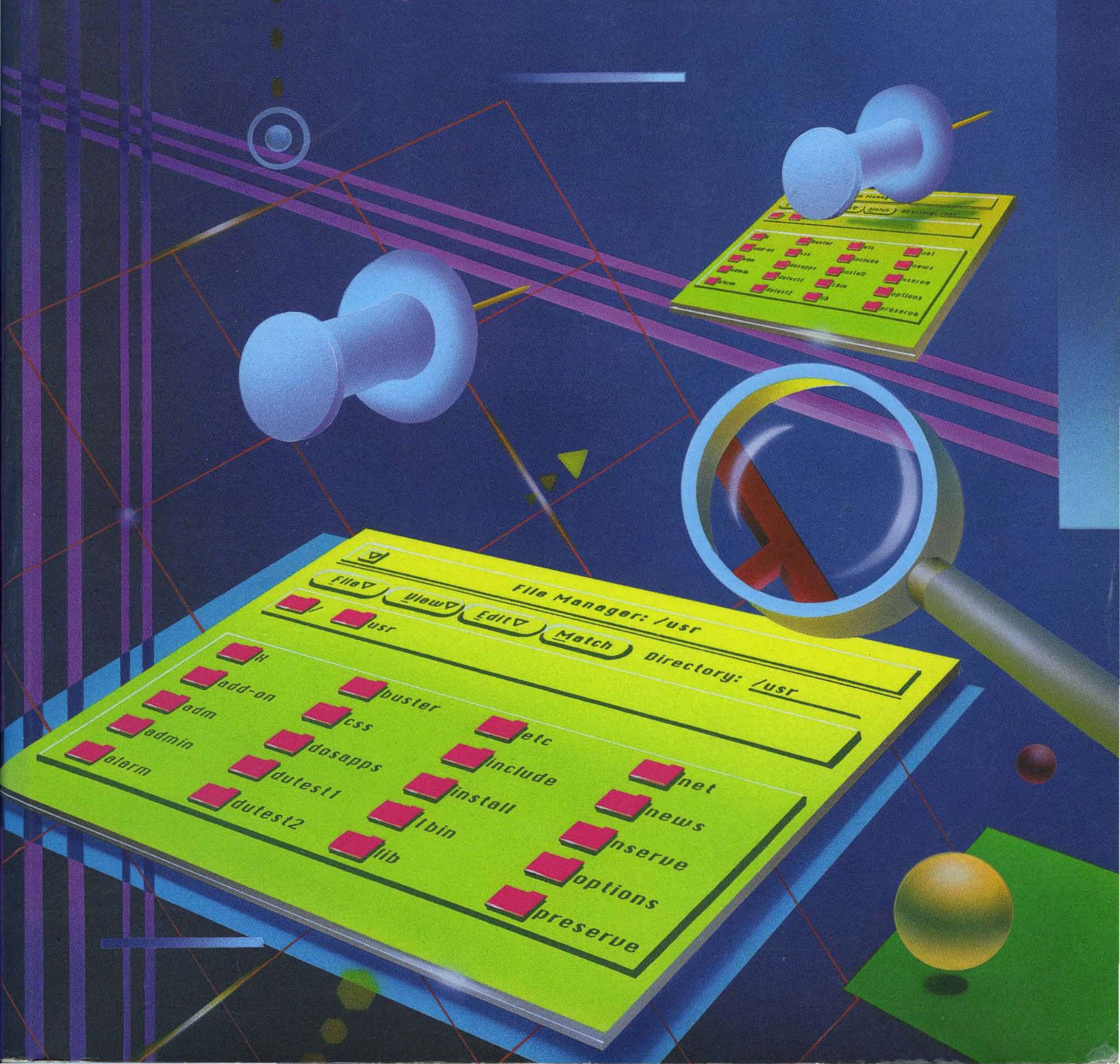
INCLUDES INTERNATIONALIZATION FEATURES

OPEN LOOK®
GRAPHICAL USER INTERFACE

PROGRAMMER'S GUIDE

UNIX System Laboratories, Inc.



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UNIX System Laboratories, Inc.

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1 Introduction

Preface

Purpose

The purpose of this manual is to provide a guide for programmers using the *OPEN LOOK® Graphical User Interface* (GUI). The book is intended for skilled C language programmers, intending to develop applications using a "windowed" front-end. While the OPEN LOOK GUI toolkit is built on top of the X Window System™, you do not need to be familiar with that system to be able to make effective use of the OPEN LOOK toolkit.

The intention of this manual is to guide programmers in the use of the toolkit. Reference material and manual pages are also found in this manual.

Overview

Chapter 2 of this manual provides an overall description of the OPEN LOOK toolkit. The description includes background information on the X Window System toolkit, called the Xt Intrinsics. The Intrinsics provide an opaque interface to the X Window System and some of the Intrinsic functions are necessary for using the OPEN LOOK toolkit. Of particular importance is the notion of what a "widget" is.

This provides a basis for describing the specific OPEN LOOK abstractions and a brief description of each of the OPEN LOOK widgets and important widget attributes (called "resources").

Chapter 2 also describes the OPEN LOOK functions and how they are generally used.

Chapter 3 provides a brief description of how to program using the OPEN LOOK toolkit; how to lay out a screen; how to create and manage widgets and "callbacks." Each of the sample programs that are distributed with the OPEN LOOK toolkit are presented and described. The applications are presented in increasing complexity.

Chapter 4 presents conventions for using the OPEN LOOK toolkit so that applications can co-exist and interoperate.

Chapter 5 discusses mouseless operations.

Chapter 6 presents an extensive example program that demonstrates the use of most of the OPEN LOOK widgets.

Document Conventions

The *OPEN LOOK® Graphical User Interface Programmer's Guide* uses certain typographical conventions, such as boldface and italics, to identify different types of information. The following conventions apply:

- Commands and pathnames that must be typed on the computer exactly as shown appear in `constant width`.
- Variables to those commands and pathnames appear in *italic*. For example, in the command

  xwd -out file

  file will be any name that you select as the file name to be entered.
- Routines, widget names, and procedure names appear in `constant width`.
- Structure member names appear in *italic*.
- Computer output such as prompts and messages appear in `computer style type`. Text references to parts of a displayed program or routine also appear in in this type style. Resource names, resource classes, and widget classes also appear in this `constant width` style.

2 The OPEN LOOK Toolkit

The X Window System and the Xt Intrinsics

The X Window System is a comprehensive mechanism for creating and managing a window environment. Access to the X Window system is usually through an Application Programmer Interface (API) toolkit, such as the OPEN LOOK Toolkit. The base level of the X Window System, Xlib, is a collection of C routines that perform fundamental screen and window management operations. The application programmer would use Xlib directly, for example, for drawing lines, arcs, rectangles, and so on.

The API toolkit can be separated into two distinct layers:

- Xt Intrinsics
- Widgets

The fundamental layer of the API toolkit is the Xt Intrinsics (Xt is shorthand for X Toolkit). The Xt Intrinsics are a set of C routines that monitor events related to end-user interactions and dispatch the correct code to handle those events.

A major function of the Xt Intrinsics is to provide for the creation and management of "Widgets". A widget is a set of code and data that provides a certain "look and feel" to an end-user. A widget defines a rectangular area of a screen that complies with an application interface policy, such as the OPEN LOOK GUI. A widget is a user-interface component combining an X window with the necessary semantics to form an object. The object provides an intuitive user-interface abstraction, such as a **button** or a **scrollbar**.

The Xt Intrinsics contain facilities to create, customize, organize, and destroy widgets. They also translate event sequences from the window server into procedure calls, which the application can then interpret. The intrinsics keep track of the state of a particular widget and negotiate screen real estate when a widget changes size or position.

The OPEN LOOK Widgets

The OPEN LOOK Toolkit provides the application programmer with a defined set of widgets and other user-interface abstractions. The application programmer is not primarily concerned with defining widgets. You are concerned, rather, with defining the layout of the screen for a particular application and designing the code to manage specific end-user interactions with the widgets. The OPEN LOOK API also gives you the ability to customize applications by defining sub-classes of the OPEN LOOK widgets. This is achieved by giving you direct access to the underlying C structures that define the widgets.

Widgets have certain attributes, called resources. At the programming interface level a resource is a named data item, a named component of a structure definition. For example, some of the resources associated with widgets are the background color, the parent widget (all widgets have a parent widget, where the "topmost" parent is the application's base window), the height and width of the defined area, and so on.

Some widgets exist only to define an area in which other widgets can be defined; that is, they are Composite Widgets and exist only as parents to child widgets. For example, the Bulletin Board widget simply provides a space to attach other widgets to. A widget with no children is a Primitive Widget. Primitive widgets are directly associated with an action: they perform a function, enter data, or output data. They do not contain other widgets.

Each time you specify a widget, you can also register the name of the routine(s) you have written to process that widget; that is, you pass the routine name(s) to the Xt Intrinsics. These application registered routines are termed "callbacks." Callbacks manage the semantics of an end-user interaction. The Xt Intrinsics also monitor application registered, non-graphical events and dispatch application routines to handle them. These features allow application programmers to use this implementation of an OPEN LOOK Toolkit in database management, network management, process control, and other applications requiring response to external events.

NOTE The widgets as outlined in this guide, when implemented with the X Toolkit Intrinsics in XWIN Release 4i, meet Level 1 compliance with the OPEN LOOK specification and some Level 2 features, such as the use of color and menus with more than one type of control.

Flat Widgets and Gadgets

The OPEN LOOK Toolkit provides two other abstract interface components:

- Flat Widgets
- Gadgets

These abstractions are very much like widgets. They are designed to enhance the performance of OPEN LOOK applications by saving time and space. They minimize the space used by redundant window definitions.

For the most part, the term *widget* will be used to refer to any of widgets, flat widgets or gadgets.

Flat Widgets

A Flat Widget is a single widget that maintains a collection of similar user-interface components (sub-objects). The flat widget gives the appearance and behavior of many widgets. The sub-objects could be defined as widgets, but, because they share the same basic characteristics, defining them collectively results in improved performance. Flattened widgets, for instance, consume only a fraction of the memory that an equivalent hierarchy of widgets requires.

In this version of OPEN LOOK there are three flat widgets:

1. Flat Exclusives, containing the equivalent of RectButton widgets.
2. Flat NonExclusives, also containing the equivalent of RectButton widgets.
3. Flat Checkboxes, equivalent to a nonexclusives widget populated with Checkbox widgets.

In general, flat widgets (or flattened widgets) have the following attributes:

- They are container objects, responsible for managing the look and feel of one or more sub-objects.
- After the container is populated, minimal or no manipulation is done on the sub-objects.
- Each container is simply a region that contains zero or more sub-objects of a certain type.

- The sub-objects within the container do not have an associated window or widget structure.

From the end-user's perspective, there is no discernible difference between a flattened widget interface and the same interface defined as a composite widget with child widgets.

From the application programmer's perspective, flattened widgets have a different interface than traditional widgets or gadgets. Flattened widgets are more efficient and easier to deal with, particularly when the sub-objects are regularly spaced and have similar attributes. A single toolkit request can specify an arbitrary number of sub-objects to the flattened widget, thus achieving a substantial reduction in the lines of code required to produce a complex graphical interface component. Additionally, there is a single callback routine for all sub-objects of the flattened widget.

Chapter 3 includes a detailed description of programming using flattened widgets.

Gadgets

A Gadget is a windowless object; that is, it is a widget that uses its parent's window. For the most part, there is no difference in the application programmer's handling of a gadget and of the same object defined as a widget. The only difference is in the widget class (for example, an OblongButton Widget belongs to the **`oblongButtonWidgetClass`** while the OblongButton Gadget belongs to the **`oblongButtonGadgetClass`**).

It is important to note that a gadget is a subclass of the RectObj class while a widget is a subclass of Core, with a gadget having only a subset of the resources found associated with the Core class. Thus care should be taken to avoid referencing fields which exist for widgets but not gadgets, both in writing gadget code or in converting widget code to gadget code in existing applications.

NOTE

`MenuButton` gadgets cannot be parents (that is, cannot be used as the parent parameter when creating a widget or other gadget.

Gadgets share some core fields. But since they are not subclasses of `Core`, they do not have all `Core` fields. In particular, they don't have a name field or a translation field (so translations cannot be specified/overridden).

Naming Conventions for Widgets

The OPEN LOOK Toolkit programmer may end up dealing with hundreds of programming particles: widgets, widget resources, Xt intrinsic routines, OPEN LOOK routines, and so on. A well-defined set of naming conventions has been adopted to simplify the process of reading and writing applications. The naming conventions are important, and are essential to effective toolkit programming and debugging.

The names of structure members are lower-case; underscores are used to join compound words. Examples of these names are *tag, display,* and *id_type.*

Type and procedure names begin with upper-case letters. Capitalization is used to separate the components of compound words. Examples of this style are:

- **`XtGetValues`**
- **`XtSetArg`**
- **`XtSetValues`**
- **`ArgList`**
- **`OlInitialize`**

Because of the object-oriented nature of the toolkit, all data structures and most data types are type-defined (''typedef-ed''). Further stylization is often accomplished using typedefs for derivatives of these private data types.

Additional conventions stipulate that:

- A resource name will have the prefix *XtN.* Using this convention, the resource name **`XtNbackgroundPixmap`** will associate with a structure member *background_pixmap.*

- A resource class will have the prefix *XtC*. For example, the resource class *Background* will be defined as **XtCBackground**.

Basic widget naming conventions can, therefore, be thought of according to the following list:

- Intrinsics procedure names begin with "Xt"
- OPEN LOOK routines start with "Ol"
- Resource names begin with "XtN"
- Resource class names begin with "XtC"

These conventions are like those used for X Window's Xlib

Resources for Widgets

A resource is a named data item. This section describes how default values for resources are established. The next section describes how these values are set and obtained after the widget is created. There is a fundamental distinction between the nature of a widget, or its "Widget Class" (for example, an Oblong-Button), and a specific widget, or an *instance* of a widget (for example, This Blue OblongButton Over Here). Widgets may be defined as sub-classes of other defined widgets, which are then considered to be their "super-class" widget.

The resource value may be set by a program, specified by a user, or specified as a default. For example, in the case of the **OblongButton** widget, some of the resource items that are specific to a given instant of the widget include fore-ground color, text font, the label string, and label justification. Some of these resource elements may come from the widget's superclass, such as background color, border color, and border width.

During initialization of the OPEN LOOK Toolkit (through a call to the **OlInitialize** routine), the resources are merged from several sources in the order shown below. During the merge, unrelated resources are simply added to the complete set, while overlapping resources are replaced with the latest values. For instance, if the resource **XtNforeground** is specified in several sources, the value of **XtNforeground** from the last source overrides earlier values.

Resource values may be supplied to an application from the following sources, in the order given:

1. Internal defaults - Each object in the toolkit has object-specific defaults for the resources it uses. These defaults are in effect unless overridden from another source.

2. Application defaults - The application-specific resource file name is constructed from the class name of the application and points to a site-specific resource file that usually is installed by the site manager when the application is installed. On UNIX-based systems, the application resource file is **`/usr/X/lib/app-defaults/`***class*, where *class* is the application class name.

3. Server resource or **`.Xdefaults`** file - The next source is the X server's **`RESOURCE_MANAGER`** property, as returned by the **`XOpenDisplay`** routine. If no such property exists, the **`.Xdefaults`** file in the user's home directory, if it exists, is loaded in place of the server property.

   However, when the OPEN LOOK Workspace Manager (**`olwsm`**) is running, the **`RESOURCE_MANAGER`** property always exists, and obtains its values from the **`.Xdefaults`** file. This essentially makes moot the differences between these alternate sources.

   NOTE A user can make changes to the **`.Xdefaults`** file as long as the **`olwsm`** program is *not* running. Changes made while the Workspace Manager is running will be lost.

