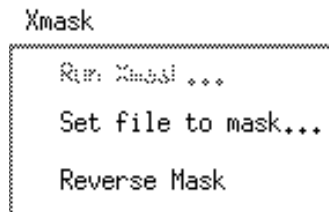
---

**FIGURE 26** Pull-Down Menu

---

**Note:** A menu option name which appears in a stippled format (comprised of small dots rather than lines) indicates that the option is currently unavailable for execution.

---



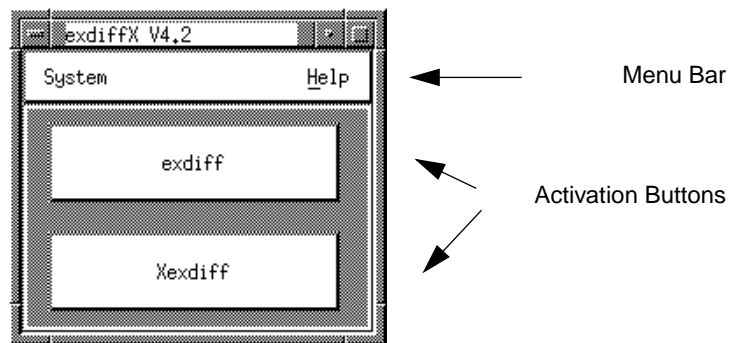
---

**FIGURE 27** Pull-Down Menu Containing a Stippled Option

### 3.3 The EXDIFF Main Window

When the *EXDIFF* GUI is invoked from the OSF/Motif X Window System, the **Main** window is first displayed. The **Main** window is divided into the following sections:

1. Menu bar.
2. **exdiff** activation button.
3. **Xexdiff** activation button.



**FIGURE 28** EXDIFF Main Window

In this section, the options and functions of the three sections of the **Main** window will be examined.

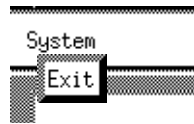
#### 3.3.1 Menu Bar

The menu bar section spans the top of the **Main** window and contains the following options:

1. **System** menu
2. **Help** option

### 3.3.1.1 System Menu

The **System** menu contains only one option: the **Exit** option which terminates the differencing test session.

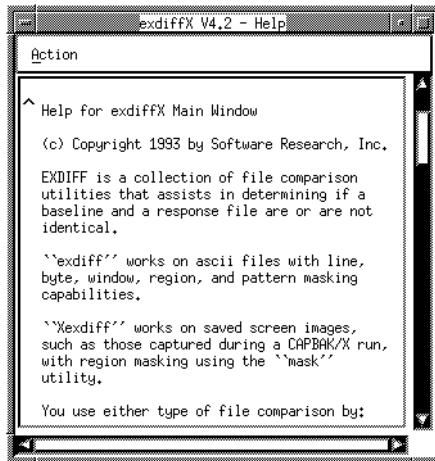


---

**FIGURE 29** System Menu

### 3.3.1.2 Help Option

The **Help** option invokes a **Help** window which describes the basic functions of the **Main** window.



---

**FIGURE 30** Help Window for the Main Window



### 3.3.2 **exdiff Activation Button**

When the **exdiff** activation button is executed from the **Main** window, the **exdiff** window is displayed.

The **exdiff** utility differences two ASCII files as line-oriented or byte-oriented files. *CAPBAK/UNIX* binary keysave files can also be compared using the **exdiff** utility. The **exdiff** window is examined in another section (See Section 3.4 - "exdiff Window" on page 56.).

### 3.3.3 **Xexdiff Activation Button**

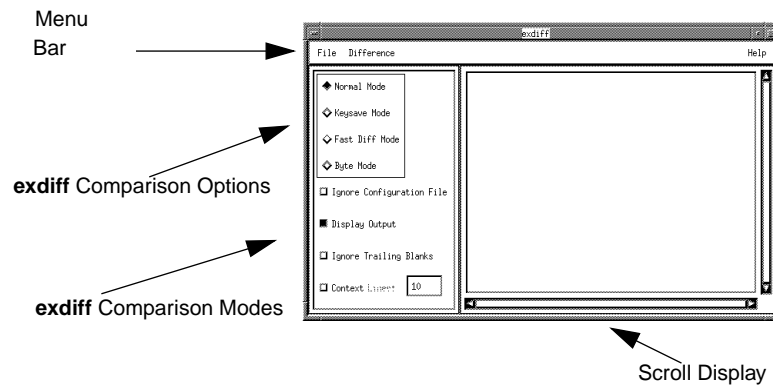
When the **Xexdiff** activation button is executed from the **Main** window, the **Xexdiff** window is displayed.

The **Xexdiff** window supports two utilities: **Xexdiff** and **Xmask**. The **Xexdiff** utility performs a pixel-by-pixel comparison of the two saved bit-map image files and displays comparison or differenced images to the screen. User-specified areas to be ignored during the differencing process are established using the **Xmask** utility. The **Xexdiff** window is examined in another section (See Section 3.5 - "Xexdiff Window" on page 67.).

### 3.4 exdiff Window

Click the **exdiff** activation button from the **Main** window, to display the **exdiff** window. The **exdiff** window contains the following components:

1. Menu bar
2. Comparison modes
3. Comparison options
4. Scroll display



---

**FIGURE 31** exdiff Window

---

**Note:** A window or menu option which appears in a stippled format (comprised of small dots rather than lines) indicates that the option is currently unavailable for execution.

---

#### 3.4.1 Menu Bar

The **exdiff** title bar spans the top of the **exdiff** window and contains the following items:

1. **File** menu
2. **Difference** menu
3. **Help** option

### 3.4.1.1 **exdiff** File Menu

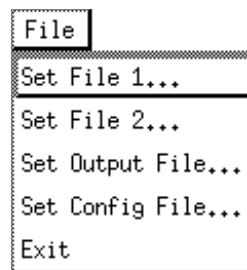
The **exdiff** utility differences two ASCII files as line-oriented or byte-oriented files. *CAPBAK/UNIX*'s binary keysave files can also be compared using the **exdiff** utility. The default comparison files accessed by the **exdiff** utility are set from the **File** menu.

The **File** menu is also used to set an output or configuration file. For further information regarding configuration files, please refer to a later chapter (See CHAPTER 5 - "Configuration File Processing" on page 111.)

---

**Note:** The invoked file selection windows for the **File** menu options default to the working directory, unless a specified path has been indicated in the *EXDIFF* resource file. Please refer to Appendix A for information on customizing the GUI environment.

---

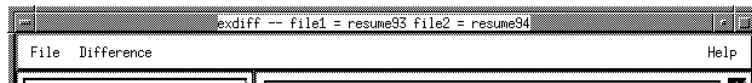


---

**FIGURE 32** **exdiff** File Menu

When clicked on, the **File** menu displays the following options:

- Set File 1** Invokes a file selection pop-up window where the first of two files is selected for comparison. The name of the first selected file is then indicated across the top of the **exdiff** window frame (as shown in the following figure) and will remain active until reset.
- Set File 2** Invokes a file selection pop-up window where the second of two files is selected for comparison. The name of the first selected file is then indicated across the top of the **exdiff** window frame (as shown in the following figure) and will remain active until reset.



---

**FIGURE 33** exdiff Window Frame Following File Selection

---

**Note:** As long as either corresponding ASCII or *CAPBAK/UNIX*'s binary keysave files are established as comparison files, it is irrelevant which file is set first.

---

**Set Output File** Invokes a file selection window to specify a file where differences determined by **exdiff** will be stored.

**Set Configuration File**

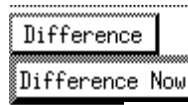
Allows the user to specify a resource configuration (RC) file for **exdiff** via a file selection window. An RC file is comprised of a series of runtime parameters (file names to be accessed, processing restrictions, etc.) and is invoked when the **exdiff** utility is executed.

For further information, please refer to another chapter (See CHAPTER 5 - "Configuration File Processing" on page 111.).

**Exit** Closes the **exdiff** window.

### 3.4.1.2 Difference Menu

The **exdiff** utility is activated from the **Difference** menu.



**FIGURE 34** exdiff Difference Menu

**Note:** Before you select files for comparison, the **Difference** menu option is stippled, indicating that it is not accessible for execution.

**Difference Now** executes the comparison process. Differences between the two files are displayed based on the comparison modes and options selected prior to **exdiff** activation. Upon completion of the comparison process, a pop-up message box will indicate if differences were found.



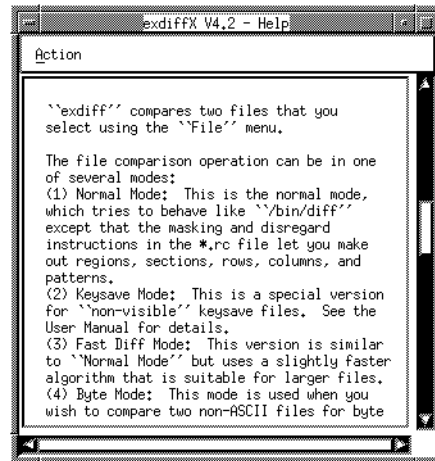
**FIGURE 35** Message Box Displayed Following Execution of Difference Now Option

If **Display Output** comparison option has been activated, the comparison output is listed in the **exdiff** window's scroll display after the **OK** button in the pop-up message box is clicked on. For further information on the **Display Output** option, please refer to another section (See Section 3.4.3 - "exdiff Comparison Options" on page 62.).

Comparison output can also be saved to a file specified using the **File** menu's **Set Output File** option. Please refer to another section for details regarding the **Set Output File** option (See Section 3.4.1.1 - "exdiff File Menu" on page 57.).

### 3.4.1.3 Help Option

The **Help** option brings up a **Help** window which describes the basic functions of the **exdiff** window.

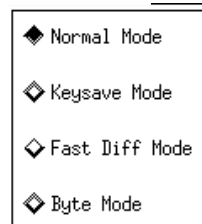


---

**FIGURE 36** Help Window for the exdiff Window

### 3.4.2 **exdiff** Comparison Modes

Specify File type (ASCII or *CAPBAK/UNIX*'s keysave binary file) and **exdiff** processing methods, via the **exdiff** comparison mode buttons which are located in the upper left corner of the **exdiff** window, beneath the menu bar's **File** menu.