   An application can use the **`olwsm`** program to store changes to resource values. The changes are stored immediately in both the **`.Xdefaults`** file and the **`RESOURCE_MANAGER`** property.

4. **`XENVIRONMENT`** or **`.Xdefaults-`***host* file - The user's environment variable **`XENVIRONMENT`** provides the name of the file for the next source. If this environment variable is not set, the file **`.Xdefaults-`***host* in the user's home directory, if present, is used, where *host* is the name of the user's host machine.

5. Command line options - The next source is the command line, where the user can give several standard and application-specific options. The **`OlInitialize`** routine has a table of the standard command line options for adding resources to the resource database, and it takes as a parameter additional application-specific resource abbreviations. See "Parsing the

Command Line" in Chapter 4 of the *X Toolkit Intrinsics* for the format of this table.

6. Application overriding values - Resource values set within the application program are the last source. These assignments will override any, and all, previous assignments. See the next section, "Getting and Setting Widget Resources", for details on how the application can set resource values.

Getting and Setting Widget Resources

The intrinsics provide procedures for obtaining a widget's current resource values and assigning values to a widget's resources. These functions are used after a widget is created.

The values can be set at initialization time, can be set with a call to - **XtSetValues**, can be read with a call to **XtGetValues**, or can be set in other ways (see the reference sections of this guide for specific information).

The following table describes the arguments for the **XtSetValues** and **XtGetValues**.

	XtSetValues
Widget	Specifies the widget.
args	Specifies a variable length argument list of the name/value parts to be modified.
num_args	Specifies the number of entries in the argument list.

	XtGetValues
Widget	Specifies the widget.
args	Specifies a variable length argument list of name/address pairs. The address part is the address of an object of the type given as name.
num_args	Specifies the number of entries in the argument list.

Both functions require the number of arguments (num_args) to be passed as a parameter. The function **XtNumber**(*array_name*) can be used to return the number of entries in a fixed length array.

Basic Widget Resources

This section describes those widget resources that belong to the Core Widget. The Core Widget contains the definitions of resources that are common to all widgets. All widgets are subclasses of Core.

A description of these resources are briefly presented here and in more detail later in the reference sections of this Guide. These resources are common to all widgets and you should consult the reference manual before actually using them.

Resource Set

Name	Class	Type	Access
XtNancestorSensitive	XtCSensitive	Boolean	G*
XtNbackground	XtCBackground	Pixel	SGI
XtNbackgroundPixmap	XtCPixmap	Pixmap	SGI
XtNborderColor	XtCBorderColor	Pixel	SGI
XtNborderPixmap	XtCPixmap	Pixmap	SGI
XtNborderWidth	XtCBorderWidth	Dimension	SGI
XtNdepth	XtCDepth	Cardinal	SG
XtNdestroyCallback	XtCCallback	XtCallbackList	SI
XtNheight	XtCHeight	Dimension	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	SGI
XtNsensitive	XtCSensitive	Boolean	GI*
XtNtranslations	XtCTranslations	XtTranslations	G
XtNwidth	XtCWidth	Dimension	SGI
XtNx	XtCPosition	Position	SGI
XtNy	XtCPosition	Position	SGI

The Access column is interpreted as follows:

S	Value can be set by **XtSetValues**
G	Value can be read by XtGetValues
I	Value can be set at initialization
*	Value set in other ways

XtNancestorSensitive

Range of Values:
TRUE
FALSE

This argument specifies whether the immediate parent of the widget will receive input events.

XtNbackground

Range of Values:
Any pixel value valid for the current display

This resource specifies the background color of the widget.

XtNbackgroundPixmap

The application can specify a pixmap to be used for tiling the background. This takes precedence over **XtNbackground**.

XtNborderColor

Range of Values:
Any pixel valid for the current display

This resource specifies the color of the border.

XtNborderPixmap

The application can specify a pixmap to be used for tiling the border. This takes precedence over **XtNborderColor**.

XtNborderWidth

Range of Values:
    0 <= XtNborderWidth <= min (XtNwidth, XtNheight) / 2

This resource sets the width of the border for a widget. A width of zero means no border will show.

XtNdepth

Range of Values:
    0 *or* (any value supported by the current display)

Determines how many bits should be used for each pixel in the widget's window. The value of this resource is used by the Xt Intrinsics to set the depth of the widget's window when it is created.

XtNdestroyCallback

This is a pointer to a callback list containing routines to be called when the widget is destroyed.

XtNheight

Range of Values:
    0 <= XtNheight

This resource contains the height of the widget's window (in pixels), not counting the border area.

XtNmappedWhenManaged

Range of Values:
    TRUE
    FALSE

If set to TRUE, the widget will be mapped (made visible) as soon as it is both realized and managed. If set to FALSE, the application program is responsible for mapping and unmapping the widget. If the value is changed from TRUE to FALSE after the widget has been realized and managed, the widget is unmapped.

`XtNsensitive`

Range of Values:
TRUE
FALSE

This resource determines whether a widget will receive input events. Note that in the table this resource is marked *. In order to set this resource, you should use the function **`XtSetSensitive`**. This is because this resource affects the status of any child widgets and the **`XtSetSensitive`** function will propagate the new value to all children.

`XtNwidth`

Range of Values:
0 <= XtNwidth

This resource contains the width of the widget's window in pixels, not including the border area.

`XtNtranslations`

This resource should not be set by an application.

`XtNx, XtNy`

These resources contain the x-coordinate and y-coordinate of the widget's upper left hand corner, excluding the border, relative to its parent widget.

Specifying Resources for Flattened Widgets

A flattened widget has three kinds of resources:

- Resources that affect the container object; for example, **`XtNcontainerType`** or **`XtNgravity`**, specifying how the sub-objects in this container are positioned within another container.

- Resources that must be specified for each sub-object; for example, **`XtNlabel`**, specifying the label that goes inside the button or checkbox.
- Resources that may be applied to every sub-object or may be applied individually to each sub-object; for example, height, width, font, background color, and so on.

This means that resource specification must allow for variation in the number of specified resources (that is, where the number of specifications is a function of the number of sub-objects) and also allow for variation in specifying which resources will be defined for the container and which will be defined for the sub-objects. This variation is determined by using resource lists for the specification.

Sub-Object Resource Lists

The resources for the sub-objects of a flat container are specified in **`list format`**. This allows the programmer to determine which container resources will be inherited by the sub-objects and which will be specified individually.

Each list is an array of application-defined records (typically, in a "C" structure format or as an array), where each record describes a particular sub-object. The items to be entered on the list are determined by the application programmer. In the same application, different flat containers can have different lists. For a given flat container all items on the list are specified in the same format. That is, for efficiency reasons, each record in the array *must* have the same form as the other records in the array; each structure in the list has identical fields.

Every different flat container widget may have a different set of fields for each record in its sub-object resource list. For example, if an application wanted to specify an "unselect" callback procedure for one group of exclusives but not for another, the application would specify an **`XtNunselectProc`** field as an element field for the first list but not for the second list. For data alignment and parsing reasons, the fields of each record must use the **`XtArgVal`** type (see the code example in Chapter 3).

Inheriting Resources

Since all sub-object resources are part of a container (parent), sub-objects inherit any non-specified resource from the parent container. For example, if the application requires a particular font color for all sub-objects, you do not have to specify the **`XtNfontColor`** resource for each sub-object; you simply set the font color resource on the parent container and all sub-objects will use that font color.

Though sub-object resources are part of its container's resource set, none of the sub-object resources have any direct effect on the container.

Ordering Resources in the List

Since the "form" of the sub-object record is defined within the application's domain, the container must be given a hint about the record's form so that it can parse the supplied list. A resource name list is the key to unlocking the application's sub-object list. While the ordering of fields in each record is not important, the application must give the resource names in the same sequence that their associated values appear in the record.

For example, if the records specifying sub-objects of a flat exclusives container had a "**`XtNlabel`**" field followed by the "**`XtNselectProc`**" callback field, the application must supply the container with the **`XtNlabel`** resource name followed by the **`XtNselectProc`** resource name. Inconsistent ordering of the fields will result in undefined behavior when the sub-objects are instantiated.

Resources for Specifying Sub-Objects in a Flat Widget

Five common resources are used by each container class to describe the necessary sub-object information:

Resource Set

Name	Class	Type	Access
XtNitems	XtCItems	XtPointer	SGI
XtNnumItems	XtCNumItems	Cardinal	SGI
XtNitemFields	XtCItemFields	String *	SGI
XtNnumItemFields	XtCNumItemFields	Cardinal	SGI
XtNitemsTouched	XtCItemsTouched	Boolean	SG

XtNitems	This is the list of sub-object items.
XtNnumItems	Specifies the number of sub-object items in the list.
XtNitemFields	Contains the list of resource names used to parse the records in the **XtNitems** list.
XtNnumItemFields	Specifies the number of resource names in **XtNitem-Fields**.
XtNitemsTouched	Values are TRUE or FALSE (the default). Whenever you modify an item list directly, you must set this as TRUE to the flat widget container so that it can update the visual.

Screen Resolution and Color

Low and High End Color

This implementation of an OPEN LOOK toolkit supports the low and high end color representation, that is, the primary colors, as well as the fine shadings.

If you wish to fine-tune your color choices, you can edit the color resources in your **.Xdefaults** file. Note that you should only do so when OPEN LOOK is not currently running.

RESOURCE	AFFECTS
`*Background`	windows and widget background
`*TextBackground`	TextEdit, xterm
`*TextFontColor`	TextEdit, TextField, ScrollingList, xterm
`*inputFocusColor`	cursor, traversal, highlighting
`*inputWindowHeader`	header of window with input focus
`olwsm.workspace`	workspace color
`*foreground`	window title, window menu label, buttons, scrollbars sliders
`*borderColor`	border of widgets and windows
`*FontColor`	TextEdit, TextField and ScrollingList widgets and xterm

NOTE Refer to the resource sets of widgets in the "Manual Pages: Widgets" appendix of this guide.

Device Resolutions

The table below presents the screen formats that are supported with this toolkit. Assuming 11 inch diagonal and 13 inch diagonal (nominal) monitors are used, the table also shows the corresponding pixel densities. The numbers are given in pixels per inch horizontally by pixels per inch vertically.

Adapter Type	Format	11" Monitor	13" Monitor
EGA	640 x 350	76 x 55	66 x 48
EGA (AT&T Extended)	640 x 400	76 x 63	66 x 55
VGA	640 x 480	76 x 76	66 x 66
Enhanced VGA	800 x 600	95 x 95	83 x 83

On screens that meet these resolutions, the visuals presented by the toolkit adhere to the 12-point size visuals required by the OPEN LOOK specification. However, the toolkit will work with any resolution. On low resolution screens, such as the CGA format, the visuals will be larger than 12 points; on higher resolutions, the visuals will be smaller than 12 points.

Supported Fonts

Standard Font

The defined OPEN LOOK font "Lucida" is used in labels for all labeled controls and as the default font in text widgets.

Automatic Choice of Font for Resolution

The toolkit automatically selects the correct default font to match the resolution of the device. The application can override the font selection, but then the toolkit does not automatically adjust the font to accommodate a change in screen resolution.

Note that fonts must be cached on a per screen basis.

Widget Functions and Applications

This section describes the OPEN LOOK widgets and processing routines. The widgets defined for the OPEN LOOK GUI are listed below:

```
Action Widgets

OblongButton
RectButton
CheckBox
MenuButton (was: ButtonStack)
AbbrevMenuButton (was: AbbrevStack)
Slider
Scrollbar
Stub

Text Control Widgets

StaticText
Text
TextField

Container Widgets

BulletinBoard
ControlArea
Form
Caption
FooterPanel
Exclusives
Nonexclusives
FlatCheckbox
FlatExclusives
FlatNonExlusives
ScrolledWindow
ScrollingList

Popup Choices

Notice
PopupWindow
Menu
```

OPEN LOOK Widget Descriptions

NOTE A reference to a widget class is formed by using the lower case widget name followed by "`WidgetClass`," such as `menuButtonWidgetclass` and `menuWidgetClass`.

Action Widgets

OblongButton Widget and Gadget

The `OblongButton` widget is a primitive widget consisting of a label surrounded by a rounded oblong border (Figure 1).

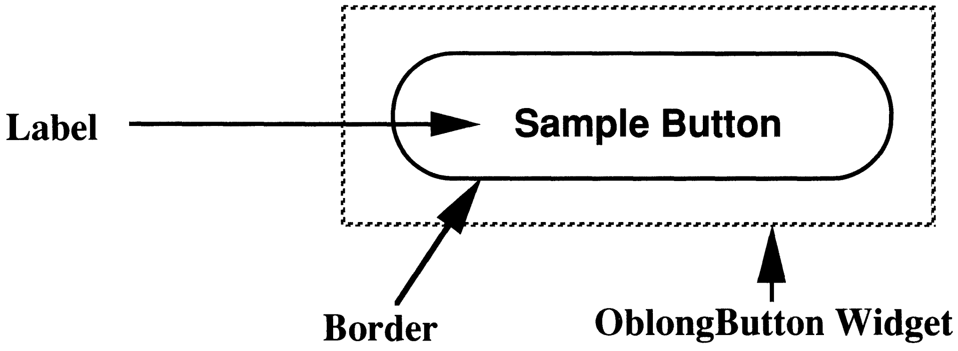


Figure 1. Oblong Button Widgets

In a series of Buttons, the default choice is indicated by a double border. The `OblongButton` provides a single-action control for the end-user. The user initiates an action each time the Button is selected, unless the Button is marked as "busy" or "inactive".

The **OblongButton** is typically incorporated into a **Menu**, **ControlArea**, or other composite widget as part of a set of controls. Because of this, we recommend you use an **OblongButton Gadget** instead. This saves both time and space.

RectButton

The **RectButton** is a primitive widget consisting of a label surrounded by a rectangular border. Figure 2 illustrates Rectangular Buttons under several possible conditions, and using different borders to indicate the condition. While a **RectButton** may be used alone, it is generally used as a component child of an **Exclusives** or **Nonexclusives** composite widget. The **RectButton** is used to indicate a choice (for example, to set or reset a switch value) in the application.

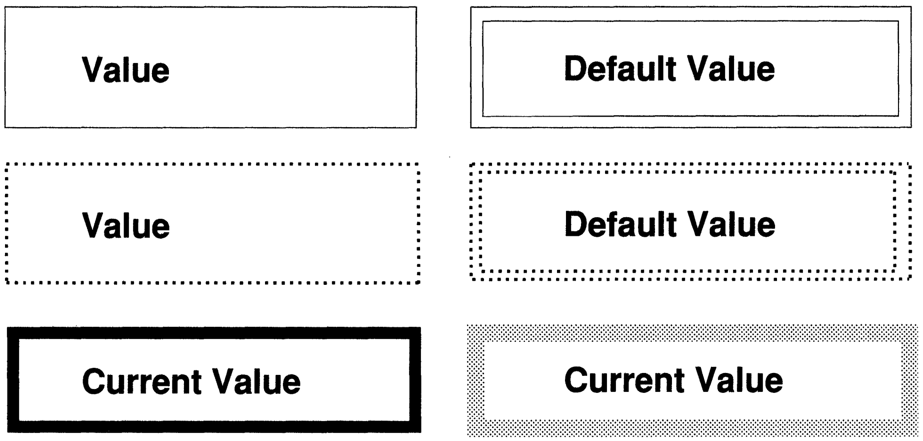


Figure 2. Rectangular Button Widgets

CheckBox

The **CheckBox** widget consists of a label followed by a check box. The widget acts as a toggle switch. The first time it is selected a check mark is drawn in the box. Selecting it again removes the check mark. If it is initially set, the first time it is selected it will be un-set.

CheckBox widgets may be used alone or as part of another composite, but they are almost always used as children of the **Nonexclusive** composite widget. The **Nonexclusives** widget manages the appearance of the **CheckBox**. These widgets provide the end-user with a way to make one or more selections from a list of choices in a form that looks like items being checked off a list.

Figure 3 illustrates a **CheckBox** and specifies each of its components.

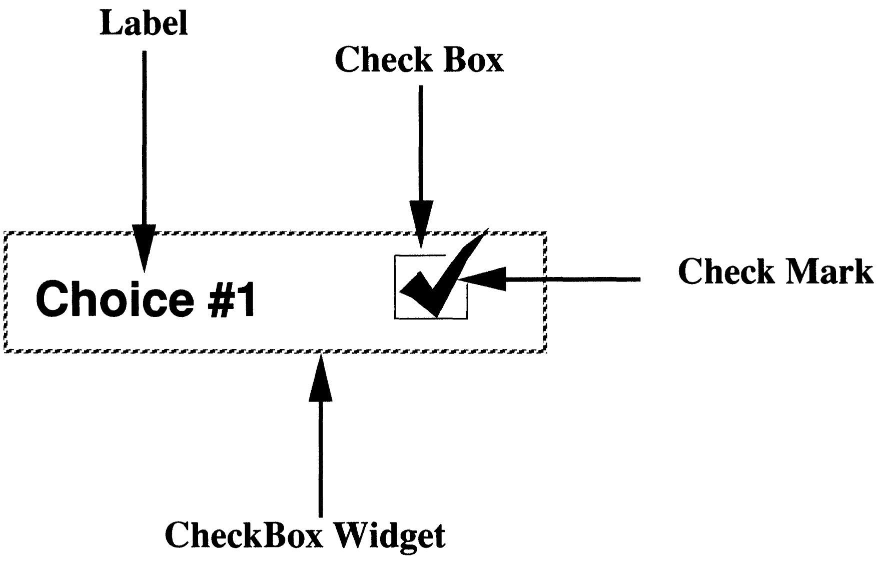


Figure 3. CheckBox Widget

MenuButton Widget and Gadget

The **MenuButton** (**ButtonStack in Release 1.0**) is a composite widget that provides the look of a regular **OblongButton**, or "stack" of **OblongButtons**. The stack of buttons acts as a visual representation for a menu. It has all the features that the **Menu** has and also provides quick access to the menu defaults, both for selection and previewing.

Figure 4 illustrates a **MenuButton**. The inverted triangle (also known as a Menu mark) visually distinguishes a **MenuButton** from a primitive Button.

The **MenuButton** is normally defined as a Gadget for more efficient performance.

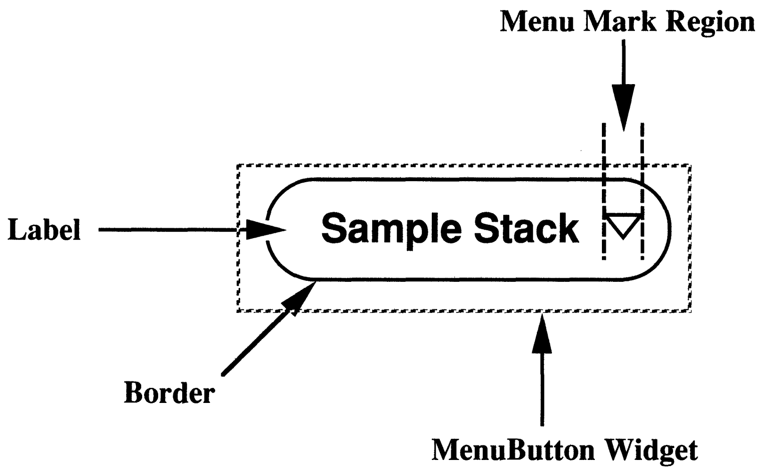


Figure 4. MenuButton Widget

AbbrevMenuButton

The **AbbrevMenuButton** (AbbrevStack in Release 1.0) composite widget is similar to the **MenuButton** control. It appears on the screen without a label, taking up less screen space. The **AbbrevMenuButton** widget can be used with other widgets to allow the end user to add new items to the menu.

Figure 5 illustrates an **AbbrevMenuButton** widget next to a Current Selection Widget. The Current Selection widget is independently created by the application. Typically, you would place both widgets side by side in a composite widget. The **AbbrevMenuButton** widget only automatically previews the default selection in the selection widget; the application is responsible for showing any other selections.

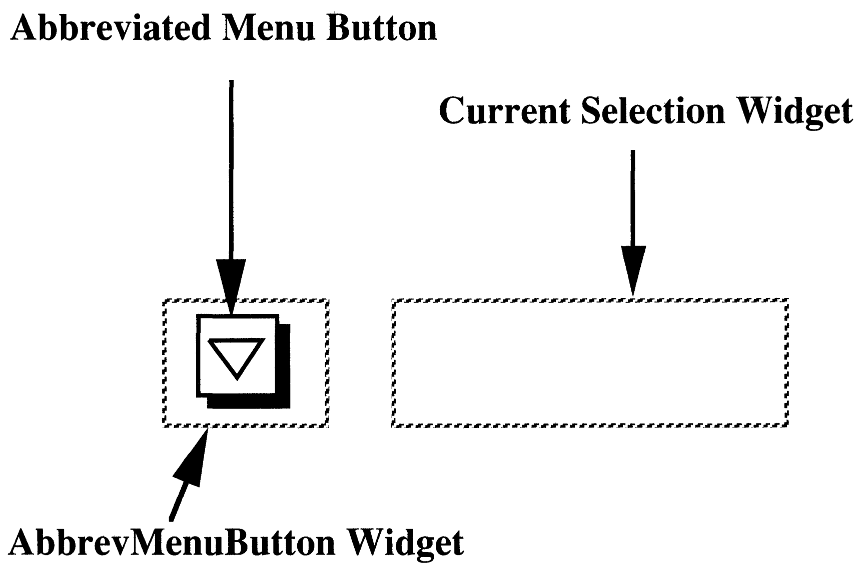


Figure 5. AbbrevMenuButton Widget

Slider

The **Slider** widget provides the graphical equivalent of an analog control, allowing the end-user to move a slider element to a position that represents a value along a continuum.

The application specifies the minimum and maximum values as well as the granularity. Figures 6A and 6B illustrate both a horizontal and vertical **Slider** widget and labels each of its components.

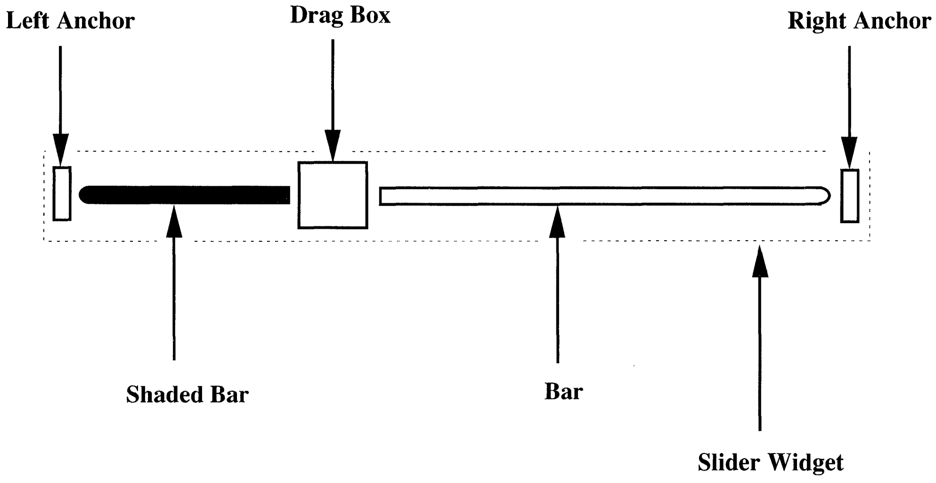


Figure 6A. Slider Widget (Horizontal)

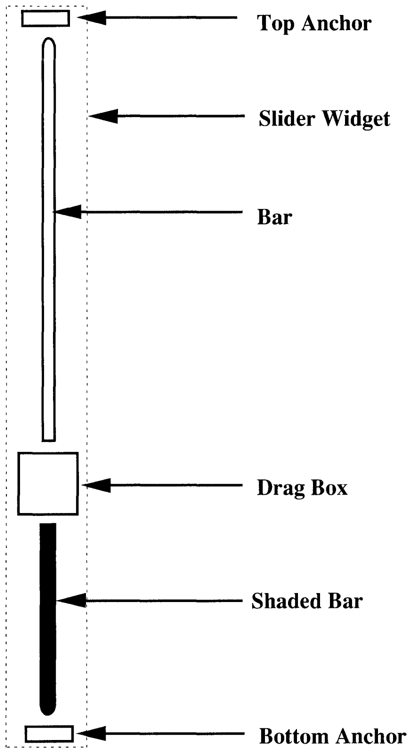


Figure 6B. Slider Widget (Vertical)

Scrollbar

The **Scrollbar** widget has no intrinsic function; it is always associated with an adjoining window, that contains the "Content" to be scrolled.

The Content is composed of units of data (for example, lines of text), that typically exceed the size of its window (called a window pane). The end-user scrolls through the Content by selecting and moving the **Scrollbar**. In appearance, the **Scrollbar** looks like an elevator or a cable car that moves back and forth (or up and down) on a cable. The Content moves through the pane proportionately to the movement of the **Scrollbar**. Figures 7A and 7B illustrate different aspects of **Scrollbars**, showing their components and illustrating fully extended **Scrollbars**, both horizontal and vertical. **Scrollbars** can also be abbreviated (when they are attached to a small window, for example). In this case the cable component is eliminated.

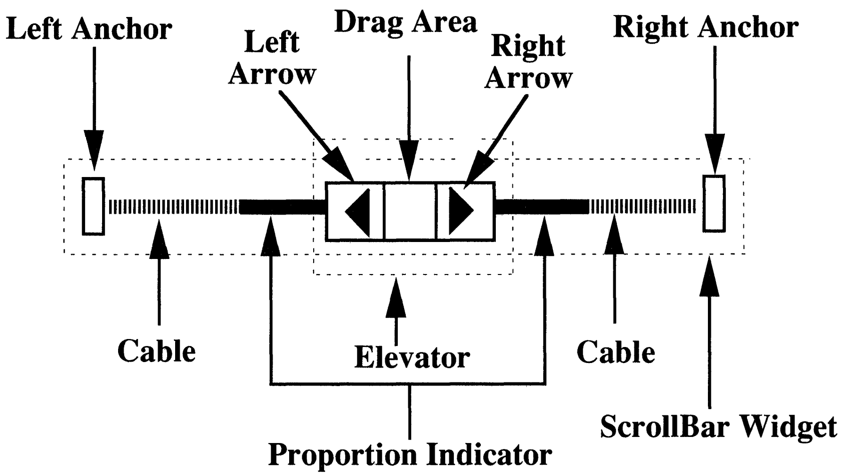


Figure 7A. Scrollbar Widget (Horizontal)

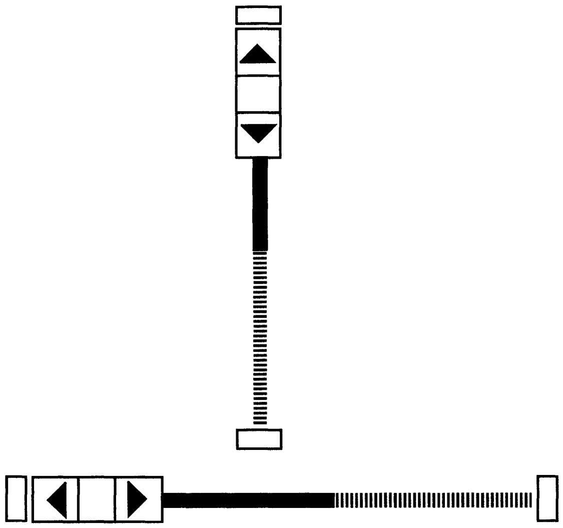


Figure 7B. Scrollbar Widget: Elevator and Proportion Indicator at Left/Top Limits

The **Scrollbar** does not provide semantics for scrolling through any particular content, but provides an interface for an application or another widget, such as the **ScrolledWindow** and widgets, to implement a scrollable window pane.

Stub

The **Stub** widget is designed to give you increased flexibility in controlling the screen during execution. It allows you to specify procedures at creation and/or **XtSetValues** time that are normally restricted to a widget's class part. Most of the class part procedures have been attached to the instance part.

This allows you to use **Stub** widgets to build local widgets (that is, to design application-specific widgets). The **Stub** is particularly useful for drawing graphics.

Text Control Widgets

StaticText

The StaticText widget implements the OPEN LOOK Message control to provide an uneditable display. The application has some flexibility in laying out the text within the StaticText widget.

Figure 8 illustrates a typical StaticText widget, showing the resources used to control the display coloration.

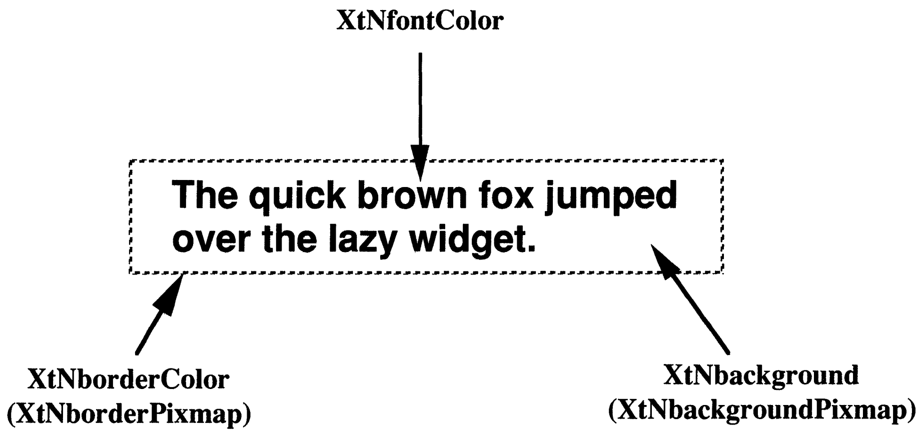

XtNfontColor
The quick brown fox jumped over the lazy widget.
XtNborderColor (XtNborderPixmap)
XtNbackground (XtNbackgroundPixmap)

Figure 8. StaticText Widget

TextEdit

The TextEdit widget provides an interface for the end user to enter and edit text. It provides a basic set of editing controls, including selection control for text, copy, move, and cut and paste.

TextEdit widgets are often used in conjunction with ScrolledWindows and Scrollbars to manage text that cannot fit within the provided window frame.

TextField

The **TextField** widget provides a one-line text field, with an application-set width, for letting the end user enter and edit text. Controls are included for scrolling long text left and right within the field. Figure 9 illustrates a **Text-Field** widget with various controls and those resources used to control the coloration. The left and right arrows are used to indicate the direction of text overflow; the vertical triangle is the editing cursor.