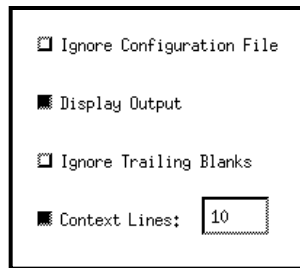
**FIGURE 37** **exdiff** Differencing Modes

The **exdiff** differencing modes are as follows:

- |                       |   |
|-----------------------|---|
| <b>Normal Mode</b>    | Provides a line-by-line comparison of two ASCII files, fully compatible with the standard UNIX <b>diff</b> utility. When used in tandem with the <b>Ignore Trailing Blanks</b> option, the <b>exdiff</b> utility disregards trailing spaces and tabs and compares strings of blanks as equal. |
| <b>Keysave Mode</b>   | Compares binary files containing <i>CAPBAK/UNIX</i> test session inputs.<br><br>For further information on <i>CAPBAK/UNIX</i> keysave files, please refer to the <i>CAPBAK/UNIX User Manual</i> .   |
| <b>Fast Diff Mode</b> | Similar to <b>Normal Mode</b> , but invokes a slightly faster algorithm suitable for larger files where modified passages are short and well-separated.   |
| <b>Byte Mode</b>      | Compares two ASCII or binary files for byte equivalence.  |

### 3.4.3 **exdiff Comparison Options**

Differencing options for the **exdiff** utility are located beneath the menu bar in the upper right corner of the **exdiff** window and are selected prior to executing the **exdiff** utility.



---

**FIGURE 38** exdiff Differencing Options

The **exdiff** differencing options are as follows:

#### **Ignore Configuration File**

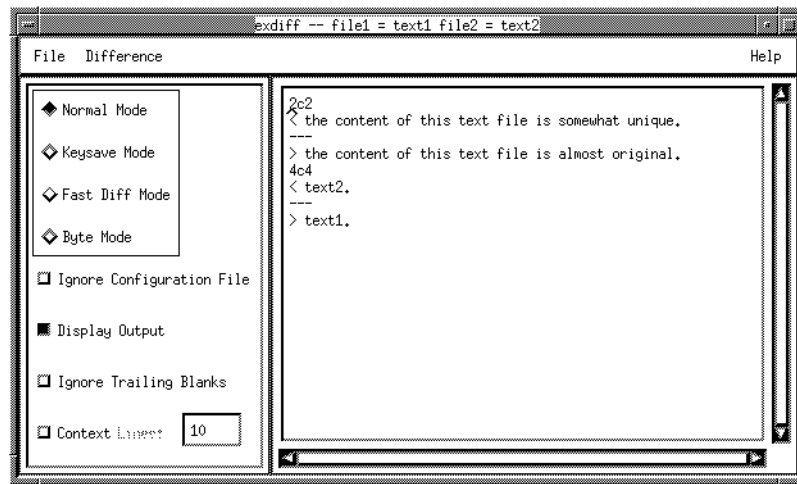
Ignores the default resource configuration (RC) file *exdiff.rc*. A resource configuration file includes runtime parameters which are invoked when the *EXDIFF* application is executed. If *EXDIFF* is invoked without an RC file, then the embedded default values for the *EXDIFF* application are used. This option is available for all **exdiff** comparison modes.

For further information on runtime parameters, please refer to other chapters (See CHAPTER 4 - "Configuration File Processing" on page 111.), (See CHAPTER 5 - "Configuration File Processing" on page 111.).



**Display Output** When selected before executing the **Difference Now** option, lists comparison output to the **exdiff** window scroll display. The displayed text can be traversed either by clicking on the text and dragging the mouse or using the vertical and horizontal scroll bars. This option is available for all **exdiff** comparison modes except the **Byte Mode**.

As shown in the following figure, the format of the comparison output resembles that of the UNIX **diff** utility.



**FIGURE 39** exdiff Comparison Output

The syntax for the **exdiff** utility output is as follows:

```
line# [c/a/d] line#
<
---
>
```

where the first `line#` indicates the range of lines in *filename1* which are different from the range of lines specified by the second `line#` in *filename2*. The letters `c`, `a`, and `d` are standard editor commands (for example, UNIX **ed**) which can be used to make the two files equal:

<code>c</code>	Change
<code>a</code>	Append
<code>d</code>	Delete

The redirection symbols are used as follows:

- >                   Precedes a text line from *filename1*
- <                   Precedes a text line from *filename2*

For a more comprehensively annotated listing, the **Context Lines** option is also activated prior to executing the **Difference Now** option. The **Context Lines** option is the last option described in this section.

Comparison output can also be saved to a file specified using the **Set Output File** option of the **File** menu. For further information (See Section 3.4.1.1 - “exdiff File Menu” on page 57.).

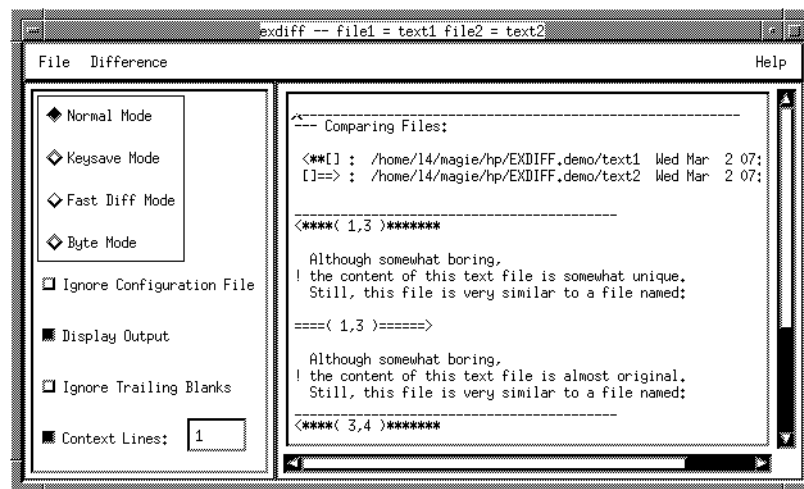
### Ignore Trailing Blanks

When comparing the selected ASCII files, disregards trailing spaces and tabs and compares strings of blanks as equal. The **Ignore Trailing Blanks** option is available for **Normal Mode** only.

### Context Lines

Provides a more comprehensively annotated comparison listing. The number of lines printed before and after each difference can be set in the **Context Lines** specification field prior to executing the **exdiff** utility. The default number of lines is 10. The **Context Lines** option is available for **Normal Mode** only.

As shown in the following figure, the output conveys the pathnames and execution date for the compared files. Lines which are different are preceded by an exclamation point (!).



**FIGURE 40** exdiff Comparison Output with Context Lines Option Activated

The file set using the **Set File 1** option of the **File** menu is represented throughout the listing by the following symbol: **<\*[ ]**

The file set using the **Set File 2** option of the **File** menu is represented throughout the listing by the following symbol: **[ ]=>**

#### 3.4.4 Scroll Display

When the **Display Output** option is selected, comparison output is listed in the **exdiff** scroll display. The displayed text can be traversed either by clicking on the text and dragging the mouse, or using the vertical and horizontal scroll bars.

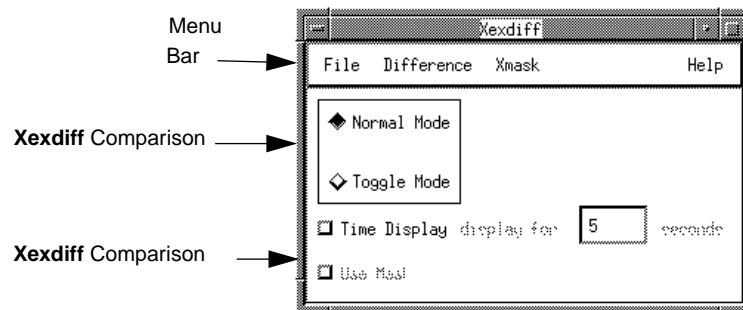
### 3.5 Xexdiff Window

The **Xexdiff** window supports two utilities: **Xexdiff** and **Xmask**. The **Xexdiff** utility performs a pixel-by-pixel comparison of the two bitmap image files saved either with the capture/playback tool *CAPBAK/X* or the standard X Window Dump utility (**xwd**). Screen fragments, complete windows or full screens can all be saved as image files. The **Xexdiff** utility then displays comparison or differenced images to the screen. User-specified areas to be ignored during the differencing process are established using the **Xmask** utility.

When images are captured during the *CAPBAK/X* recording process, they are referred to as baseline files. The *CAPBAK/X* naming convention for baseline files is *basename.bnn*, where *basename* is the name of the keysave file, **b** indicates baseline and *nn* indicates the original number sequence in which the window was captured. When these images are re-captured during *CAPBAK/X* playback, they are saved as response files. The *CAPBAK/X* naming convention for response files is *basename.rnn*, where *basename* is the name of the keysave file, **r** indicates response and *nn* indicates the original number sequence in which the window was captured. Images captured using the **xwd** utility are usually saved as *filename.xwd*.

When the **Xexdiff** activation button is executed from the **Main** window, the **Xexdiff** window is displayed. The **Xexdiff** window is comprised of the following components:

1. Menu bar
2. **Xexdiff** Comparison modes
3. **Xexdiff** Comparison options



**FIGURE 41** Xexdiff Window

**NOTE:** A window or menu option which appears stippled (comprised of small dots rather than lines) indicates that the option is currently unavailable for execution.

---

### 3.5.1 Menu Bar

The **Xexdiff** Menu bar spans the top of the **Xexdiff** window and contains the following items:

1. **File** menu
2. **Difference** menu
3. **Xmask** menu
4. **Help** Option

#### 3.5.1.1 Xexdiff File Menu

The **Xexdiff** utility performs a pixel-by-pixel comparison of the two bit-map image files saved either with the capture/playback tool *CAPBAK/X* or the standard X Window Dump utility (**xwd**). The default comparison files accessed by the **Xexdiff** utility are set from the **File** menu.