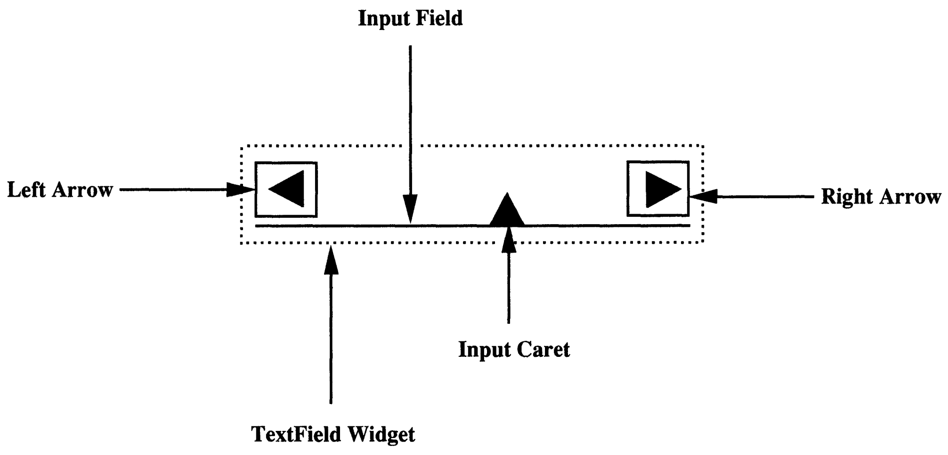


Figure 9. TextField Widget

Container Widgets

BulletinBoard

The **BulletinBoard** is a composite widget; that is, it contains and manages other widgets (which may themselves be composites). The **BulletinBoard** widget provides minimal management of its widget children, simply providing a space into which they can be placed. It allows the application to configure the overall size of the "bounding box" around the child widgets, but does not provide facilities for ordering the widgets. When defining a **BulletinBoard** you can specify that it have a fixed screen size, that it have a minimal size (just large enough to hold its children), or that it grow to meet its children's needs.

Figure 10 illustrates a **BulletinBoard** and shows the coloration resources.

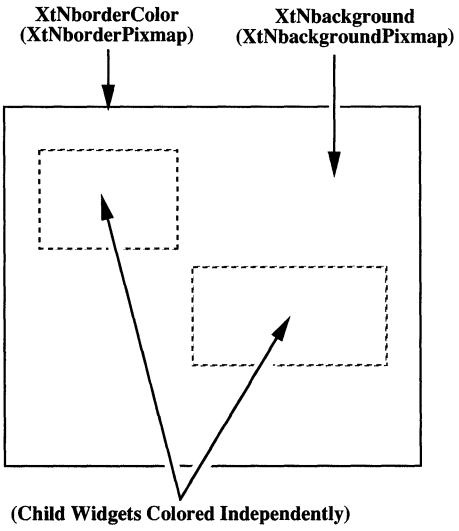


Figure 10. BulletinBoard Widget (Coloration)

ControlArea

The **ControlArea** is a composite widget that manages the layout of its children on the screen. It allows the controls to be laid out in one of four patterns and provides column or row alignment. The four patterns are:

- Fixed number of rows in the control area
- Fixed number of columns
- Fixed overall width of the control area
- Fixed overall height

The child widgets are automatically laid out left to right and then top to bottom in the order that they are added to the **ControlArea** composite widget. Typical layouts, coloration and representative resources are illustrated in Figures 11A and 11B.

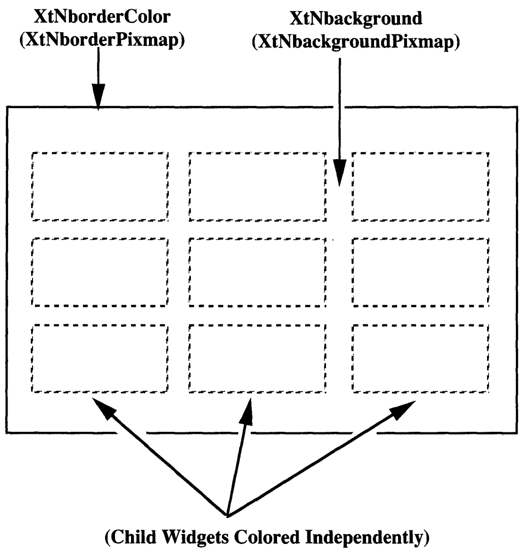


Figure 11A. ControlArea Widget (Coloration)

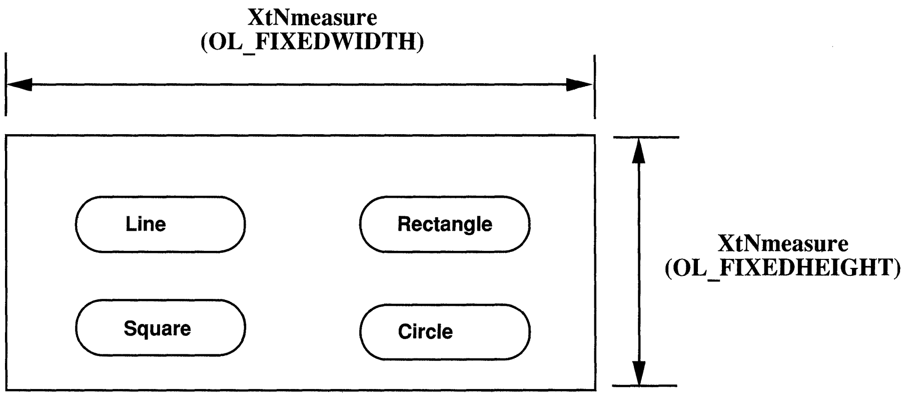


Figure 11B. ControlArea Widget (Height and Width Control)

Form

The **Form** composite widget provides more sophisticated management of other widgets than the **BulletinBoard** composite. It allows the application to specify the layout of the widgets, so that their position relative to each other remains consistent in the face of window resizing done by the end user. A **Form** widget is illustrated in Figure 12.

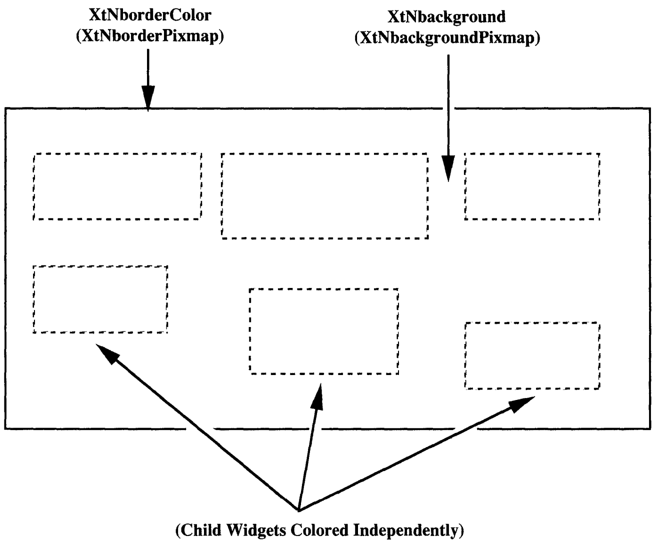


Figure 12. Form Widget (Coloration)

Caption

The **Caption** widget provides a convenient way to label other controls. It allows the application to choose the placement of a text label next to one widget. The **Caption** widget is illustrated in Figure 13. Some OPEN LOOK composite widgets recognize the **Caption** widgets and will align them specially.

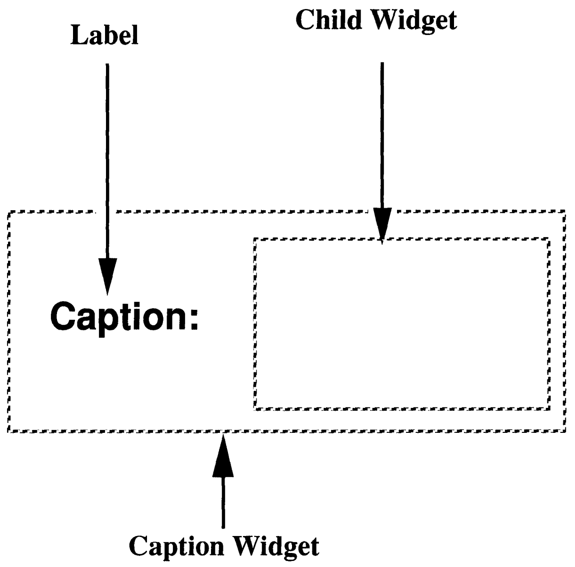


Figure 13. Caption Widget

FooterPanel

The **FooterPanel** composite widget provides a convenient way of getting a footer at the bottom of an OPEN LOOK window. It allows the application to use any widget best suited for the content of the footer and handles the resize management of the footer and the pane above it.

Exclusives

The **Exclusives** is a composite widget that allows the end-user to select one, and only one, of a series of choices. The **Exclusives** composite is only used together with **RectButton** primitive widgets as children (Figure 14).

The **Exclusives** widget provides the layout and selection control of the **RectButton** widgets, ensuring that the controls align in columns and/or rows, that only one (or none) of the buttons is set at one time, and that dimmed buttons are reset if a choice is made.

Exclusives can also be defined as Flattened Widgets. When defined in this way its children will not be treated as individual widgets. For the most part, you should use the Flattened Widget definition to improve overall performance.

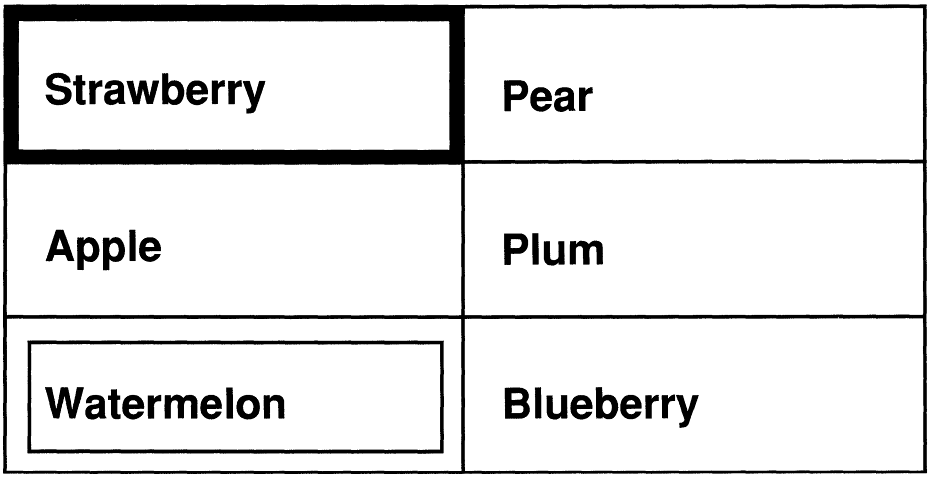


Figure 14. Exclusives Widget Example

Nonexclusives

The **Nonexclusives** is a composite widget that allows the end-user to select one or more of a series of choices. The **Nonexclusive** widget can manage either **RectButton** or **CheckBox** primitive widgets.

The **Nonexclusives** widget provides the layout and selection control of the **RectButton** or **CheckBox** widgets, ensuring that the controls align in columns and/or rows.

When the container will be populated with RectButtons, the **Nonexclusives** can also be defined as Flattened Widgets. When defined in this way its children will not be treated as individual widgets. Use the Flattened Widget definition to improve overall performance.

Flat CheckBox

The **FlatCheckBox** widget is equivalent to a **NonExclusives** widget that is populated entirely by CheckBoxes. The advantages of using this flattened widget definition is that only a single widget is defined and that resource values of the container can be inherited by each of the sub-objects.

ScrolledWindow

The **ScrolledWindow** widget can be used as the basis for implementing a scrollable pane, for example, for a **TextEdit** widget. However, it has no innate text or graphics semantics; it must be combined with other widgets for this.

To use the **ScrolledWindow** you create a widget capable of displaying the entire Content as a child of the **ScrolledWindow** widget. The **ScrolledWindow** widget positions the child "within" the view of the Content and creates scroll bars for the horizontal and vertical overflow as needed.

Figure 15 illustrates a **ScrolledWindow** widget, showing the content (which does *not* appear on the screen) and the View of the Content (which does). The vertical and horizontal **ScrollBar** widgets are separately defined and are attached to the **ScrolledWindow** widget.

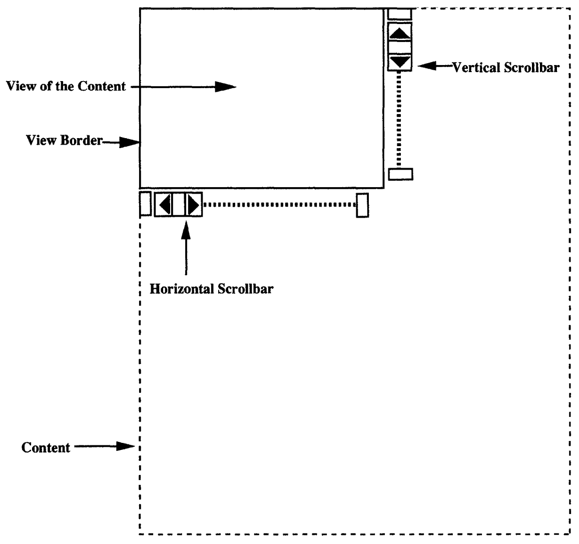


Figure 15. Scrolled Window Widget

ScrollingList

The **ScrollingList** widget is another kind of window pane, where the end-user manipulates the list with a **Scollbar**. The list consists of identifiable items; that is, there is a "current item" that the end-user selects that is highlighted in the pane. The list is completely under the control of the application. You can turn selected items into **Exclusives** or **NonExclusives**. You can define selected items to be editable text. You can add, change or delete items from the list. You use the callback routines to determine what action, if any, to take with the current item. Figure 16A illustrates common components of a "typical" **ScrollingList** widget and Figure 16B shows the same widget configured to add a new component to the List.

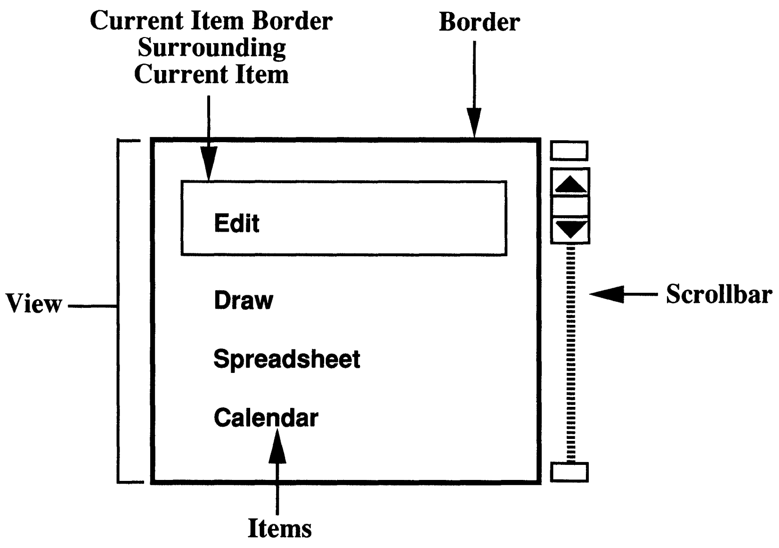


Figure 16A. Common ScrollingList Widget Components

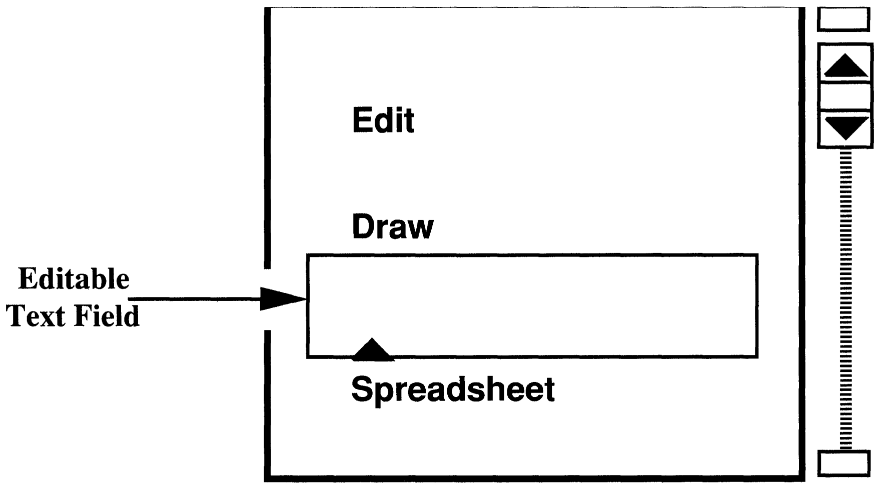


Figure 16B. Adding an Element to a ScrollingList

Attaching a Menu to a ScrollingList

A menu can be added to a `ScrollingList` Widget but it requires some work on the part of the application. The code required by the application to create a menu is shown below:

```
/* Create Menu */
cnt = 0;
XtSetArg(args[cnt], XtNmenuAugment, False); cnt++;
menu = XtCreatePopupShell("menu", menuShellWidgetClass, list_widget, args, cnt);

/* Add callback to catch MENU button */
XtAddCallback(list_widget, XtNconsumeEvent, PopupMenuCB, menu);

/* Get Menu Pane */
XtSetArg(args[0], XtNmenuPane, &menuPane);
XtGetValues(menu, args, 1);

/* Add buttons to menu pane */
cnt = 0;
XtSetArg(args[cnt], XtNaccelerator, "Ctrl<c>"); cnt++;
XtSetArg(args[cnt], XtNmnemonic, 'c'); cnt++;
```

```
    change = XtCreateManagedWidget("change", oblongButtonGadgetClass,
                                   menuPane, args, cnt);
    XtAddCallback(change, XtNselect, EditCB, NULL);

    cnt = 0;
    XtSetArg(args[cnt], XtNaccelerator, "Ctrl<d>"); cnt++;
    XtSetArg(args[cnt], XtNmnemonic, 'd'); cnt++;
    delete = XtCreateManagedWidget("delete", oblongButtonGadgetClass,
                                     menuPane, args, cnt);
    XtAddCallback(delete, XtNselect, DeleteCB, NULL);
}

static void
PopupMenuCB(w, closure, call_data)
    Widget      w;
    XtPointer   closure, call_data;
{
    OlVirtualEvent      ve = (OlVirtualEvent)call_data;
    Position            x, y;

        /* Use OlMenuPopup(w, state, setpos, x, y, pos_proc)   */
        /* to pop-up menu.  See manual page for more details. */

    switch(ve->virtual_name)
    {
    case OL_MENU :
        ve->consumed = True;
                /* Let Menu determine (x,y) */
        OlMenuPopup((Widget)closure, OL_PRESS_DRAG_MENU, False, 0, 0, NULL);
        break;

    case OL_MENUKEY :
        ve->consumed = True;
                /* calculate (x,y) here */
        ...
        OlMenuPopup((Widget)closure, OL_PRESS_DRAG_MENU, True, x, y, NULL);
        break;
    }
}
```

Popup Choices

Notice

The **Notice** widget implements a high-priority pop-up window. Once a **Notice** is popped up the end-user must respond to it before they can continue on in that application (though they can exercise other applications that may be sharing the screen). **Notices** are usually used for messages such as "Are you sure you want to do that?", coupled to Yes/No buttons (see Figure 17).

The **Notice** widget automatically handles the window-level creation and management. It also provides a text widget interface for registering the text to present to the end user and a control area widget for attaching the buttons the user needs to dispatch the **Notice**.

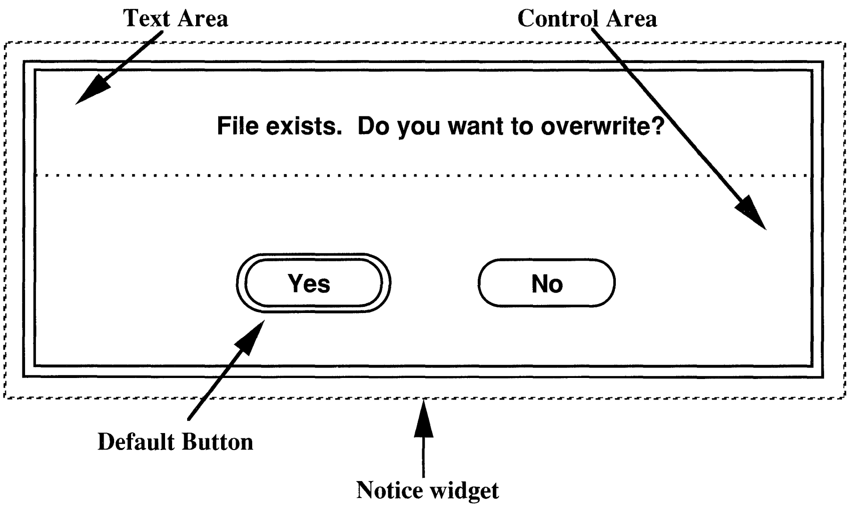


Figure 17. Notice Widget

PopupWindow

The **PopupWindow** widget is used to allow you to create Command and Property windows. A Command Window is a popup window that allows you to solicit parameters for a command. A Property Window is a popup window that is typically used to allow the end-user to specify overall properties of some aspect of an application. This widget handles the window-level creation and management, leaving the application to populate the interior of the window with controls. Figure 18 shows the various components of a **PopupWindow** widget.

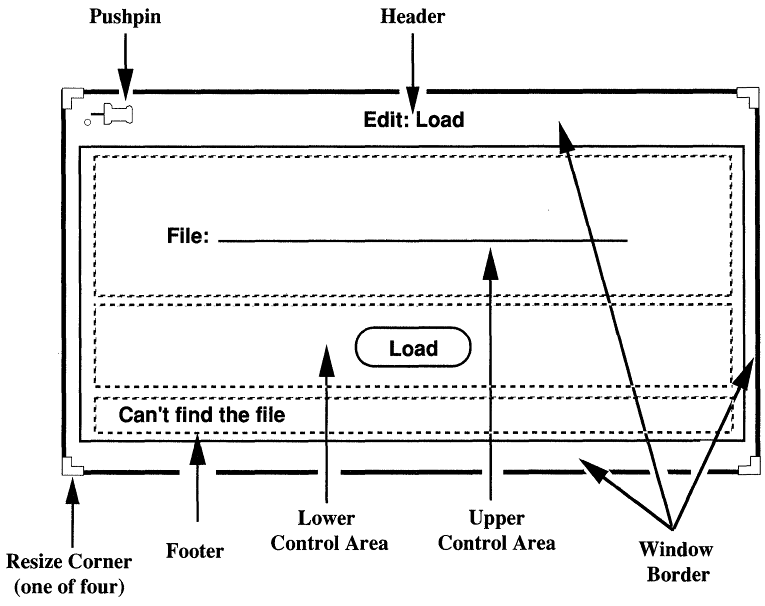


Figure 18. PopupWindow Widget

Menu

The **Menu** composite widget manages a set of widgets that comprise the items in the menu. It arranges for the proper response of the menu items to user-generated events like press or click SELECT as opposed to press or click MENU, and oversees the setting of new defaults by the end user. This widget also arranges to automatically "pop up" on the screen when the user presses or clicks MENU on the parent widget, by augmenting the way events are handled for its parent widget.

A **Menu** consists of a set of items presented to the end-user for selection. One of the items is always considered to be the Default item. **Menus** have a Title, a Separator, separating the title from the items, a Border and a Pushpin. The Pushpin is used by the end-user to control whether the menu stays up after it is used (if the Pushpin is set) or if it pops back down again. Figure 19 illustrates a typical **Menu** widget.

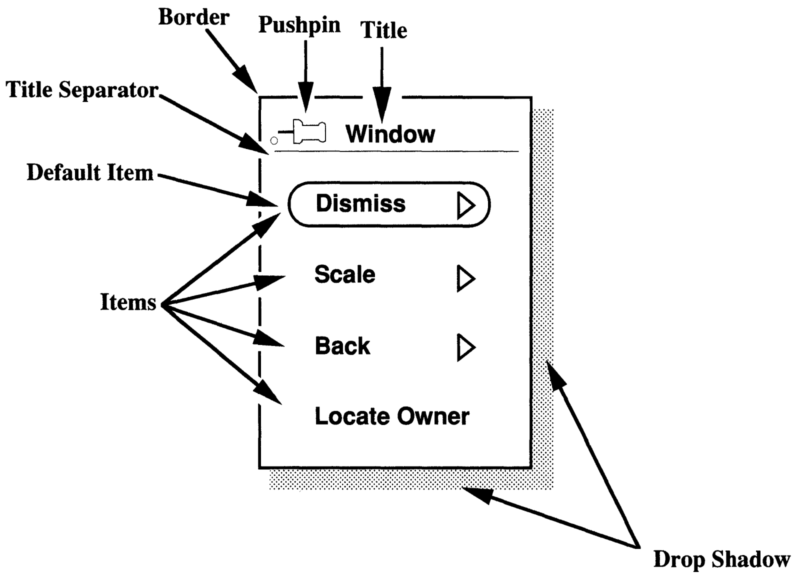


Figure 19. Menu Widget

OPEN LOOK Routines

In addition to a widget set, the OPEN LOOK toolkit provides a number of routines to support you in using the widgets and managing your application. The OPEN LOOK initialization routine is mandatory; the remainder provide additional control, flexibility and convenience in developing applications.

This section presents those routines; it simply presents the function name and describes its functionality. The reference manual describes its parameters and usage.

The first part of this section reviews those Xt Intrinsics routines that are necessary within the OPEN LOOK toolkit.

Necessary Xt Intrinsic Routines

This section presents a minimal set of Xt Intrinsic routines that are necessary to develop OPEN LOOK applications. There are a significant number of other routines that are essential for developing applications that create graphic images or sophisticated text, varying text fonts and sizes. These are not described here, though a few of them are used in the program "s_sampler" presented in Appendix A.

`XtSetArg`

Many intrinsic routines need to be passed pairs of resource names and values. These are passed as an argument list. This function specifies which pair in the list to set and what the name and value are.

`XtNumber`

This function is used to get the number of elements in a fixed array (such as the size of a resource table).

`XtCreateWidget`
`XtCreateManagedWidget`
`XtCreatePopupShell`

These are the functions used to create specific entities on the screen. The call gives the class of the widget (that is, the kind of widget), its label, and so on.

`XtDisplay`
`XtPopup`

These functions are used to control the display of widgets on the screen.

`XtDestroyWidget`

Used to destroy a temporarily created widget.

`XtAddCallback`

This function is used to register a callback routine with the intrinsics and to associate that callback with a specific widget.

`XtRealizeWidget`
`XtMainLoop`

These are generally the last two statements of your main program. All of the **`XtCreate. . .`** and **`XtSet. . .`** functions merely get the widgets ready. Nothing actually appears on the screen until the widgets are made real via the **`XtRealize`** widget function.

The last statement of your program is **`XtMainLoop`**. This turns control over to the X Window System to manage the end-user's interactions with the screen. The MainLoop manages interactions and dispatches your callback routines as requested by the end-user.

OPEN LOOK Initialization

The following routine **`must`** be used in an application in order for the application programmer's interface to function properly.

`OlInitialize`

This routine sets initial values needed by other routines and the widgets, and registers any resource converters used by the application programmer's interface.

Registering Help

`OlRegisterHelp`

This routine associates help information with either a specific widget, or a widget class.

You can supply specific Help text with the call; you can name a file containing the Help text; or you can specify an application defined routine that can implement a more elaborate help procedure.

Packed Widgets

`OlCreatePackedWidget`

This routine lets the application programmer create a related tree of widgets in a single call. Child-Parent relationships are handled automatically.

Error Handling Routines

```
OlError
OlWarning
OlVaDisplayErrorMsg
OlVaDisplayWarningMsg
OlSetErrorHandler
OlSetWarningHandler
OlSetVaDisplayErrorMsgHandler
OlSetVaDisplayWarningMsgHandler
```

NOTE See the `error`(3W) manual page in the "Manual Pages: Convenience Routines" appendix of this guide.

Because of the non-procedural aspects of "widget programming", there are no convenient error returns that an application can check. Currently, the default routines used are OlError and OlWarning. These print messages to the UNIX standard error channel to convey error conditions.

You can override the default messages by registering your own custom error messages. The `OlSet. . .` routines are used to do that.

The widgets attempt to continue running whenever they can. This allows you to discover multiple errors in a single run. They cannot recover from bad pointers, but when they encounter illegally set resource values, they use the default value and report on their actions. When unrecoverable errors occur, the widgets generate an error message and terminate the process.

Controlling Input Focus

These routines allow the application programmer to determine which widget is receiving input focus and which widget is next to receive input focus. The routines are:

```
OlCallAcceptFocus
OlGetCurrentFocusWidget
OlMoveFocus
OlCanAcceptFocus
OlSetInputFocus
OlHasFocus
```

The `OlHasFocus` routine returns true or false depending upon whether the designated widget currently has the input focus. The `OlCanAcceptFocus` determines whether a particular widget is able to be designated to get the input focus.

The `OlCallAcceptFocus` routine determines whether the widget can accept input focus and, if it can, moves the focus to it.

The `OlMoveFocus` routine shifts the focus to the next widget in a specified direction (current, next or previous).

NOTE Please see the `Input_Focus` manual page in the "Manual Pages: Convenience Routines" chapter of this guide.

Flat Widget Routines

These two routines are the equivalent of **`XtGetValues`** and **`XtSetValues`** for flattened widgets. The only distinction between the Xt routines and the Ol routines is that the index of the sub-object must be specified. These routines are illustrated in Chapter 3. The routines are:

```
OlFlatGetValues
OlFlatSetValues
OlVaFlatGetValues
OlVaFlatSetValues
OlFlatCallAcceptFocus
OlFlatGetFocusItem
OlFlatGetItemIndex
OlFlatGetItemGeometry
```

NOTE See the **`Flattened Widget Utilities`**(3W) manual page for more information.

Convenience Routines

The following routines are not a necessary functional part of the application programmer's interface, but they make it easier to get certain features:

```
OlMMToPixel
Ol_MMToPixel
OlPointToPixel
Ol_PointToPixel
OlScreenMMToPixel
Ol_ScreenMMToPixel
OlScreenPointToPixel
Ol_ScreenPointToPixel
OlPixelToMM
Ol_PixelToMM
OlPixelToPoint
Ol_PixelToPoint
OlScreenPixelToMM
Ol_ScreenPixelToMM
OlScreenPixelToPoint
Ol_ScreenPixelToPoint
```

The first set provides screen independence for sizing and layout of controls, giving conversions between millimeters and pixels, and points and pixels. The latter converts from virtual OPEN LOOK translations to standard X Toolkit Intrinsics translations.

Applications with Multiple Base Windows

Every application has a single base window, automatically created by the **OlInitialize** call that initializes the toolkit. If your application needs additional base windows, they are created with a call to **XtCreateApplicationShell**. The widget class pointers that can be used here are **transientShellWidgetClass** or **applicationShellWidgetClass**.

Text Selection Operations

The `StaticText`, `TextEdit`, and `TextField` widgets use the following operations to copy and move text.

Setting Insert Point

Clicking SELECT sets the insert point at the boundary between two characters or spaces nearest the pointer. This makes an inactive caret active and highlights the header of the main window (base window or pop-up window) containing the specific text widget, to show which window has the input focus. Any active selection on the screen is deselected.

Wipe-through Selection

Pressing and dragging SELECT marks the bounds of a new selection and highlights it, and deselects any other active selection on the screen. While SELECT is pressed, the active or inactive caret that marks the insert point is invisible, but when SELECT is released, the insert point is left at the position of the release. This does not make the insert point (caret) active if it isn't already active.

The selection starts with the character where SELECT is pressed and extends to the character where SELECT is released. If the pointer moves outside the widget and the widget can scroll in that direction (that is, there is a scrollbar for that direction), the widget scrolls additional text into the widget and adds it to the selection. The rate at which text scrolls into the widget is the same rate at which pressing SELECT on the arrows of the Scrollbar scrolls the widget.

Deletion of the new selection is pending: new text entered from the keyboard or pasted from the clipboard replaces the selection.