The **Xexdiff File** menu is also used to set a the default mask file. For further information on mask files and the masking process, please refer to another section (See Section 3.5.1.3 - “Xmask Menu” on page 72.).

**NOTE:** The invoked file selection windows for the **File** menu options default to the working directory unless a specified path has been indicated in the *EXDIFF* resource file. Please refer to the Appendix for information on customizing the GUI environment.

---



**FIGURE 42** Xexdiff File Menu

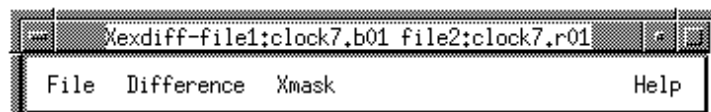
Click on the **File** menu to display the following options:

**Set File 1** Invokes a file selection pop-up window where the first of two bitmap image files is selected for comparison. The name of the first selected image file is then

indicated across the top of the **Xexdiff** window frame (as shown in the following figure) and will remain active until re-set.

**Set File 2**

Invokes a file selection pop-up window where the second of two bitmap image files is selected for comparison. The name of the first selected image file is then indicated across the top of the **Xexdiff** window frame (as shown in the following figure) and will remain active until re-set.



**FIGURE 43** Xexdiff Window Frame Following File Selection

**Note:** As long as either corresponding *CAPBAK/X* baseline and response files (*basename.bnn* or *basename.rnn*) or standard X Window Dump files (*filename.xwd*) are established as comparison files, it is irrelevant which file is set first.

**Set Mask File...**

Invokes a file selection pop-up window to set the default mask file (*filename.m\*\**), ensuring that the appropriate mask file is read by the **Xexdiff** utility.

Create a mask file via the **Xmask** menu: select bitmap image files for masking using the **Set file to mask** option. Then, execute the **Run Mask** option to start the masking process. when completed, the mask coordinates are saved to a *filename.m\*\** file, where *filename* is the name of the keysave file, **m** specifies a mask file and **\*\*** indicates either the original number sequence in which the window was captured or **xwd** (for X Window Dump file).

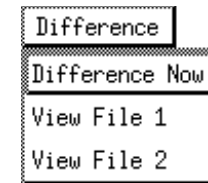
**Note:** To access the default mask coordinates during the comparison process, the **Use Mask** option must be activated prior to executing the **Xexdiff** utility.

**Exit**

Closes the **Xexdiff** window.

3.5.1.2 Xexdiff Difference Menu

The **Difference** menu is invoked after the two default image files have been set from the **File** menu and the appropriate comparison mode and options have been selected.



---

**FIGURE 44** Xexdiff Difference Menu

Then, select one of the following **Difference** menu options:

**Difference Now** executes the comparison procedure by invoking the **Xexdiff** utility and displays any differences between the two images files based on the comparison modes and options selected prior to activation. Until the displayed image file is clicked on, **Xexdiff** functions cannot be accessed. After the image is clicked on and removed, a pop-up message box indicates if differences were found.



---

**FIGURE 45** Message Box Following Execution of the Difference Now Option

---

**Note:** If either of the comparison files were masked using the **Run Mask** option of the **Xmask** menu, mask coordinate information was generated and saved to a *filename.m\*\** file, where *filename* is the name of the keysave file, *m* specifies mask file and *\*\** indicates either the original number sequence in which the window was captured or *xwd* (for X Window Dump file).

If either of the generated masks for the comparison files has been



set as the default mask file and the **Use Mask** option is activated prior to executing the **Difference Now** option, the **Xexdiff** utility will base comparisons of the two files on the masking information contained within the default mask file.

Refer to other sections for further information on **Xmask** (See Section 3.5.1.3 - "Xmask Menu" on page 72.), and **File** menus (See Section 3.5.1.1 - "Xexdiff File Menu" on page 68.), and the **Use Mask** option (See Section 3.5.3 - "Xexdiff Comparison Options" on page 78.).

---

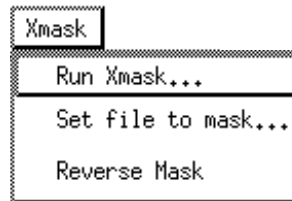
**View File 1**            Displays the first image file set using the **Set File 1** option of the **File** menu.

**View File 2**            Displays the second image file set using the **Set File 2** option of the **File** menu.

**Note:** The **View File** options allow **Xexdiff** functions to be accessed while comparison images are displayed.

### 3.5.1.3 Xmask Menu

The **Xmask** menu is invoked to establish positive or negative masks for bitmap image files, allowing user-specified areas to be ignored during the differencing process.



---

**FIGURE 46** Xmask Menu

The **Xmask** utility facilitates three types of bitmap image files:

- Images captured during the *CAPBAK/X* recording process (baseline files).  
The *CAPBAK/X* naming convention for baseline files is *base-name.bnn*.
- Images re-captured during *CAPBAK/X* playback (response files).  
The *CAPBAK/X* naming convention for response files is *base-name.rnn*.
- Images captured using the **xwd** utility, which are usually saved as *filename.xwd*.

Following completion of the masking process, the mask co-ordinates are saved to a *filename.m\*\** file, where *filename* is the name of the bitmap image file, and *\*\** indicates either the original number sequence in which the window was captured or **xwd** (for X Window Dump file).

---

**Note:** Prior to running the **Xmask** utility, determine whether a *filename.m\*\** file already exists for the image file to be masked. If a mask file has already been generated for an image file, then old parameters will be read when the **Run Xmask** option is executed.

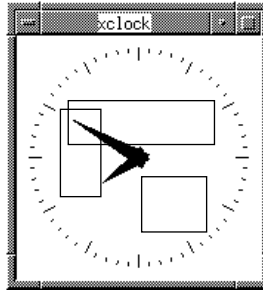
---

Previous masks can be deleted either:

- Using the middle mouse button when running the **Run Xmask** option, or
- Removing the existing mask file.

The **Xmask** menu provides the following options:

**Run Xmask...** Displays the image file selected with the **Set file to mask** option and invokes a crosshair to create masked areas in the displayed image. The following figure depicts an image during the masking process.



---

**FIGURE 47** Image File During Masking Process

During the masking process, individual mouse buttons are used as follows:

**Left button** Outlines areas to be masked or ignored. Unlimited, overlapping masks can be set for each image.  
**Middle button** Deletes an unwanted mask.

---

**Note:** If you don't have a middle mouse button, this option is not available.

---

**Right button** Saves all mask co-ordinate information for the selected bitmap image file to *filename.m\*\**.

---

**Note:** Unlimited, overlapping masks can be set for each image.

---

**Set file to mask...** Invokes a file selection pop-up window from which a bitmap image file is selected for masking. A baseline, response or standard X Window Dump file can be selected for masking.

Following completion of the masking process, the mask coordinates are saved to a *filename.m\*\** file, where *filename* is the name of the bitmap image file, and *\*\** indicates either the original number sequence in which the window was captured or **xwd** (for X Window Dump file).

Prior to executing the comparison procedure, the **Set Mask File** option of the **File** menu is invoked to set the default mask file (*filename.m\*\**), ensuring that the **Xmask** utility reads the appropriate masking co-ordinates.

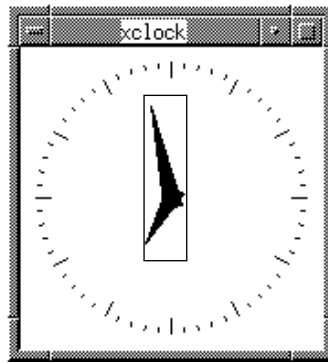
**Reverse Mask** Creates negative (or reverse) mask coordinates in the resulting mask file. That is, areas lying within the masked boundary will be differenced, while those areas beyond the masked boundary will ignored.

---

**Note:** This step is optional.

---

For example, the rectangular-shaped outline in the following figure represents a mask. If the mask is positive (the **Xmask** default mode), the area within the outlined region will be ignored during the comparison process. If the **Reverse Mask** option was selected prior to creating the mask, the masked region would be the *only* area compared during the differencing process.



---

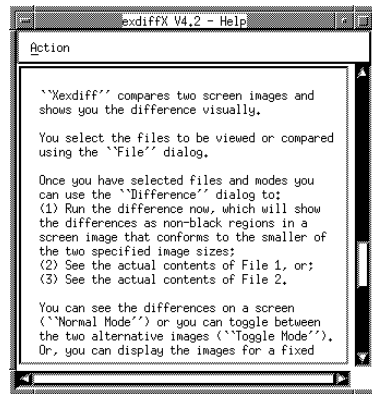
**FIGURE 48** Example Mask

To execute the **Reverse Mask** option, the same steps for executing **Xmask** are performed but with the following exceptions:

1. If a mask file already exists for the image file to be selected for reverse masking, it *must* be deleted.
2. Prior to activating the **Run Xmask** option, the **Reverse Mask** option is selected from the **Xmask** menu.

**3.5.1.4 Help Option**

The **Help** option brings up a **Help** window which describes the basic functions of the **Xexdiff** window.

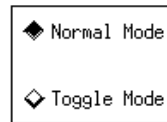


---

**FIGURE 49** Help Window for the Xexdiff Window

### 3.5.2 Xexdiff Comparison Modes

The **Xexdiff** comparison modes determine how comparison images are to be displayed. Radio buttons for the **Xexdiff** comparison modes are located in the upper left corner of the **Xexdiff** window.



---

**FIGURE 50** Xexdiff Comparison Modes

Prior to executing the **Xexdiff** utility using the **Difference** menu, one of the following comparison modes must be selected:

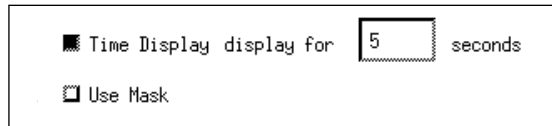
**Normal Mode**      Displays only image differences to the screen.

**Toggle Mode**      Allows you to alternate between the two comparison images by pressing any key.

In either mode, the image is removed by clicking the mouse within the confines of the displayed image.

### 3.5.3 Xexdiff Comparison Options

The **Xexdiff** comparison options are located in the lower left corner of the **Xexdiff** window.