Adjusted Selection

Clicking SELECT, moving the pointer, and clicking ADJUST marks the bounds of a selection and highlights it. A subsequent click of ADJUST changes the end bound of the selection. The ADJUST may also follow a wipe-through selection. The selection starts with the character where SELECT was clicked and extends to the character where ADJUST is clicked. The insert point is moved to the position of the ADJUST. As above, deletion of the new selection is pending.

Multi-click Selection

Double-clicking SELECT selects the word nearest the pointer. In case of a tie, the word to the left is selected. Triple-clicking SELECT selects the entire line, and quadruple-clicking selects the entire content. The selection is highlighted and the insert point is left at the position of the multi-click.

NOTE Multi-Click Selection does not work with mouseless operations. Please see Chapter 7 in the *OPEN LOOK User's Guide* for more information about CUT, COPY, and PASTE using the keyboard.

Copying Text

Using COPY copies any selected text to the clipboard and deselects it.

Cutting Text

Using CUT moves any selected text to the clipboard and deletes it from the Input Field.

Pasting Text

After setting the insert point, using PASTE copies text from the clipboard as though it were typed in, leaving the insert point at the end of the pasted text. This will replace any text currently selected in the widget. Note that the data on the clipboard may have come from outside the Input Field, but it must be text. If the clipboard is empty, the system beeps.

Selecting Text with the Keyboard

The keyboard can be used to select and adjust text. The SELCHARFWD key adjusts the selection one character to the right of the insert point and moves the insert point one character to the right. The SELWORDFWD key adjusts the selection one word to the right of the insert point and moves the insert point to the end of the word. The SELLINEFWD key adjusts the selection from the insert point to the end of the line. The insert point moves to after the last character in the line but before the newline.

Similar keys adjust the selection backwards. The SELCHARBACK key adjusts the selection one character to the left of the insert point and moves the insert point one character to the left. The SELWORDBACK key adjusts the selection one word to the left of the insert point and moves the insert point to the beginning of the word. The SELLINEBACK key adjusts the selection from the insert point to the beginning of the line. The insert point moves to before the first character in the line.

The key SELLINE adjusts the selection to include the entire line in which the insert pointer is set. The insert pointer is positioned to the right of the last character in the line.

The SELFLIPENDS key moves the insert pointer from one end of the selection to the other without adjusting the selection.

3 Programming Using the OPEN LOOK Toolkit

Introduction

This chapter provides a practical introduction to how to develop programs using the OPEN LOOK Toolkit. It consists of five sections:

- How to Write OPEN LOOK programs
- Navigating Through the System
- Annotated Sample Programs
- Using Flattened Widgets
- Programming Caveats

The fundamental assumption of this chapter is that you are a competent C Programmer, though not necessarily familiar with programming for the X Window System or Object Oriented programming.

The "How to Write OPEN LOOK Programs" section offers a brief walk-through of the steps necessary to get started.

The section on "Navigating Through the System" simply lays out the necessary **`#include`** file structure and the library structure for using the OPEN LOOK Toolkit.

The "Annotated Sample Programs" and "Using Flattened Widgets" sections present several source programs of increasing complexity that create widgets and associated callback routines. The intent of this section is to provide coding models that you can use that will prove to be the base for your own use of the OPEN LOOK toolkit.

The final section "Programming Caveats" presents tips and warnings.

How to Write OPEN LOOK Programs

Object Oriented Programming

In order to read and write Object Oriented code effectively, you need to be aware both of the style requirements and the design requirements.

You will notice the programming style differences immediately upon looking at a listing of OPEN LOOK code: you will be hard pressed to find `int`s, or `long`s, or `char`s. In Object Oriented Programming things are distinct; a widget is a Widget; a display is a Display. It is probably a good idea (in general) to look through the include files and familiarize yourself with the style used to define and develop the components you work with. After a while the specific typing of objects will become familiar and you will get over the strangeness and appreciate the increased clarity.

The design requirements are critical. You will need to change how you think about your application. Object Oriented Programs are not sequential. They are not well-ordered. The program flow is not a function of the input data stream; rather, it is entirely a function of the end-user's choosing.

Object Oriented programs are usually "event driven." Control is given to a routine as a function of an event, usually associated with an action taken by the end-user. In the case of an OPEN LOOK application, the event is a combination of a particular mouse (or key) action on a particular screen widget. Usually, it is the selection of a particular option, though the end-user may have requested help on that widget, may have requested a menu, and so on. Routines are initiated as a combination of a specific action on a specific object.

You need to know that it might not be a sensible action; not necessarily the correct next-thing-to-do. And you need to program for that. You must also be aware that because the actions are essentially asynchronous, it may be very hard to determine when errors have occurred. You will have to think about debugging your application taking this form of flow and usage into consideration.

In another way, programming is actually much easier. The notion of object orientation gives rise to small, relatively stand-alone routines. They can be written and tested outside of the full application system.

In the simplest sense applications are divided into two distinct parts: laying out the screen and programming the proper response to specific events. The first part consists of creating widgets; the second part consists of programming callbacks. Laying out the screen is completely separate from developing the callback routines. A useful way to proceed is to write your program using dummy callbacks that do nothing but return. Once you are satisfied with the screen layout and have tested and debugged the screen management you can add the callbacks one at a time.

In the examples, the order of the code is:

- Include Files
- Necessary Global Data Definitions
- Callback Routines
- The Main Routine that Creates the Widgets
- Realizing the Widgets and Exiting to the Xt Main Loop

It was done this way for clarity of presentation. You should probably put the screen layout section in a separate routine and thereby keep the code that much cleaner. It also means that the exposition is a bit backwards; the event driven actions are described before the objects of the event are created.

Navigating Through the System

Include File Directories

The XWIN implementation of the OPEN LOOK Toolkit places all **#include** files and libraries in the following directories:

/usr/X/include/Xol	holds all include files for the OPEN LOOK widgets
/usr/X/include/X11	holds all include files for the X Toolkit Intrinsics
/usr/X/libl	holds all object libraries.

The names of the actual public and private include files for the OPEN LOOK widgets are listed at the end of this section.

Libraries

The names of the object libraries are:

```
Object libraries:
        /usr/X/lib/X11.a
        /usr/X/lib/libXt.a
        /usr/X/lib/libXol.a

Shared libraries:
        /usr/X/lib/X11.so
        /usr/X/lib/libXt.so
        /usr/X/lib/libXol.so
```

Compilation Command

The prototypical command for compiling an application built with the XWIN implementation of the OPEN LOOK GUI is the following for UNIX System V Release 4:

```
cc -I/usr/X/include -I/usr/X/include/Xol -I/usr/X/include/X11 -c ...

cc -o ... -L/usr/X/lib -lXol -lXt -lXmu -lX11 -lnsl -ldl -lw
```

NOTE

There is a dependency upon `libw -lw` from the MNLS package for Release 4. Compilation will not work for pre-Release 4 releases because there is no MNLS.

WARNING

For UNIX System V Release 4, it is necessary to set the following flags as part of the compilation line:

```
-DUSG -Datt -DSYSV
```

for Release 4 an additional flag must be added:

```
-DSVR4_0 -D__TIMEVAL__
```

Note that the order of linking the libraries is important.

Public and Private Include Files

Include file names are limited to ten characters. For private include files the character before the ".h" is always "P". The private files give you access to the internal widget class definitions used in the Toolkit. By having access to the underlying C structure definitions, you can extend the widget definitions and define customized, application-specific widgets.

In order to develop OPEN LOOK applications you need to include the appropriate widget class definition files and the basic Xt Intrinsics and OPEN LOOK files. The three fundamental files are:

```
/usr/X/include/X11/Intrinsic.h
/usr/X/include/X11/StringDefs.h
/usr/X/include/Xol/OpenLook.h
```

For the names of the OPEN LOOK GUI public and private include files, see the widget manual page in the "Manual Pages: Widgets" appendix of this guide. Include files are listed at the top of the page.

Annotated Sample Programs

This section presents and analyzes source code that makes use of the OPEN LOOK Toolkit. It includes three stand-alone programs, and four excerpts from a comprehensive example, **s_sampler**. In each of these examples, we specify where and how you can choose between defining an object as a widget and defining the same object as a gadget.

The three stand-alone programs describe the creation and use of:

- a button widget (named **s_button.c**)
- a composite widget (**s_composite.c**)
- and a menu widget (**s_menu.c**)

Chapter 6 contains of the code for **s_sampler**, that illustrates all of the objects in the OPEN LOOK toolkit. This chapter includes four excerpts from that example that describe the creation and use of:

- entering data using a textfield widget
- a slider widget
- using a stub widget for drawing
- and defining and placing objects on a form widget

Each program is preceded by a brief explanation. The source code then follows on the right-hand page with explanations of the source code appearing on the corresponding left-hand page.

The four stand-alone programs are also available on-line with OPEN LOOK. The programs are stored in the directory **/usr/X/lib/tutorial/Xol**. To compile one of these programs, such as **s_button.c**, enter that directory and execute the following commands for Release 4:

```
cc -I/usr/X/include -I/usr/X/include/Xol -I/usr/X/include/X11 -c s_button.c
cc -o s_button s_button.o /usr/X/lib/libXol.so /usr/X/lib/libXt.so
      /usr/X/lib/libX11.so -lnsl -lc
```

Creating a Button Widget

The first program introduced here is the easiest of the three programs. It creates a single Button, labeled **`Quit`**. When the end-user presses the button, the program terminates.

Program Description

Lines 1-4 include the header files required by this program. Every program that uses the OPEN LOOK interface requires the first two general header files, plus a specific header file (in this case, **OblongButt.h**) for each widget class used.

Lines 5-11 implement a callback function that is associated with the **OblongButton** widget (line 26) and is invoked when the user selects the oblong button. For consistency, all callback functions define the same set of parameters, even though, as in this example, they are not always used. This particular callback function simply causes the application program to exit. All cleanup of OPEN LOOK resources is handled automatically by the system and the associated screen image is deleted.

Lines 12-16 are the standard declarations for a C program and lines 17-19 declare the data objects used. The *args* array will be used to contain argument lists to widget creation functions (line 22). Its size is arbitrary, but should be large enough to hold the largest argument list used in the program and should allow for possible future growth of argument lists.

Line 20 initializes the system and creates a toplevel shell widget. This widget does not have a visible image on the screen. It serves as a root for the widget hierarchy about to be created.

Line 22 generates the argument list to be used in creating the **OblongButton** widget. The array *args* stores the argument list, which consists of name-value pairs. The variable *n* is used to count the number of arguments present. In this program, the name of the argument is **XtNlabel**, and its value is the string **Quit**. The syntax shown in these lines is a widely used standard for creating argument lists. In this example, all arguments other than the button label assume standard default values.

Lines 23-25 create the **OblongButton** widget, make it a child of the toplevel shell widget, and assign it to the widget variable **quitButton**.

Line 26 adds the callback function defined above to the (previously NULL) list of functions to be called whenever the **quitButton** widget is selected by the user.

Line 27 takes the widget hierarchy defined above, with toplevel as its root, and creates the associated windows and displays the image on the screen.

Line 28 invokes the main event loop, which processes events, such as user inputs through the mouse and keyboard, and invokes the appropriate callback functions.

```
#include <X11/Intrinsic.h>
#include <X11/StringDefs.h>
#include <Xol/OpenLook.h>
#include <Xol/OblongButt.h>

void
QuitCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
exit(0);
}


int
main(argc, argv)
int argc;
char **argv;
{

      Widget  toplevel, quitButton;
      Arg     args[10];
      int     n;

      toplevel = OlInitialize("top", "Top", NULL, 0, &argc, argv);

      n = 0;
      XtSetArg(args[n], XtNlabel, "Quit");            n++;

      quitButton = XtCreateManagedWidget(      "button",
                                  oblongButtonWidgetClass,
                                  toplevel, args, n);

      XtAddCallback(quitButton, XtNselect, QuitCallback, NULL);

      XtRealizeWidget(toplevel);
      XtMainLoop();
}
```

Creating a Composite Widget

This program is a relatively easy program, although it's slightly more complex than the previous **`Quit`** Button widget program. It introduces the composite **`ControlArea`** widget and puts two Button children in it. The commentary describes how to modify the program to use gadgets instead of widgets.

The first child Button is the **`Quit`** button from the previous program. The second child Button changes its label when pressed, demonstrating the use of **`XtSetValues`** on an existing widget.

Program Description

Lines 1-5 include the header files required by this program. This program uses two widget classes, oblong button and control area, and has a header file for each.

Lines 6-25 implement a callback function, which will be associated with the toggle button widget and will be invoked when the user selects the toggle button.

Lines 8-9 define the standard callback parameters, although only one of them (**`widget`**) will be used.

Line 11 declares an array that will contain an argument list (limited to 1 argument).

Lines 15-23 implement a switch statement that chooses a new label for the widget and updates the variable containing the toggle value based on the current value of the counter. A switch statement is used so that the program can be easily extended to cycle among more than the two states currently implemented.

Line 24 updates the label field of the specified widget based on the value set in the argument list in the switch statement above. The updated label is reflected in the screen image of the widget (in this example, the toggle button).

Lines 26-32 implement the same callback function described in the previous program.

```
#include <X11/Intrinsic.h>
#include <X11/StringDefs.h>
#include <Xol/OpenLook.h>
#include <Xol/OblongButt.h>
#include <Xol/ControlAre.h>


void
ToggleCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
     Arg     args[1];

     static int value = 1;
     int n;

     n = 0;

     switch (value) {
     case 1:
             XtSetArg(args[n], XtNlabel, "Two");      n++;
             value++;
             break;
     case 2:
             XtSetArg(args[n], XtNlabel, "One");      n++;
             value--;
     }
     XtSetValues (widget, args, n);
}

void
QuitCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
     exit(0);
}
```

Line 37 declares and names the widgets that are used in this application.

Line 40 initializes the OPEN LOOK Graphical User Interface and creates the **`toplevel`** shell widget.

Lines 41-46 create a control area widget as a child of the **`toplevel`** widget. The argument lists in lines 42 and 43 specify that child widgets placed in the control area will have a layout consisting of a fixed number of columns, and that the number of columns (**`XtNmeasure`**) will be 1. By default, the widgets placed in this column will have the same size.

Lines 47-52 create an oblong button widget (**`quitButton`**) as a child of the control area widget and add the **`QuitCallback`** function to the **`quitButton`** widget's list of callback functions. This is the same widget that was presented in the previous program example.

Lines 53-57 create a second oblong button widget (**`toggleButton`**) as a child of the control area widget and add the **`ToggleCallback`** function to **`toggleButton`**'s list of callback functions. Based on the definition of the control area widget above, this button will be placed under the **`quitButton`**, forming a single column, and both buttons will have the same size.

To transform the two button widgets into button **`gadgets`**, you simply change lines 50 and 56 to read "**`oblongButtonGadgetClass`**". This results in the buttons using the control area window and not needing the code required to maintain their own windows. This is more efficient in both time and space.

Line 59 takes the widget hierarchy defined above, with toplevel as its root, creates the associated windows, and displays the image on the screen.

Line 60 invokes the main event loop, which processes events, such as user inputs through the mouse and keyboard, and invokes the appropriate callback functions.

```
int main(argc, argv)
int argc;
char **argv;
{

     Widget  toplevel, control, toggleButton, quitButton;
     Arg     args[10];
     int     n;

     toplevel = OlInitialize("top", "Top", NULL, 0, &argc, argv);

     n = 0;
     XtSetArg(args[n], XtNlayoutType, OL_FIXEDCOLS);  n++;
     XtSetArg(args[n], XtNmeasure, 1);                n++;
     control = XtCreateManagedWidget( "control",
                                         controlAreaWidgetClass,
                                         toplevel, args, n);

     n = 0;
     XtSetArg(args[n], XtNlabel, "Quit");             n++;
     quitButton = XtCreateManagedWidget(     "qbutton",
                                 oblongButtonWidgetClass,
                                 control, args, n);

     XtAddCallback(quitButton, XtNselect, QuitCallback, NULL);

     n = 0;
     XtSetArg(args[n], XtNlabel, "One");              n++;
     toggleButton = XtCreateManagedWidget(   "tbutton",
                                 oblongButtonWidgetClass,
                                 control, args, n);

     XtAddCallback(toggleButton, XtNselect, ToggleCallback, NULL);

     XtRealizeWidget(toplevel);
     XtMainLoop();
}
```

Creating a Menu

This program creates an automatic popup widget, using the **MenuButton** widget. The menu has three children, one of which is the **Quit** Button used in the previous two programs. The two remaining children share the same two select and unselect callback functions, but pass different numbers to the functions.

Program Description

Lines 1-7 include the header files required by this program. This program uses four widget classes and contains a specific header file for each.

Lines 8-14 define the **QuitCallback** function from the previous examples.

Lines 15-21 define a callback function that will print a message to the client's standard out when it is invoked. This function is associated with the selection event of multiple widgets. The **clientData** parameter will contain a pointer to an integer value (typecast to **caddr_t**) identifying which widget invoked it.

Lines 22-28 define a callback function that is similar to the preceding function, except that it is associated with an *unselect* event, that is, the clearing of a previous selection.

```
#include <X11/Intrinsic.h>
#include <X11/StringDefs.h>
#include <Xol/OpenLook.h>
#include <Xol/MenuButton.h>
#include <Xol/Menu.h>
#include <Xol/Exclusives.h>
#include <Xol/RectButton.h>

void
QuitCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
     exit(0);
}

void
SelectCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
     printf("Button %d selected\n", *clientData);
}

void
UnselectCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
     printf("Button %d unselected\n", *clientData);
}
```

Lines 34-38 declare the widgets and the argument list for this application.

Line 39 initializes the OPEN LOOK Graphical User Interface and creates a top level shell widget called `toplevel`.

Lines 40-42 create a menuButton widget as a child of `toplevel`, and the menuButton widget creates a composite child widget where menu items can be attached.

Lines 43-45 obtain the widget ID of the menuButton's composite child widget and store this id into the **`menupane`** variable.

```
void
UnselectCallback(widget, clientData, callData)
Widget widget;
caddr_t clientData, callData;
{
      printf("Button %d unselected0, *clientData);
}

void
main(argc, argv)
int argc;
char **argv;
{
      Widget  toplevel,MenuButton;
      Widget  menupane,exclusives,button1,button2,button3;

      Arg args[10];
      int n;
      int n1, n2;

      toplevel = OlInitialize("top", "Top", NULL, 0, &argc, argv);


      MenuButton = XtCreateManagedWidget(      "MenuButton",
                                               MenuButtonWidgetClass,
                                               toplevel, NULL, 0);

      n = 0;
      XtSetArg(args[n], XtNmenuPane, &menupane);       n++;
      XtGetValues(MenuButton, args, n);
```

Lines 47-52 create an exclusives widget as a child of **menupane**. This exclusives widget will appear when the mouse menu button is clicked on the menuButton created above. The argument list specifies that child widgets placed in the control area will have a layout consisting of a fixed number of columns, and that the number of columns (**XtNmeasure**) will be 1.

Lines 53-68 create three rectangular button widgets as children of the exclusives widget. These rectButton widgets provide the user-selectable choices in the pop-up menu of the menuButton.

Lines 53-58 create a rectangular button with the label "ONE" and associate two callback functions with it. The first, **SelectCallback**, is invoked when the associated button is selected. The second, **UnselectCallback**, is invoked when the button is unselected, that is, the selection is cleared. Both functions are passed a value for the **callData** parameter that identifies the call as being associated with button 1.

Lines 59-64 are similar to lines 52-56, except the new rectangular button has the label "TWO," and its callback function is passed a value for **callData** identifying button 2.

Line 69 takes the widget hierarchy under **toplevel** and creates the associated windows and displays the image on the screen.

Line 70 begins the main event loop.

```
    n = 0;
    XtSetArg(args[n],XtNlayout, OL_FIXEDCOLS);      n++;
    XtSetArg(args[n],XtNmeasure, 1);        n++;
    XtSetArg(args[n],XtNrecomputeSize,(XtArgVal) TRUE);     n++;

    exclusives= XtCreateManagedWidget(      "exclusives",
                                            exclusivesWidgetClass,
                                            menupane,args,n);


    n1 = 1;
    button1 = XtCreateManagedWidget( "ONE",
                                            rectButtonWidgetClass,
                                            exclusives, NULL, 0);
    XtAddCallback(button1, XtNselect, SelectCallback, &n1);
    XtAddCallback(button1, XtNunselect, UnselectCallback, &n1);

    n2 = 2;
    button2 = XtCreateManagedWidget( "TWO",
                                            rectButtonWidgetClass,
                                            exclusives, NULL, 0);
    XtAddCallback(button2, XtNselect, SelectCallback, &n2);
    XtAddCallback(button2, XtNunselect, UnselectCallback, &n2);

    button3 = XtCreateManagedWidget( "EXIT",
                                            rectButtonWidgetClass,
                                            exclusives, NULL, 0);
    XtAddCallback(button3, XtNselect, QuitCallback, NULL);

    XtRealizeWidget(toplevel);
    XtMainLoop();

}
```

Excerpted Programming Examples from s_sampler

This section presents four code pieces selected from the comprehensive programming example, **`s_sampler`**, that appears in Chapter 6. The line numbers used in the excerpts match those in the appendix so that you can refer to the program as a whole.

The example in the appendix illustrates all widgets, gadgets, and flats that comprise the OPEN LOOK Toolkit. The code can be used as a model for developing OPEN LOOK applications. It is worth mentioning that, with a comment density in excess of 25%, the application sampler takes less than 2000 lines of code.

Entering Data

This section describes how to develop a textfield widget that permits the end-user to enter data. This may be the most common end-user operation and so is a critical example.

Lines 587 - 601 define the textfield widget callback routine. The callback routine is invoked whenever the end user *completes* the entry, which is indicated by pressing RETURN.

In this case, the callback simply outputs the text that was entered. The value here is to see how the text is referenced. In the same way, you can capture the text, convert it (in case it were numeric), and store it for use by other routines.

Lines 763 - 776 create the labeled data entry field. Defining the size and position of the field is done elsewhere in the example.

```
static void
textfieldCB(widget,clientData,callData)
    Widget widget;
    XtPointer clientData,callData;
{
    OlTextFieldVerify *tfv = (OlTextFieldVerify *) callData;
    char buf[MAXBUF];
    Arg arg;


    sprintf(buf,"Footerpanel: TEXTFIELD User Input: %s0,
            tfv->string);
    FooterMessage(footer_text,buf);

    XtSetArg(arg,XtNstring,(XtArgVal) "");
    XtSetValues(widget,&arg,1);
}

 . . .


/*
 * Make a caption as a label/prompt for the TEXTFIELD.
 */

    i=0;
    XtSetArg(arg[i],XtNlabel,
            (XtArgVal) "Textfield: type & type <return> :"); i++;
    widget = XtCreateManagedWidget("caption",
            captionWidgetClass,popupcall,arg,i);

    widget = XtCreateManagedWidget("textfield",
            textFieldWidgetClass,widget,NULL,0);

/*
 * Callback to "read" user input when <return> typed.
 */

    XtAddCallback(widget,XtNverification,textfieldCB,NULL);
```

Using a Slider Widget

This section describes how to develop and use a slider widget.

The use of the slider widget here is both simple and dramatic. The slider is calibrated to return an integer value over the range of colors for the hardware. This value is returned to the callback as "**callData**." It is used in the **XtSetValues** call to set the background color of a stub widget that had been defined to sit physically above the slider widget on the screen. The effect, therefore, is to change the color of the stub widget as the end-user moves the slider. The result is a pretty demonstration of the use of color in graphic applications.

Line 583 accesses the color value established by the slider. Lines 584 and 585 change the value of the background color resource.

Lines 1236 - 1263 define the resources for the slider and associate the callback with its movement.

The position of the slider on the form is defined elsewhere in the application.

```
574 static void
575 sliderCB(widget,clientData,callData)
576     Widget widget;
577     XtPointer clientData,callData;
578 {
579     Arg arg;

580 /*
581  * Slider returns current value.
582  */
583     arg.value = (XtArgVal) *callData;
584     XtSetArg(arg,XtNbackground,arg.value);
585     XtSetValues(stub,&arg,1);
586 }
```

```
    . . .

{
    Display *display = XtDisplay(toplevel);
    int screen = XDefaultScreen(display);
    int n, ncolors=2;
    Widget w;

    n= XDefaultDepth(display,screen);

    for(i=1; i<n; i++) {
            ncolors= ncolors*2;
    }

    ncolors = ncolors -1 ;

    i = 0;
    XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
    XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
    XtSetArg(arg[i],XtNlabel,(XtArgVal) "Slider"); i++;
    slider_caption = XtCreateManagedWidget("slider_caption",
            captionWidgetClass,form,arg,i);

    i = 0;
    XtSetArg(arg[i], XtNwidth, (XtArgVal) N200_H_PIXELS); i++;
    XtSetArg(arg[i],XtNorientation, (XtArgVal) OL_HORIZONTAL); i++;
    XtSetArg(arg[i],XtNsliderMax, (XtArgVal) ncolors); i++;
    XtSetArg(arg[i],XtNgranularity, (XtArgVal) 1); i++;
    XtSetArg(arg[i], XtNticks, (XtArgVal) 1); i++;
    XtSetArg(arg[i], XtNtickUnit, (XtArgVal) OL_SLIDERVALUE); i++;
    XtSetArg(arg[i], XtNdragCBType, (XtArgVal) OL_RELEASE); i++;
    w = XtCreateManagedWidget("slider",
            sliderWidgetClass,slider_caption,arg,i);
    XtAddCallback(w,XtNsliderMoved,sliderCB,NULL);
}
```

Defining and Using a Stub Widget

This section describes how to develop and use a stub widget.

The stub widget provides the application programmer with the flexibility of customizing a widget's visual appearance and semantics. In this application, selecting the caption button "RAINBOW" paints the stub widget window by calling the function, **DrawAndPrint**. The stub widget itself refreshes the current contents of its window when necessary. Lines 1017-1034 illustrate the creation of the stub widget. Line 1027 registers the function **DrawAndPrint**, to repaint the widget when it is exposed. Lines 1033-1034 add an event handler to monitor the pointer entering and leaving the widget's window. Lines 345-365 present the function, **StubEventHandler**. The stub widget also has its own cursor, which is set with the function, **SetStubCursor** in lines 331-341. Other related sections of code are **DrawAndPrint** (lines 143-223) and **GetColors** (lines 238-276). Please see Chapter 6.

```
1017 /*
1018  * First two arguments scale widget to resolution of screen.
1019  */

1020     i = 0;
1021     XtSetArg(arg[i],XtNheight,(XtArgVal) N100_V_PIXELS); i++;
1022     XtSetArg(arg[i],XtNwidth,(XtArgVal) N100_H_PIXELS); i++;
1023     XtSetArg(arg[i],XtNbackground, skyblue_pixel); i++;
1024 /*
1025  * DrawAndPrint() will be called with an Expose event;
1026  */
1027     XtSetArg(arg[i],XtNexpose, DrawAndPrint); i++;
1028     stub = XtCreateManagedWidget("stub",stubWidgetClass,form,arg,i);

1029 /*
1030  * Add an eventhandler to track when the pointer
1031  * enters and leaves the stub widget window.
1032  */
1033     XtAddEventHandler(stub,EnterWindowMask | LeaveWindowMask,
1034             FALSE, StubEventHandler, (XtPointer)NULL);
```

```
static void
StubEventHandler(widget,clientData,event)
    Widget widget;
    XtPointer clientData;
    XEvent *event;
{
    XCrossingEvent *xce;

/*
 * The xce pointer allows referencing to event specifics - see Xlib.h
 */

    if(event->type==EnterNotify || event->type==LeaveNotify)
            xce = (XCrossingEvent *) &(event->xcrossing);
    else
            return;

    if(event->type ==EnterNotify)
            FooterMessage(footer_text,
                    "Footerpanel: Pointer entered STUB widget");
    else
            FooterMessage(footer_text,
                    "Footerpanel: Pointer left STUB widget");
}

  . . .
static void
SetStubCursor(widget)
    Widget widget;
{
    static Cursor cursor;

/*
 * See OlCorsor.c for other cursor possibilities.
 */

    cursor = GetOlQuestionCursor(XtScreen(widget));
    XDefineCursor(XtDisplay(widget),XtWindow(widget),cursor);
}
```

Using a Form Widget

This last example shows how to create a form widget and how to position other widgets on the form. The form is a useful "backdrop" widget; it provides an empty area on which to position other widgets.

Lines 110 - 117 define some of the constraint resources used to position widgets on the form. These resources are specified for each widget and are later used to support positioning the widgets relative to each other. Both **XtNxOffset** and **XtNyOffset** are defined later in the application as a specific number of pixels. The **XtNxOffset** indicates that a child widget will be positioned a specific number of pixels to the right of a reference widget, defined by **XtNxRefName**. The **XtNyOffset** indicates that a child widget will be positioned a specific number of pixels below a reference widget, defined by **XtNyRefName**.

While **XtNxRefWidget** and **XtNyRefWidget** are also form constraint resources, **XtNxRefName** and **XtNyRefName** are used since they allow specifying the relative positions of widgets before any of the widgets are created.

The **XtNxAddWidth** and **XtNyAddHeight** resources determine whether the reference widget's width or height, that is, **XtNxRefWidget**'s width or **XtNyRefWidget**'s height, should be added to the offset.

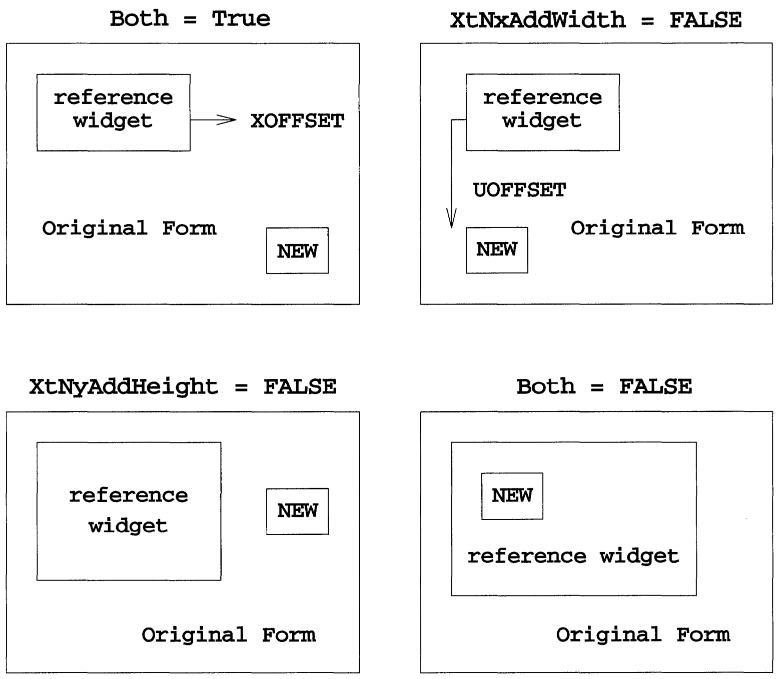
```
   . . .

110 static Arg genericARGS[] = {

111      { XtNxRefName, NULL },
112      { XtNyRefName, NULL },
113      { XtNxOffset,(XtArgVal) 0 },     /* to be initialized below */
114      { XtNyOffset,(XtArgVal) 0 },     /* to be initialized below */
115      { XtNxAddWidth,(XtArgVal) TRUE },
116      { XtNyAddHeight,(XtArgVal) TRUE },
117 };

   . . .
```

The **SetPosition** routine sets the resource values in the current widget that will be used by the Form widget to place the current widget relative to other widgets already placed on the Form. The way to read the definition of **SetPosition** is "position **widget** with its upper left hand corner to the right of the upper left hand corner of **xwidget** and below the upper left hand corner of **ywidget**." How much to the right is determined by **XtNxOffset** (perhaps plus **xwidget**'s width) and how much below is determined by **XtNyOffset** (perhaps plus **ywidget**'s height). The figure below illustrates the effects of the **XtNxAddWidth** and **XtNyAddHeight** resources on placing **NEW** widget when both **xwidget** and **ywidget** are the same reference widget:



Lines 1470-1473 position the stub on left of the form below the caption.

```
 287 static void
 288 SetPosition(widget, xwidget, ywidget)
 289 Widget widget;
 290 char *xwidget, *ywidget;
 291 {
 292    static int nargs;

 293    if(nargs == 0)
 294            nargs = XtNumber(genericARGS);

   . . .

1470    genericARGS[2].value = (XtArgVal) N10_H_PIXELS;
1471    genericARGS[3].value = (XtArgVal) N10_V_PIXELS;

1472    SetPosition(caption,"form","ca_caption");
1473    SetPosition(stub,"form","caption");
```

Using Flattened Widgets

This section presents pieces of code that will serve as examples of how to set-up, create and use Flattened Widgets.