---

**FIGURE 51** Xexdiff Comparison Options

Prior to executing the **Xexdiff** utility using the **Difference** menu, the following comparison options may be selected:

- |                     |  |
|---------------------|--|
| <b>Time Display</b> | Displays a comparison or differenced bitmap image for the specified number of seconds. If <i>seconds</i> = 0, then the image is not displayed and can be regarded as batch processing, as no user activity/confirmation is required. |
| <b>Use Mask</b>     | Informs the <b>Xexdiff</b> utility to base comparisons of the two files on the masking information contained within the default mask file.   |



# Command Line Processing

This chapter examines the runtime options for the **exdiffX**, **Xexdiff**, **Xmask**, **exdiff**, and **EX** utilities.

---

## 4.1 Introduction

*EXDIFF* command-line processing is often useful when memory constraints and extensive batch processing impede the differencing procedure. Many of the available *EXDIFF* command line options are equivalent to functions that can otherwise be performed via the *EXDIFF* graphical user interface (GUI).

In addition, various *EXDIFF* command-line utilities extend *EXDIFF*'s GUI comparison capabilities by:

- Comparing compressed image files.
- Determining the first byte where two similar ASCII files differ.
- Reformatting and/or dividing an ASCII file (based on user-specified byte numbers, line numbers or character strings) for more reliable differentiating by the **exdiff** utility.

## 4.2 Command Line Invocation

The *EXDIFF* system is comprised of the following executable files.

<b>exdiffX</b>	Invokes the GUI version for the X Window System version. For further information: (See CHAPTER 4 - Invoking EXDIFF” on page 79.).
<b>Xexdiff</b>	Invokes the <b>Xexdiff</b> utility for command line execution.
<b>Xmask</b>	Invokes the <b>Xmask</b> utility for command line execution.
<b>exdiff</b>	Invokes the <b>exdiff</b> utility for command line execution.
<b>EX utilities</b>	Series of command line utilities which allow similar ASCII files to be reformatted and/or divided (based on user-specified character strings and text lines) for more reliable differentiating by the <b>exdiff</b> utility.

These executable files may reside in any file system directory, as long as they are included in the execution search path.

#### 4.2.1 EXDIFF Exit Codes

When executing from the command line, the exit codes for the *EXDIFF* system utilities are as follows:

- 0 no differences.
- 1 differences.
- 2 error.

Following command line execution, execution status is displayed by entering the following command:

```
echo $status
```

#### 4.2.2 Resource Configuration (RC) File

When the **exdiff** utility is executed, either from the GUI or the command line, a configuration file which includes runtime parameters may also be invoked. In *EXDIFF*, this file is referred to as the resource configuration (RC) file and the default is *exdiff.rc*. If **exdiff** is invoked without the RC file, then the embedded default values for the *EXDIFF* application are used.

---

**NOTE:** RC file runtime commands will take precedence over runtime options specified from the command line.

---

Runtime parameters for the **exdiff** utility can be set or modified using any of the following methods:

1. Specified in an RC file prior to invoking *EXDIFF*.
2. Indicated during the command-line invocation.
3. Specified from the GUI.

This chapter addresses executing **exdiff** runtime parameters from the command line. For further information on the **exdiff** RC file, refer to the section in another chapter (See CHAPTER 5 - Configuration File Processing” on page 111.). For information on specifying **exdiff** runtime options from the *EXDIFF* GUI, refer to Chapter 3, “UNDERSTANDING THE GUI”.

## 4.3 Xexdiff Command Line Runtime Options

**Xexdiff** performs a pixel-by-pixel comparison of two bitmap image files saved using either the capture/playback tool *CAPBAK/X* or the standard X Window Dump utility (*xwd*).

User-specified areas to be removed from consideration during differencing process are established using the **Xmask** utility. For further information on the **Xmask** utility: (See Section 3.5 - "Xexdiff Window" on page 67.).

### 4.3.1 Xexdiff Command Summary

The **Xexdiff** runtime options are specified from the command line using the following syntax:

```
xexdiff [-option parameter] filename1 [filename2]
```

*filename1* [*filename2*] Bitmap image files to be differenced. If only one bitmap image is specified, then the image file is displayed, but the comparison process is not executed.

---

**NOTE:** If no parameter is specified, default values are assumed.

---

The following runtime options are available:

```
-A seconds  
-D | -T  
-help  
-m mask_file  
-M  
-q  
-Z  
-ZC compress_command  
-ZU uncompress_command
```

**-A seconds** Image Appearance Specification Switch. Displays the image for the specified number of seconds before exiting with the appropriate exit code. If *seconds* = 0, then the image is not displayed and can be regarded as batch processing, as no user activity/confirmation is required.

<b>-D</b>   <b>-T</b>	Comparison Mode Specification Switch. The <b>-D</b> (Difference) option displays only the contrasting elements of the compared image files. The <b>-T</b> (Toggle) option allows you to toggle between the two comparison images by pressing any key. The default comparison mode is <b>-D</b> . In either mode, exit <b>Xexdiff</b> by clicking the mouse within the confines of the displayed image.
<b>-help</b>	Help Switch. Displays syntax usage for the <b>Xexdiff</b> utility.
<b>-m</b> <i>mask_file</i>	Mask File Specification Switch. Restricts the differencing process to the user-specified area(s) indicated in the specified mask file.

---

**NOTE:** The **-m** switch *MUST* be used in order for the mask file to be properly invoked.

---

	The <i>mask_file</i> is generated by the <b>Xmask</b> utility. Refer to Section 33.4 for further information on the <b>Xmask</b> utility.
<b>-M</b>	Corresponding Mask File Switch. If a corresponding mask file for <i>filename1</i> exists, restricts the comparison process to the masking information within the located mask file. (For example, if <i>filename1</i> is <i>CBX/BSL/file1.001</i> and <i>filename2</i> is <i>CBX/RSP/file2.001</i> , <b>Xmask</b> will attempt to read a mask file named <i>CBX/BSL/file1.m01</i> .)
<b>-q</b>	Quiet Operation Switch. Suppresses start-up copyright messages.
<b>-z</b>	Compression/Decompression Switch. Indicates that the image files to be differenced are in a compressed format and activates the default image decompression and compression commands. The default commands are <b>uncompress</b> (for decompression) and <b>compress -f</b> (for compression).

**-zC** *compress\_command*

Compression Command Switch. Allows the default compression command (**compress -f**) to be overridden by an alternative compression command.

**-zU** *uncompress\_command*

Decompression Command Switch. Allows the default decompression command (**uncompress**) to be overridden by an alternative decompression command.

### 4.3.2 Xexdiff Examples

*Example 1:* `Xexdiff clock1.b01`

Displays the image file `clock1.b01` until the image is clicked on.

*Example 2:* `Xexdiff clock1.b01 clock1.r01`

Displays only the contrasting elements of the image files `clock1.b01` and `clock1.r01`.

---

**NOTE:** This command is identical to:

```
xexdiff clock1.b01 clock1.r01 -D
```

---

*Example 3:* `Xexdiff clock1.b01 clock1.r01 -T`

Initially displays `clock1.b01`, but will toggle between the two image files when any key is pressed.

*Example 4:* `Xexdiff clock1.b01 clock1.r01 -A 20`

Displays the contrasting elements of `clock1.b01` and `clock1.r01` for twenty seconds before exiting.

*Example 5:* `Xexdiff clock1.b01 clock1.r01 -A 0`

Exits without displaying an image. **Xexdiff**'s exit code, however, will reflect the difference between the two screens. For further information on **Xexdiff** exit codes, refer to another section (See Section 4.2.1 - "EXDIFF Exit Codes" on page 81.).

*Example 6:* `Xexdiff clock1.b01 clock1.r01 -m clock1.m01`

Differences `clock1.b01` and `clock1.r01` based on the user-specified coordinates in the `clock1.m01` mask file.

## 4.4 Xmask Command Line Runtime Options

The **Xmask** utility is invoked to establish either positive or negative mask coordinates for a bitmap image file. The resulting mask file can be read by the **Xexdiff** utility to restrict the differencing process to the user-specified area(s).

A positive mask indicates user-specified areas to be removed from consideration during the differencing process. A negative (or reverse) mask enables inverse processing, where *only* the user-specified area is compared during the comparison process.

### 4.4.1 Xmask Command Summary

The **Xmask** runtime options are specified from the command line using the following syntax:

```
Xmask filename [-option]
```

*filename*           Bitmap image file invoked for masking.

---

**NOTE:** If no parameter is specified, default values are assumed.

---

The following runtime options are available: **-R** and **-m**

**-R**           Reverse Switch. Creates negative (or reverse) mask coordinates in the resulting mask file. That is, the areas lying within the mask coordinates will be compared, while those areas beyond the masked boundaries will be ignored.

**-m**           Mask File Switch. Invokes the corresponding mask file, if one exists, for *filename*. If the mask file does not exist, then the **-m** option is ignored and *filename* is displayed for masking. For example, if *filename* is *test.b01*, **Xmask** will attempt to read the mask file *test.m01*.

Once **Xmask** is invoked, the appropriate image file is displayed and the pointer's cursor will become a crosshair confined to the displayed image. As each mask is processed, **Xmask** will print an appropriate message to standard output. Refer to another section for information on creating masks (See Section 4.4.2 - "Establishing Mask Coordinates" on page 87.).



#### 4.4.2 Establishing Mask Coordinates

During the masking process, individual mouse buttons are used as follows:

**Left button**            Outlines areas to be masked or ignored.  
Click and hold at one corner of area to be masked, drag cursor to opposing corner of area to be masked, and release the left button to complete the mask. A rectangle will remain, marking the masked area. Subsequent click/drag/release actions will create more masks, with each mask added to an internal stack. Following each addition to the internal stack, a processing message is printed to standard output.

---

**NOTE:** Unlimited, overlapping masks can be set for each image.

---

**Middle button**        Deletes an unwanted mask.  
Click and release to remove the last mask written to the screen off the internal stack. The deleted mask will disappear from the display. Subsequent clicks will remove masks from the stack until no more masks exist. Following each deletion, a processing message is printed to standard output.

---

**NOTE:** If you don't have a Middle button on your mouse, this option is not available.

---

**Right button**         Saves all mask coordinate information for the selected bitmap image file to *filename.m\*\**. A processing message is then printed to standard output.

Upon completion of the masking procedure, the mask coordinates are saved to a *filename.m\*\** file, where *filename* is the name of the bitmap image file, *m* specifies mask file and *\*\** indicates either the original number sequence in which the window was captured or **xwd** (for X Window Dump file).

### 4.4.3 Xmask Mask Files

Alternatively, a mask file can be created or edited with a text editor using the following syntax:

```
# comment
reverse off | on
xmask= x1:y1-x2:y2
```

Comment lines, as well as syntactically incorrect lines, are ignored. The default masking mode is positive (**reverse off**).

The coordinates **x1:y1** and **x2:y2** which follow **xmask=** designate the upper-left and lower-right corners of the mask, respectively. Coordinates representing a mask which extends beyond the boundaries of the image file are clipped. A mask file may contain unlimited, overlapping masks.

Here is a sample positive mask file:

```
# Xmask mask file
reverse off
xmask= 58:60-102:146
xmask= 94:48-162:103
xmask= 94:122-160:176
xmask= 24:72-36:78
xmask= 32:76-65:112
```

Here is a sample negative mask file::

```
# Xmask mask file
reverse on
xmask= 37:74-104:105
xmask= 65:106-71:107
xmask= 64:105-100:127
```

#### 4.4.4 Xmask Examples

*Example 1:*            `xmask calculator.b01`

Loads the image file *calculator.b01* for positive masking. The resulting mask file will be named *calculator.m01*.

*Example 2:*            `xmask sunDIAL.b01 -R`

Loads the image file *sunDIAL.b01* for reverse masking. The resulting mask file will be named *sunDIALk.m01*.

*Example 3:*            `xmask calculator.b01 -m`

Loads the image file *calculator.b01* and attempts to read the corresponding mask file *calculator.m01*.

If *calculator.m01* exists, the mask file and any user-specified areas are displayed. If the mask file does not exist, then the `-m` option is ignored and *calculator.b01* is displayed for masking.

## 4.5 **exdiff** Command Overview

The **exdiff** utility compares two files and reports the differences to standard output. The **exdiff** utility differences two ASCII files as line-oriented or byte-oriented files. *CAPBAK/UNIX* binary keysave files can also be compared using the **exdiff** utility.

---

**NOTE:** Before executing the **exdiff** utility, an ASCII file can be reformatted and/or divided (based on user-specified byte numbers, line numbers or character strings) using the **EX** command line utilities. For further information on the **EX** utilities, refer to another section (See Section 4.6 - “EX utilities” on page 98).

---

### 4.5.1 **exdiff** Command Syntax

The **exdiff** runtime options are specified from the command line using the following syntax:

```
exdiff [-option parameter] filename1 filename2  
filename1 filename2ASCII or keysave files to be differenced.
```

---

**NOTE:** If no parameter is specified, default values are assumed.

---

The following runtime options are available:

```
-b  
-B  
-c N  
-h  
-help  
-i  
-k  
-R rc_file
```

**-b** Ignore Trailing Blanks Switch. Disregards trailing spaces and tabs and compare strings of blanks as equal when differencing ASCII files.

- B** Byte Mode Switch. Compares two ASCII or non-ASCII files for byte equivalence.
- c N** Context Lines Switch. Generates a more comprehensively annotated comparison listing than the default comparison output: the pathnames and execution date for the compared files are indicated and lines which are different are preceded by an exclamation point (!). An optional line number, *N*, can be used to control the number of lines printed before and after each difference. The default value for *N* is 3.
- h** Fast Differencing Mode Switch. Invokes a slightly faster algorithm suitable for larger files where modified passages are short and well separated.
- NOTE:** Masking options may *not* be used with this runtime parameter.
- help** Help Switch. Displays on-line informational text regarding **exdiff** utility command syntax and runtime options.
- i** Ignore Resource Configuration File Switch. Disregards the resource configuration file *exdiff.rc* or the RC file specified with the **-R** switch. When *EXDIFF* is invoked without a RC file, the embedded default values for the *EXDIFF* product are used.
- k** Keysave Mode Switch. Compares binary files containing *CAPBAK/UNIX* test session inputs.
- R rc\_file** Resource Configuration File Specification Switch. Reads parameters from the *rc\_file*. When this switch is not present, the default RC file used is *exdiff.rc*.
- For further information on the RC file; (See Section 4.2.1 - "EXDIFF Exit Codes" on page 81.).
- s N** For *CAPBAK* screensave files (*N*=start screen#).

## 4.5.2 Line-Oriented Files

Line-oriented files are ASCII text files such as manuals, letters, and source programs. The **exdiff** utility incorporates many features of the standard UNIX **diff** utility and has a compatible syntax and subset of options. The following run-time options are available:

```
-b
-c N
-h
-i
-R rc_file
```

For information regarding **exdiff** command syntax and descriptions of the above runtime options, please refer to another section (See Section 4.5.1 - “**exdiff** Command Syntax” on page 90.).

### 4.5.2.1 Standard **exdiff** Output

When the **-c N** parameter is not executed, the format of the **exdiff** comparison output resembles that of the UNIX **diff** utility. The syntax for the standard **exdiff** utility output is as follows:

```
line# [c/a/d] line#
i<
---
>
```

The first **line#** indicates the range of lines in *filename1* which are different from the range of lines specified by the second **line#** in *filename2*. The letters **c**, **a**, and **d** are standard editor commands (for example, UNIX **ed**) which can be used to make the two files equal:

<b>c</b>	Change
<b>a</b>	Append
<b>d</b>	Delete

The redirection symbols are used as follows:

>	Precedes a text line from <i>filename1</i>
<	Precedes a text line from <i>filename2</i>

Here is a sample output for the **exdiff** command:

```
2c2
< the content of this text file is somewhat unique.
---
> the content of this text file is almost original.
4c4
< text2.
---
> text1.
```

#### **4.5.2.2 Context Lines exdiff Output**

A more comprehensively annotated comparison listing is produced by including the **-c N** parameter in the **exdiff** command. The output conveys the pathnames and execution date for the compared files, with *N* number of lines printed before and after each difference.

*Example:* Output for the command **exdiff -c1 text1 text2** is depicted below:

```
--- Comparing Files:

<*[ ] : text1 Sun Feb 27 22:50:39 1994
[ ]==> : text2 Sun Feb 27 22:50:50 1994

-----
<****( 1,3 )*****

    Although somewhat boring,
! the content of this text file is somewhat unique.
    Still, this file is very similar to a file named:

====( 1,3 )=====>

    Although somewhat boring,
! the content of this text file is almost original.
    Still, this file is very similar to a file named:

-----
<****( 3,4 )*****

    Still, this file is very similar to a file named:
! text2.

====( 3,4 )=====>

    Still, this file is very similar to a file named:
! text1.
```

The symbols depicted throughout the displayed listing are as follows:

!	Precedes lines which are different.
<*[ ]	Indicates text from <i>filename1</i> .
[ ]==>	Indicates text from <i>filename2</i> .



### 4.5.3 Byte-Oriented Files

Byte-oriented files are typically binary or character-based files. When processing files in byte mode, the **exdiff** utility compares two ASCII or non-ASCII files for byte equivalence. The following runtime options are available:

```
-B
-i
-R rc_file
```

For information regarding **exdiff** command syntax and descriptions of the above runtime options, please refer to another section (See Section 4.5.1 - "exdiff Command Syntax" on page 90.).

#### 4.5.3.1 **exdiff** Output Byte-Oriented files

When differencing byte-oriented files, **exdiff** simply reports whether or not the compared files are different.

sample 1:

```
EXDIFF: Expert/Extended File Differencing System.
[Rel 4.1 (HPUX) (02/02/94)]
(c) Copyright 1990-1994 by Software Research, Inc.
ALL RIGHTS RESERVED
```

```
Files are different
```

sample 2:

```
EXDIFF: Expert/Extended File Differencing System.
[Rel 4.1 (HPUX) (02/02/94)]
(c) Copyright 1990-1994 by Software Research, Inc.
ALL RIGHTS RESERVED
```

```
bytecnt = 133
```

#### 4.5.4 CAPBAK/UNIX Keysave Files

During a recording session, the *CAPBAK/UNIX* capture/playback tool automatically generates input statements that represent user input directed to the application under test (AUT). The test input statements are then stored, in binary format, as a keysave file.

When the **-k** runtime option is given, **exdiff** will compare *CAPBAK/UNIX* keysave files. The following runtime options are available:

```
-h
-i
-R rc_file
```

For information regarding **exdiff** command syntax and descriptions of the above runtime options, please refer to another section (See Section 4.5.2 - “Line-Oriented Files” on page 92.).

---

**NOTE:** *CAPBAK/UNIX* keysave files can also be differenced in byte mode. Please refer to another section for further information (See Section 4.5.3 - “Byte-Oriented Files” on page 95.).

---

##### 4.5.4.1 exdiff Output for CAPBAK/UNIX Keysave Files

The **exdiff** output syntax for *CAPBAK/UNIX* keysave files is as follows:

```
line N: key number N
< byte number of first input file
> byte number of second input file
-----
```

The *N* values reflect the command line number and key number (respectively) where the difference occurs.

The following is sample output for the **-k** option:

```
line 1: key number 2
< 004e 74 00
> 0054 6d 00
-----
line 1: key number 3
< 0004 68 00
> 0007 61 00
-----
line 1: key number 4
< 0008 69 00
> 0009 67 00
-----
```

For further information on *CAPBAK/UNIX* keysave files, please refer to the *CAPBAK/UNIX User Manual*.

## 4.6 EX utilities

The **exdiff** utility is intended to compare ASCII files that are very similar. Such comparisons are most often required in complex regression analyses, as the baseline and response files generated in two separate executions of a product test will very likely produce the same results.

In many cases, however, the formatting and extraneous differences between two files prevents **exdiff** from reliably differentiating the files. An example would be a user recording terminal sessions in which the log-on procedure generates a variable length “front end”. In such a case, the two files would need to be pre-processed before invoking the **exdiff** utility.

The **EX** utilities described in this section:

- Indicate the first byte where two similar ASCII files differ.
- Reformat and/or divide an ASCII file (based on user-specified byte numbers, line numbers or character strings) for more reliable differentiating by the **exdiff** utility.

All **EX** utilities have the suffix **EX**.

---

**NOTE:** More extensive mask restrictions can be established for similar ASCII files in an **exdiff** resource configuration (RC) file.  
On-line Syntax Information

---

To display syntax usage for an **EX** utility, enter the following command:

**EXcommand -help**

### 4.6.1 First Difference Identification

The **EX1stdiff** utility quickly determines whether two files are identical by indicating the first byte number where the two files differ. The command syntax is:

**EX1stdiff filename1 filename2**

*Example Usage:* A very long file contains expected regression differences which are known to be located within a single byte. Executing the **EX1stdiff** function can quickly determine whether the two files are identical.

## 4.6.2 Extracting the Front, Back and Middle Sections of a File

These **EX** utilities reformat a file by line numbers.

### 4.6.2.1 **EXfront**

The **EXfront** command syntax is:

**EXfront** *N filename*

This utility displays, to standard output, all the lines in the specified file up to (and including) line *N*.

*Example Usage:* If the only relevant information within a response file is the first 100 lines, the following **EXfront** command would display only the first 100 lines of the specified *file* to standard output:

**EXfront** 100 *filename*

### 4.6.2.2 **EXback**

The **EXback** command syntax is:

**EXback** *N filename*

This utility displays line *N* and all following lines in the specified file to standard output.

*Example Usage:* In some cases, the significant information in the baseline and response files is known to be situated at the ends of the files. The **EXback** command can be used to produce two files that contain only the material preceding the specified line number.

### 4.6.2.3 **EXmid**

The **EXmid** command syntax is:

**EXmid** *N1 N2 filename*

This utility displays the *N1*-th line through (and including) the *N2*-th line of the specified file to standard output.

*Example Usage:* The **EXmid** command can be executed to extract a range of lines containing extraneous information.

### 4.6.3 Pattern Based Processing

The pattern-based EX utilities search for exact matches of a specified pattern.

Rules for pattern-based processing are as follows:

1. The specified pattern cannot include the following characters:
  - white space
  - wild card characters
  - **newline** or **tab** character
2. Upper- and lower-case specification within a pattern is respected during processing.
3. A specified pattern containing more than one word must be enclosed by double quotation marks (i.e. “*word1 word2 word3*”).

#### 4.6.3.1 Initial Pattern Match

The **EXfrontpat** command syntax is:

**EXfrontpat** *pattern filename*

This command displays to standard output either the content of *filename* from the first instance of *pattern* onward or the entire content of *filename* if *pattern* is not found.

*Example Usage:* The **EXfrontpat** can be executed to discard any initial, irrelevant system messages which may precede a recorded login session.

#### 4.6.3.2 Final Pattern Match

The **EXbackpat** command syntax is:

**EXbackpat** *pattern filename*

This command displays to standard output either the content of *filename* up until the first instance of *pattern* or the entire content of *filename* if *pattern* is not found.

*Example Usage:* In some situations, the text which follows an error message in a response file is irrelevant to the comparison process. The **EXbackpat** command could be used to eliminate all data following an indicated error message.

#### 4.6.3.3 Interior Pattern Match Pair

The **EXmidpat** command syntax:

**EXmidpat** *pattern1 pattern2 filename*

This command displays to standard output the contents of *filename* from the first instance of *pattern1* through (and including) the first instance of *pattern2*.

*Example Usage:* If a process is interrupted and the patterns which uniquely identify the beginning and the end of the interruption are known, the **EXmidpat** command can be invoked to display the section of text between the two patterns.

#### 4.6.3.4 Pattern Substitution

The **EXsub** command syntax is as follows:

**EXsub** *pattern1 pattern2 filename*

This command replaces every occurrence of *pattern1* in the file with *pattern2*.

*Example Usage:* If a file is being transferred to a different platform and the character @ is interpreted as a kill character, the @ character can be replaced with **XYZ**. Once the file is on the new platform, the substitution can be reversed.

**4.6.4 File-Balancing**

These **EX** utilities force two files to become the same length.

*Example Usage:* An **EX** file balancing utility could be invoked if two files of different lengths began with similar information.

---

**WARNING:** Unlike other **EX** utilities, the **EX** file-balancing utilities effect the content of the referenced files and will modify the longer of the two files.

---



**4.6.4.1 Front-Balancing**

The **EXfrontbal** command syntax is:

**EXfrontbal** *filename1 filename2*

This command maintains the front sections of both files but removes the remaining lines of the longer file.

*Example Usage:* If *filename1* is 100 lines and *filename2* is 150 lines, the *LAST* 50 lines of *filename2* will be removed.

**4.6.4.2 Back-Balancing**

The **EXbackbal** command syntax is:

**EXbackbal** *filename1 filename2*

This command maintains the end sections of both files but removes the initial lines of the longer file.

*Example Usage:* If *filename1* is 100 lines and *filename2* is 150 lines, the *FIRST* 50 lines of *filename2* will be removed.

#### 4.6.5 Margin Modification and Center Text Preservation and Extraction

These **EX** utilities display to standard output:

- Modified variable length lines for a specified file.
- A remaining or extracted numeric range of characters in each line for a specified file.

##### 4.6.5.1 Right Margin Modification

The **EXfrontcut** command syntax is:

**EXfrontcut** *N filename*

This command displays to standard output all characters *AFTER* the *N*-th character in each line of the specified file.

---

**NOTE:** If a line is shorter than *N* characters, then only a blank line is displayed.

---

**4.6.5.2 Left Margin Modification**

The **EXendcut** command syntax is:

**EXendcut** *N filename*

This command displays to standard output all characters up to and including the *N*-th character for each line of the specified file.

---

**Note:** If a line is shorter than *N* characters, then no characters are effected.

---

**4.6.5.3 Center Text Preservation**

The **EXmidcut** command syntax is:

**EXmidcut** *N1 N2 filename*

This command displays to standard output the *N1*-th through the *N2*-th character of every line in the specified file.

---

**Note:** The following are results of *N1* and *N2* variables on displayed output.

---

- If the line is shorter than *N1* characters, then only a blank line is displayed.
- If the line is shorter than *N2* characters, then only the *N1*-th character through the remaining characters of the line are displayed.
- If *N1* = *N2*, then only the *N1*-th character or a blank line is displayed.
- If *N2* < *N1*, then the output is empty (there are *no* characters that meet the criteria).

#### 4.6.5.4 Center Text Extraction

The **EXmidblock** command syntax is:

```
EXmidblock N1 N2 filename
```

This command displays to standard output all characters preceding the *N1*-th character and all characters following the *N2*-th character for every line in the specified file.

The following are effects of *N1* and *N2* variables on displayed output.

- If the line is shorter than *N1* characters, then no characters are blocked and the output line is the same as the referenced line.
- If the line is longer than *N1* characters but shorter than *N2* characters, then only the characters from the beginning of the line to the *N1*-th character are displayed.
- If *N1* = *N2*, then the only the initial part of the line, (including the *N1*-th character) remains.
- If *N2* < *N1*, then the output is identical to the input (there are *no* characters that fall into the negative range).

**4.6.6 Case Conversion**

These **EX** utilities permit character conversion from upper-case to lower case or from lower case to upper-case.

**4.6.6.1 Converting Upper- to Lower-Case**

The **EXlower** command syntax is:

**EXlower** *filename*

This command converts all upper-case letters in the file to lower-case letters and sends the result to standard output.

**4.6.6.2 Converting Lower- to Upper-case**

The **EXupper** command syntax is:

**EXupper** *filename*

This command converts all lower-case letters in the file to upper-case letters and sends the result to standard output.

#### 4.6.7 Breaking Up A File Based on a Pattern

Similar to the UNIX **split** command, the **EXbreak** command divides a specified file into multiple sub-files. However, while the **split** command divides a file based on an indicated number of lines, the **EXbreak** command produces sub-files based on instances of a single pattern.

---

**Note:** The rules for pattern-based processing are applicable for the **EXbreak** command.

---

The **EXbreak** command syntax is as follows:

```
EXbreak pattern filename prefix_name
```

The output files are produced in a very specific manner. The first sub-file is named *prefix\_name.001*. It begins with the first line and includes the line with the first instance of *pattern*. The second sub-file is called *prefix\_name.002*, contains the line immediately following the instance of *pattern*, and all lines up and including to the line that contains the next instance of *pattern*, and so forth.

If more than 999 sub-files are required (which will occur, for example, if there are more than 999 instances of the specified *pattern*), then the remainder of the input file is placed in the final output sub-file called *prefix\_name.999*.

*Example:* The contents of an input file named *sample* is as follows:

```
This is
a sample
PATTERN
file and it
has a number
of instances of
PATTERN in it.
The output
file will be
broken up based
on when PATTERN
occurs in the file.
However, it does NOT
break up the file
when the PAT
TERN is split up!
```

To break the file into sub-files based on instances of the pattern "PATTERN", issue the following command:

**EXbreak PATTERN sample broken**

Here is the output file sequence *broken* produced by **EXbreak**:

*broken.001:*

This is  
a sample  
PATTERN

*broken.002:*

file and it  
has a number  
of instances of  
PATTERN in it.

*broken.003:*

The output  
file will be  
broken up based  
on when PATTERN

*broken.004:*

occurs in the file.  
However, it does NOT  
break up the file  
when the PAT  
TERN is split up!





# Configuration File Processing

This chapter examines establishing **exdiff** runtime options within a configuration file.

---

## 5.1 Overview

When you run **exdiff** from either the graphical user interface (GUI) or the command line, you can also invoke a configuration file (which includes runtime parameters). In *EXDIFF*, this file is referred to as the resource configuration (RC) file and the default is *exdiff.rc*. If **exdiff** is invoked without a RC file, then the embedded default values for the *EXDIFF* application are used.

Runtime parameters for the **exdiff** utility can be set or modified using any of the following methods:

1. Specified in a **exdiff** RC file prior to invoking *EXDIFF*.
2. Indicated during the command line invocation.
3. Specified from the GUI.

This chapter addresses setting **exdiff** runtime parameters in a RC file. For information on specifying **exdiff** runtime options from the GUI, refer to Chapter 3, “UNDERSTANDING THE GRAPHICAL USER INTERFACE”.

## 5.2 exdiff Resource Configuration (RC) File

The **exdiff** RC file is comprised of a series of runtime parameters, which are set one per line and listed in any order. Many of the available **exdiff** RC commands are equivalent to functions that can otherwise be performed via the *EXDIFF* GUI or the command line. In addition, various **exdiff** RC options extend the **exdiff** utility's comparison capabilities by allowing extensive masking restrictions to be specified for:

- Byte (individual characters)
- Line
- Pattern (character string)
- Character(s) preceding and/or following a pattern

If an invoked RC file contains no syntax errors, then the **exdiff** utility compares two specified ASCII or *CAPBAK/UNIX* keysave files based on the RC file's run-time parameters.

---

**NOTE:** RC file runtime options will take precedence over runtime options specified from the command line.

---

The **exdiff** RC file can be created or modified with a text editor. While any name may be used for an **exdiff** RC file, the convention is to use *.rc* as the filename extension. Using the indicated syntax, the following runtime commands can be specified within an **exdiff** RC file:

```
# comment
options= command_line_option(s)
byteoff= value1 | value1-value2 [ , value2 | value3-value4 ... ]
lineoff= value1 | value1-value2 [ , value2 | value3-value4 ... ]
pattern N1 "pattern" N2
```

---

**FIGURE 52** Syntax for exdiff RC File

A line beginning with the pound character, #, is considered a comment and is ignored by the configuration file processor.

### 5.3 Specifying Command Line Options

The syntax for specifying **exdiff** command line options an **exdiff** RC file is:

```
options= command_line_option(s)
```

The *command\_line\_option(s)* indicate **exdiff**'s runtime options. For a complete listing, refer to another section (See Section 4.5.1 - "exdiff Command Syntax" on page 90.).

Rules for specifying command line options are as follows:

1. Parameters cannot be set for command line options; only the default values are available.

For example, when executed from the command line, the *N* parameter of the **-c N** option controls the number of lines printed before and after each discovered difference. When indicated as a runtime option from within an **exdiff** RC file, the *N* parameter of the **-c** option cannot be set and the default value of 3 lines is used.

2. The **exdiff** help switch (**-h**) cannot be specified as an **options** variable.

Here is a sample **options** command in an **exdiff** RC file:

```
options = -b -c
```

Switches can specified in a compressed format. For example, the previous sample **options** command could be rewritten as follows:

```
options = -bc
```

## 5.4 Specifying Masking Commands

Complex regression analysis most often requires the comparison of similar baseline and response files which were generated in two separate executions of a product test. In many cases, however, inconsequential differences throughout similar ASCII files (such as dates, headers, footers, or names) prevent **exdiff** from reliably differentiating the files.

Extensive masking commands can be established in the **exdiff** RC file, allowing extraneous differences throughout similar ASCII files to be ignored *during* the comparison process.

---

**NOTE:** *Prior* to executing the **exdiff** utility, an ASCII file can be reformatted and/or divided (based on user-specified byte numbers, line numbers or character strings) using the **EX** command line utilities. For further information on the **EX** utilities, refer to another section (See Section 4.6 - “EX utilities” on page 98.).

---

The **exdiff** RC masking commands are as follows:

- The **byteoff** command indicates byte (individual characters) to be masked.
- The **lineoff** command specifies line numbers to be masked.
- The **pattern** command indicates a characters string (and a specified number of characters preceding and/or following the string) to be masked.

The **byteoff** and **lineoff** commands are examined in another section (See Section 5.4.1 - “Byte and Line Masking Commands” on page 114.); the **pattern** command is also examined in another section (See Section 5.4.2 - “Pattern Masking Command” on page 117.).

### 5.4.1 Byte and Line Masking Commands

The **exdiff** RC **byteoff** and **lineoff** commands specify byte masking and line masking, respectively.

Arguments for the **byteoff** and **lineoff** commands are specified using either of the following syntax formats (or a combination thereof):

```
byteoff | lineoff= value1 [ , value2...]
```

or:

```
byteoff | lineoff= value1-value2 [ , value3-value4...]
```

The first syntax format is used to mask an individual byte or line number. The second syntax format is used to mask a range of bytes or line numbers. Descriptions of command parameters are as follows:

<i>value1</i>	Individual byte or line number.
<i>value1-value2</i> [, <i>value2...</i> ]	Range of bytes or line numbers.
[, <i>value3-value4...</i> ]	Subsequent values or value ranges are to be separated by commas

**NOTE:** The notation [...] represents a instance which can occur zero or more times.

Rules for specifying the **exdiff** RC file **byteoff** and **lineoff** commands are as follows:

1. Indicated values must be positive integers and can be specified in any order.
2. The **byteoff** and **lineoff** commands can be listed in any order within an **exdiff** RC file. However, a **lineoff** command takes precedence over a **byteoff** command.

*Example:* The contents of an input file named *insight1* is:

```
This is a GREAT show.  
But he is glad to leave.
```

The contents of an input file named *insight2* is:

```
this is a great show.  
But he is glad to be in the lobby.
```

An **exdiff** RC file named *insight.rc* contains the following **byteoff** and **line off** commands:

```
byteoff= 1, 11-15  
lineoff= 2
```

Although the **byteoff** command does not mask all differences on the second line of both files, the entire line is masked by the **lineoff** command. Therefore, if the *insight.rc* file is invoked when comparing *insight1* and *insight2* with the **exdiff** utility, the files will register as equal.

3. When calculating offsets for the **byteoff** command, be certain to include spaces, tabs and carriage returns.

5.4.1.1 **byteoff and lineoff Examples**

**Output Sample 1:**

The following is a sample **byteoff** command in an **exdiff** RC file:

```
byteoff= 305, 2, 607-941, 83
```

In this sample, the 2nd, 83rd and 305th byte, as well as bytes 607 through 941, will be masked in the compared ASCII files.

**Output Sample 2:**

Byte values can also be specified on individual lines. For example, the previous sample **byteoff** statement could be rewritten as follows:

```
byteoff = 2
byteoff = 83
byteoff = 607-941
byteoff = 305
```

**Output Sample 3:**

The following is a sample **lineoff** command in an **exdiff** RC file:

```
lineoff= 39-57, 11, 43
```

In this sample, the 11th and 43rd line, as well as lines 39 through 57, will be masked in the compared ASCII files.

---

**NOTE:** While any value can be combined or separated, values may *not* be duplicated. The following masking statements are *incorrect*:

---

```
lineoff = 305, 2, 305
```

or

```
lineoff = 305, 2
lineoff = 305
```

In both instances, byte **305** has been specified twice and will result in an error message.

## 5.4.2 Pattern Masking Command

The **exdiff** RC **pattern** command searches the comparison files for an indicated character string. If located, the pattern and an indicated number of characters preceding or following the pattern are masked. If the pattern is not located in *both* comparison files, the entire command is ignored by the **exdiff** utility.

Arguments for the **pattern** command are specified using the following syntax:

```
pattern N1 "pattern_string" N2
```

<i>N1</i>	Number of characters to be masked <i>before</i> the matched pattern string.
<i>"pattern_string"</i>	Character string to be located and masked.
<i>N2</i>	Number of characters to be masked <i>after</i> the matched pattern string.

Rules for specifying the **exdiff** RC file **pattern** command are as follows:

1. Negative numbers and numbers which exceed file line length cannot be specified. That is:
  - The number of characters masked before a pattern string cannot go beyond the prior newline character ("\n") and
  - The number of characters masked after a pattern string cannot go beyond the next newline character ("\n").
2. The **pattern** command *must* have three arguments; if not, an error message is issued. To mask *only* a **pattern** string, the command is indicated as follows:
 

```
pattern 0 "pattern_string" 0
```
3. The **pattern** command can be listed in any order with **byteoff** and **lineoff** commands within an **exdiff** RC file. However, a **lineoff** command takes precedence over a **pattern** command. For an example, refer to the second rule for specifying the **byteoff** and **lineoff** commands (See Section 5.4.1 - "Byte and Line Masking Commands" on page 114).

The **exdiff** RC file can maintain an unlimited number of pattern commands, subject to general memory constraints.

#### 5.4.2.1 Wild Card and Escape Characters

Wild card and escape characters are specified within a **pattern** string as follows:

?	Mask an instance of ANY character.
\?	Mask an instance of the ? character.
\\	Mask an instance of the \ character.

*Example Usage:* The **pattern** string **?AND?** matches the FORTRAN logical operator **.AND.** as well as the characters **SANDY**. However, the **pattern** string **\?AND\?** matches **only** on the string **?AND?**.

#### 5.4.2.2 Special Characters Allowed

Using the indicated escape notations, the following non-printing control characters are accepted within a **pattern** string:

\t	Horizontal tab character
\v	Vertical tab character
\f	Form feed character
\a	Bell character
\b	Backspace character

#### 5.4.2.3 Disallowed Characters

The following non-printing control characters (and their corresponding escape notations) *cannot* be used in a pattern:

\n	Newline
\r	Carriage Return
\0	Null Character

---

**NOTE:** The null character is used exclusively to terminate a file.

---



**5.4.2.4 Octal Character Specification**

A character may be represented within the **pattern** string, using the octal format `\OOO` where `OOO` is an octal number.

---

**NOTE:** Only octal character values `< 177` are allowed; an error message is issued if a larger number is specified.

---

*Example Usage:* Specifying nonprintable characters.

**5.4.2.5 pattern Examples**

**Example 1:** `pattern 0 "date" 12`

Masks the **pattern** string `date` and the 12 characters *after* the string.

**Example 2:** `pattern 20 "Smith" 0`

Masks the **pattern** string `Smith` and the 12 characters *preceding* the string.

**Example 3:** `pattern 0 "05?25?94" 0`

Masks the **pattern** string `05?25?94`, where `?` represents any character. Thus, various formats for the date March 25, 1994, such as `05/25/94` and `05-25-94`, will be ignored by the **exdiff** utility.

---

**NOTE:** If `?` is to be the actual comparison character, then the command *must* be written as follows:

---

```
pattern 12 "05\?25\?94" 0
```

**Example 4:** `pattern 3 "\t" 2`

Masks a horizontal tab character, as well as the 3 characters preceding and the 2 characters following the horizontal tab.

## 5.5 Sample exdiff RC File

```
#
# Invoke this exdiff RC file with the following ASCII
# files:
#     resume93
#     resume94
#
byteoff= 6-10, 65
#
lineoff= 1, 23-35, 50
#
pattern 0 "December" 4
#
options= -c
#
```

# Customizing the GUI Environment

This appendix explains where the graphical user interface (GUI) setup information is stored and provides modification instructions.

---

## A.1 EXDIFF Setup Information

The *EXDIFF* GUI can be customized by modifying the X Window System resource or setup file. This appendix explains where the setup information is stored and provides modification instructions.

Resource files or setup files are text files which can be edited with any standard UNIX text editor. All the graphical user interface defaults are set in the *SR* file supplied with the product. The *SR* file is copied to the */usr/lib/X11/app-defaults* directory during the installation procedure. For more information on the *SR* file, please refer to the *Installation Instructions*.

To avoid constantly resetting the GUI parameters, the set defaults can be modified by manually changing the *SR* file. The following GUI defaults affect the switches, directory, and directory mask settings for the **exdiff** utility:

```
exdiff*diffFile1.directory:  
exdiff*diffFile1.dirMask: *  
exdiff*diffFile2.directory:  
exdiff*diffFile2.dirMask: *  
exdiff*configFile.directory:  
exdiff*configFile.dirMask: *  
exdiff*outputFile.directory:  
exdiff*outputFile.dirMask: *  
exdiff*normalMode.set: True  
exdiff*keysaveMode.set: False  
exdiff*fastDiffMode.set: False  
exdiff*byteMode.set: False  
exdiff*ignoreConfigFile.set: False  
exdiff*displayOutput.set: True  
exdiff*ignoreTrailingBlanks.set: False  
exdiff*context.set: False  
exdiff*contextInput.value: 10
```

The following GUI defaults effect the switches, directory, and directory mask settings for the **Xexdiff** utility:

```
Xexdiff*diffFile1.directory:  
Xexdiff*diffFile1.dirMask: *.*[br]*  
Xexdiff*diffFile2.directory:  
Xexdiff*diffFile2.dirMask: *.*[br]*  
Xexdiff*maskFile.directory:  
Xexdiff*maskFile.dirMask: *.m*  
Xexdiff*fileToMask.directory:  
Xexdiff*fileToMask.dirMask: *.*[br]*  
Xexdiff*normalMode.set: True  
Xexdiff*toggleMode.set: False  
Xexdiff*timeDisplay.set: False  
Xexdiff*timeDisplayInput.value: 5  
Xexdiff*useMask.set: False  
Xexdiff*reverseMask.set: False
```

#### A.1.1 Default Switches

When opening the GUI-versions of the **exdiff** and **Xexdiff** utilities, the on/off status of **exdiff** and **Xexdiff** modes and options are determined by the default switch setting in the resource file. Within the resource file, switch settings are indicated by *set*, with *False* interpreted as off and *True* interpreted as on.

#### A.1.2 Default Directory and Directory Mask Settings

When naming files, most users prefer to name certain types of files with unique extensions, such as naming all configuration files *filename.rc*. When opening files, **EXDIFF** reads the resource file for default masks to filter directories (indicated by *directory*) and files which match the masks (indicated by *dirMask*), thereby expediting the process of locating a particular file type.

---

**NOTE:** If no path is specified, the mask defaults to the current working directory.

---

Please refer to other sections for instructions on using directory masks (See Section 3.2.1 - “File Selection Windows” on page 47.), and the **File** menu options for the **exdiff** (See Section 3.4.1.1 - “exdiff File Menu” on page 57.) and **Xexdiff** utilities (See Section 3.5.1 - “Menu Bar” on page 68.).

## A.2 EXDIFF Defaults

The following two sub-sections provide descriptions of the default switches, directory and mask settings for the **exdiff** and **Xexdiff** utilities.

### A.2.1 **exdiff** Default Switches, Directory and Mask Settings

- `exdiff*diffFile1.directory`: — Sets the directory for the **Set File 1** option of the **exdiff** utility to the specified path.
- `exdiff*diffFile1.dirMask`: \* — Sets the directory mask for the **Set File 1** option of the **exdiff** utility to \*, listing all the files in the current directory.
- `exdiff*diffFile2.directory`: — Sets the directory for the **Set File 2** option of the **exdiff** utility to the specified path.
- `exdiff*diffFile2.dirMask`: \* — Sets the directory mask for the **Set File 2** option of the **exdiff** utility to \*, listing all the files in the current directory.
- `exdiff*configFile.directory` — Sets the configuration file directory for the **Set Configuration File** option of the **exdiff** utility to the specified path.
- `exdiff*configFile.dirMask`: \* — Sets the configuration file directory mask for the **Set Configuration File** option of the **exdiff** utility to \*, listing all the files in the current directory.
- `exdiff*outputFile.directory` — Sets the output file directory for the **Set Output File** option of the **exdiff** utility to the specified path.
- `exdiff*outputFile.dirMask`: \* — Sets the output file directory mask for the **Set Output File** option of the **exdiff** utility to \*, listing all the files in the current directory.
- `exdiff*normalMode.set`: True — The **Normal Mode** option for the **exdiff** utility is defaulted to on. Change True to False to suppress the **Normal Mode** as the default **exdiff** processing mode.
- `exdiff*keysaveMode.set`: False — The **Keysave Mode** option is defaulted to off. Change False to True (and all other **exdiff** mode settings to False) to establish the **Keysave Mode** as the default **exdiff** processing mode.

- `exdiff*fastDiffMode.set: False` — The **Fast Diff Mode** option is defaulted to off. Change False to True (and all other **exdiff** mode settings to False) to establish the **Fast Diff Mode** as the default **exdiff** processing mode.
- `exdiff*byteMode.set: False` — The **Byte Mode** option is defaulted to off. Change False to True (and all other **exdiff** Mode settings to False) to establish the **Byte Mode** as the default **exdiff** processing mode.
- `exdiff*ignoreConfigFile.set: False` — The **Ignore Configuration File** option is defaulted to off. Change False to True to ignore the default resource configuration (RC) file.
- `exdiff*displayOutput.set: True` — The **Display Output** option is defaulted to on. Change True to False to suppress comparison output from being displayed to the **exdiff** window scroll display.
- `exdiff*ignoreTrailingBlank.set: False` — The **Ignore Trailing Blanks** option is defaulted to off. Change False to True to disregard trailing spaces and tabs and compare strings of blanks as equal when differencing ASCII files.
- `exdiff*context.set: False` — The **Context Lines** option is defaulted to off. Change False to True to generate a more comprehensively annotated comparison listing than the default comparison output.
- `exdiff*contextInput.value: 10` — The default value for the **Context Lines** option is set to 10. Change the default value to either increase or decrease the number of lines printed before and after each difference in output generated by the **Context Lines** option.

#### A.2.2 Xexdiff Default Switches, Directory and Mask Settings

- `Xexdiff*diffFile1.directory:` — Sets the directory for the **Set File 1** option of the **Xexdiff** utility to the specified path.
- `Xexdiff*diffFile1.dirMask: *.*[br]*` — Sets the directory mask to `*.*[br]*` for the **Set File 1** option of the **Xexdiff** utility, listing all *CAPBAK/X* baseline or response files in the current directory.
- `Xexdiff*diffFile2.directory:` — Sets the directory for the **Set File 2** option of the **Xexdiff** utility to the specified path.
- `Xexdiff*diffFile2.dirMask: *.*[br]*` — Sets the directory mask to `*.*[br]*` for the **Set File 2** option of the **Xexdiff** utility, listing all *CAPBAK/X* baseline or response files in the current directory.

- `Xexdiff*maskFile.directory` — Sets the directory for the **Set Mask File** option of the **Xexdiff** utility to the specified path.
- `Xexdiff*maskFile.dirMask: *.m*` — Sets the directory mask for the **Set Mask File** option of the **Xexdiff** utility to `*.m*`, listing all masking files in the current directory.
- `Xexdiff*fileToMask.directory` — Sets the directory for the **Set file to mask** option of the **Xmask** utility to the specified path.
- `Xexdiff*fileToMask.dirMask: *.*[br]*` — Sets the directory mask for the **Set file to mask** option of the **Xmask** utility to `*.[br]*`, listing all **CAPBAK/X** baseline or response files in the current directory.
- `Xexdiff*normalMode.set: True` — The **Normal Mode** option for the **Xexdiff** utility is defaulted to on. Change `True` to `False` to suppress the **Normal Mode** as the default **Xexdiff** processing mode.
- `Xexdiff*toggleMode.set: False` — The **Toggle Mode** option is defaulted to off. Change `False` to `True` (and the **Xexdiff Normal Mode** settings to `False`) to establish the **Toggle Mode** as the default **Xexdiff** processing mode.
- `Xexdiff*timeDisplay.set: False` — The **Time Display** option is defaulted to off. Change `False` to `True` to display a comparison or differenced bitmap image to the screen for the default number of seconds indicated in the `Xexdiff*timeDisplay-Input.value` setting.
- `Xexdiff*timeDisplayInput.value: 5` — The default value for the **Time Display** option is set to 5. Change the default value to either increase or decrease the number of seconds a comparison or differenced bitmap image file is displayed to the screen.
- `Xexdiff*useMask.set: False` — The **Use Mask** option is defaulted to off and should not be changed to `True` unless a default directory mask file is set as well.
- `Xexdiff*reverseMask.set: True` — The **Reverse Mask** option is defaulted to on. Change `True` to `False` to establish negative masking co-ordinates as the default mode when running the **Xmask** utility.





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