Specifying the Container Setting

The following code fragment illustrates how to create a flat exclusives widget setting.

In this example, each of the button sub-objects has the same client data ("**`test case`**") for the select callback procedure. Because of this, the **`XtNclientData`** resource can be specified for the container only. This allows each sub-object to inherit this value. If each sub-object wanted a different client data, the **`XtNclientData`** resource would be added to the other sub-object resources. This would automatically disable the inheriting of the container's client data value.

To improve the readability of this example, required type casts of the fields in the FlatExclusives structure initialization have been deliberately omitted.

```
                    /* Application Defined Structure */

typedef struct {
        XtArgVal label;          /* pointer to a string */
} FlatExclusives;
```

NOTE

Notice that all the fields in the application-defined structure, FlatExclusives, have the type **`XtArgVal`**. An alternate form for specifying the **`FlatExclusives`** type is:

```
        typedef XtArgVal FlatExclusives[#];
```

where '#' is the number fields per record.

```
String
exc_fields[] = { XtNlabel };

static void
cb()
{ /* This is the callback procedure...
                something interesting should go in here */ }

CreateObjects(parent)
     Widget      parent;
{
     Arg              args[6];
     static FlatExclusives exc_items[] = { /* label for each button */
               { "Choice 1" },
               { "Choice 2" },
               { "Choice 3" }
     };

     XtSetArg(args[0], XtNitems,         exc_items);
     XtSetArg(args[1], XtNnumItems,      XtNumber(exc_items));
     XtSetArg(args[2], XtNitemFields,    exc_fields);
     XtSetArg(args[3], XtNnumItemFields, XtNumber(exc_fields));
     XtSetArg(args[4], XtNselectProc,    cb,);
     XtSetArg(args[5], XtNclientData,    "test case");

     XtCreateManagedWidget("exclusives", flatExclusivesWidgetClass,
                                  parent, args, 6);
} /* END OF CreateObjects() */
```

Callbacks and Flat Widgets

There are two differences in the way callbacks are handled for flat widgets as opposed to traditional widgets. The first difference is that sub-objects do not use **XtCallback** lists; instead, they use a single **XtCallbackProc** procedure.

Secondly, since the sub-objects of flattened widget containers are not true widget instances, the *widget* argument supplied to an application's callback procedure indicates the flat container widget that is ultimately responsible for managing the sub-object. For example, the **flatExclusivesWidget** id would be supplied as the widget id to the callback procedure for all sub-objects within the flat exclusives container. By maintaining this rule, the application always has the correct widget handy in the event that the application wishes to modify the item or its list from within the callback procedure.

The value of the **XtNclientData** resource is supplied as the *client_data* field to the callback procedure.

The *call_data* field is a pointer to a structure that the application can use to determine information about the sub-object associated with the current callback. The new structure is as follows:

```
typedef struct {
     Cardinal    item_index;      /* sub-object initiating callback */
     XtPointer   items;           /* Sub-object list head           */
     Cardinal    num_items;       /* number of items                */
     String *    item_fields;     /* key of fields for list         */
     Cardinal    num_item_fields; /* number of fields per item      */
} OlFlatCallData;
```

where:

item_index	The index of the item (that is, the specific sub-object) responsible for initiating this invocation of the callback.
items	The head of item list that contains the sub-object initiating the callback
num_items	The total number of items in the sub-object list
item_fields	The list of resource names used to parse the records in the sub-objects list.
num_item_fields	The number of resource names contained in *item_fields*.

Setting the State of a Sub-Object

The application can use two methods to change the state of an item: use the **OlFlatSetValues** procedure to modify one or more attributes of a sub-object, or directly modify the item list that the container and the application share.

The first approach is very similar to doing an **XtSetValues** request on a widget, except that the **OlFlatSetValues** routine requires the item index as well as the widget id, args and num_args. The routine is defined as:

```
OlFlatSetValues(widget, item_index, args, num_args)
        Widget      widget;       /* flat widget id          */
        Cardinal    item_index;   /* item to modify          */
        ArgList     args;         /* new resources           */
        Cardinal    num_args;     /* number of new resources */
```

The following code example uses this routine and illustrates how to change an item's label from within a callback procedure. The example assumes the new label was specified as the client data.

```
Callback(widget, client_data, call_data)
        Widget    widget;       /* FlatExclusives Widget id        */
        caddr_t   client_data;  /* the new static label            */
        caddr_t   call_data;    /* OlFlatCallData structure pointer */
{
        OlFlatCallData * fcp = (OlFlatCallData *)call_data;
        Arg              args[1];


                         /* Set the label to be the new one passed in
                          * with the client data field.           */

        XtSetArg(args[0], XtNlabel, client_data);

        OlFlatSetValues(widget, fcp->item_index, args, 1);

} /* END OF Callback() */
```

Notice that the callback procedure did not have to know the number or the order of the item fields. The only requirement was that the **XtNlabel** resource is among the application-specified item fields, because if it were not, the above request would be ignored.

If the application does not use the above approach and modifies the item list directly, the application must ensure that all items within the list have valid states, since the container literally treats this type of modification as if the container were given a new list. For example, if an application wished to change a currently-set exclusive item, the application would have to unset the currently-set item and set the new item. If the application only set the new item, the container would generate a warning since the item list contains more than one set item.

The following example shows how a callback procedure changes the set item by modifying the item list. This example makes the first item be the set item whenever the last item is selected. Notice that once the list has been touched, the application must 'inform' the container of the modification. Also notice that in this example the callback needs to know the *structure* of the application to directly change its contents.

```
        /* Application Defined Structure from previous example    */

typedef struct {
        XtArgVal label;        /* pointer to a string            */
        XtArgVal select_proc;  /* pointer to a callback procedure */
        XtArgVal set;          /* this item is currently set      */
        XtArgVal sensitive;    /* this item is sensitive          */
} FlatExclusives;

Callback(widget, client_data, call_data)
        Widget     widget;         /* FlatExclusives Widget id     */
        XtPointer   client_data; /* application's client data    */
        XtPointer   call_data;   /* OlFlatCallData structure pointer */
{
        OlFlatCallData *  fcp = (OlFlatCallData *) call_data;

        if (fcp->num_items == (fcp->item_index + 1))
        {
                FlatExclusives *  fexc_items = (FlatExclusives *) fcp->items;
                Arg               args[1];
                                              /* Unset this item and
                                               * set the first one     */
                fexc_items[fcp->item_index].set = FALSE;
                fexc_items[0].set              = TRUE;
                                      /* Inform the container that the list
                                       * was modified                  */
                XtSetArg(args[0], XtNitemsTouched, TRUE);
                XtSetValues(widget, args, 1);
        }
} /* END OF Callback() */
```

Getting the State of a Sub-Object

Obtaining the state of a sub-object can also be achieved in two ways. The first is by using the **OlFlatGetValues** routine, specifying the index of the item to be queried.

```
OlFlatGetValues(widget, item_index, args, num_args)
    Widget      widget;       /* flat widget id           */
    Cardinal    item_index;   /* item to query            */
    ArgList     args;         /* query resources          */
    Cardinal    num_args;     /* number of query resources */
```

If this approach is used, the application can query any sub-object resource even though it does not appear in the item fields. Take the initial example for instance, the application can query the **XtNfontColor** resource from any sub-object even though it does not appear in the FlatExclusives structure.

The second method for getting the state of a sub-object is by looking directly into the sub-object list since both the application and flat container share the same instance of the sub-object description.

Obtaining Help on a Sub-Object

The application can specify a unique help message for each sub-object in a similar fashion as help is registered for widgets, that is, through the **OlRegisterHelp** routine. Since sub-objects are not real widgets, but are extensions of the flat widget container, the help registration routine has a complex id:

```
typedef struct {
    Widget   widget;       /* Flat Widget id          */
    Cardinal item_index;   /* item to register help on */
} OlFlatHelpId;
```

The following example registers help on the eighth sub-object in the flat widget:

```
static String   tag = "Item 8";
static String   source = "Item 8's help";
OlFlatHelpId    help_id;

help_id.widget     = flat_widget;
help_id.item_index = 7;

OlRegisterHelp(OL_FLAT_HELP, (XtPointer) &help_id,
      tag, OL_STRING_SOURCE, source);
```

Programming Caveats

Naming Conventions

This may belabor the obvious - but you must pay attention to the naming conventions or you will quickly get lost inside your own code.

Notice that each of the examples related the callback name to the widget name in an organized way. You will find it pays dividends to establish those kinds of conventions for yourself. For example, if you define a Quit OblongButton widget, you may find it useful to define the callback routine "QuitCallback" or "QuitCB".

Macro Alerts

Do not use auto-increment or auto-decrement in any intrinsic or OPEN LOOK function calls.

For example, use

```
XtSetArg(arg[i],....);  i++;
```

rather than

```
XtSetArg(arg[i++],...);
```

Callback Restrictions

Be careful not to use a "long jump" (**setjmp(3C)**) within a callback function. A long jump is used to bypass the normal function return structure (usually when an error condition occurs). This will not work from callbacks. The widget requires a return from the callback to complete updates to internal state tables, and using a "long jump" skips this return, causing the widget to have incorrect state information. This, in turn, causes incorrect visuals or program failures.

Global Name Space Restrictions

The OPEN LOOK widget library uses a particular convention when naming external C procedures, variables, and structure. It will always begin with "Ol" and may be optionally preceded by an underscore "_ ." Similarly, preprocessor symbols (#define's) will begin with "Ol" or "OL" and may be optionally preceded by an underscore. The global name space is therefore restricted in this way and you should not choose external names which begin with these prefixes.

Debugging Hints

Use the *OPEN LOOK® Graphical User Interface Style Guide*. The cleaner and more user-oriented the screen layout is, the easier it will be to debug.

You can consider developing applications in one of these ways:

- One Object at a Time

  First place the object, then check out the callback routine. The advantage of this is that it is very simple; one step at a time. The difficulty is that often one callback is really a function of other on-screen activities.

- Place All Objects

  First, place all objects on the screen, then debug the callbacks. The advantage of this approach is that placement and callback functions are easily separable functions and that placement is often a developmental checkpoint. Also, the end-user interface is both logically and functionally distinct from the actual application.

- One Grouping at a Time

  Develop a composite and all its constituents, including placement and callbacks. The advantage of this is that it often corresponds to a functional module of the application and, therefore, resembles the "traditional" style of modular development.

In any case, creating a modular development style is probably the single most valuable aid to program debugging.

4 X Window System, Version 11, Conventions for OPEN LOOK

Introduction

The OPEN LOOK graphical user interface specifies the behavior and appearance of the entire system. The X Window System, version 11 (X11) is composed of a server and several clients. Some clients are dedicated to performing particular tasks, such as window management, while others are application programs. Therefore, the responsibility for implementing OPEN LOOK under X11 must be shared among several different clients. This chapter specifies how X11 clients must cooperate in order to implement OPEN LOOK.

The X11 protocol was designed using the principle of mechanism, not policy. The protocol provides only the tools with which to build an environment, but it doesn't determine how these tools are to be used. If there were no policy governing the use of the X11 protocol, applications that worked correctly in isolation may fail to work when they share an environment with other applications. Therefore, conventions are necessary so that applications can coexist and interoperate. The standard conventions are described in the *X11 Inter-Client Communication Conventions Manual* (ICCCM). All X11 clients are required to conform to these conventions in order to guarantee interoperability.

An OPEN LOOK environment requires the existence of an additional set of conventions beyond those described in the ICCCM. The purpose of this chapter, then, is to detail the conventions necessary to guarantee that OPEN LOOK applications written by different vendors, using different toolkits and languages, will interoperate. This is a private set of conventions that must be supported only by OPEN LOOK applications. OPEN LOOK applications must support the conventions of the ICCCM as well as those outlined in this chapter.

General Considerations

Methods of Communication

The X11 protocol provides two principal means by which clients can communicate with each other: properties and events. Both mechanisms are described in the X11 protocol as having uninterpreted data, that is, data that is transmitted along with but not interpreted by the protocol. Clients use the uninterpreted data fields in properties and events to communicate amongst themselves.

Properties

Properties are uninterpreted data that are named, typed, and associated with a window. Properties are thus useful for storing pieces of a window's state. For communication between an application and a window manager, the properties will be placed on the application's top-level window(s). Unless otherwise specified, all properties will have format 32. This is necessary in order to avoid byte-order and structure-packing problems.

In X11, any client can write to any property. However, multiple clients writing to the same property raises the possibility of race conditions. Therefore, this chapter will usually designate a client that is the owner of each property. Only the owner of a property will be allowed to write to it.

Events

Events are typically generated by the server to notify a client that user input has occurred. However, there is a facility whereby clients may generate events and cause them to be sent to other clients. Events generated in this manner are called synthetic events because they were synthesized by a client, not necessarily in response to any real user action.

A special type of event called a Client Message is never created by the server; it can be synthesized only by a client. Client Messages have enough room for a small amount of uninterpreted data and are thus useful for sending datagram-like messages between clients. Client Messages are typically used for notification that an event has occurred; they are not used to transmit state information.

Restrictions

The rules for using properties and Client Messages as described in this chapter define a mini-protocol that exists entirely within the X11 protocol. When trying to communicate with other clients, any client can assume that all other clients understand the X11 protocol. However, OPEN LOOK clients cannot assume that other clients will understand the OPEN LOOK mini-protocol. OPEN LOOK clients must be prepared to deal with this situation. This principle has been embedded into the design of the mini-protocol by allowing the mini-protocol to fail gracefully if one of the communicating parties doesn't understand it.

This case may arise if an OPEN LOOK window manager is managing a non-OPEN LOOK application, or if an OPEN LOOK application is being managed by a non-OPEN LOOK window manager. OPEN LOOK applications must be able to operate (perhaps with reduced, but acceptable functionality) without the presence of an OPEN LOOK window manager. By the same token, an OPEN LOOK window manager must not depend on all of its applications implementing this protocol. This restriction precludes a style of transaction where, for example, an application sends a message to the window manager and waits for a reply. If the window manager doesn't implement the OPEN LOOK Interface, the application will never receive this reply. The transactions under this protocol must be completely asynchronous.

Nomenclature

All properties and Client Message types are named by X11 atoms. The X11 Protocol document (*X Windows System Protocol*, Release 4, *Predefined Atoms*) states that atom names private to a particular vendor or organization should have unique prefixes that begin with an underscore ("_"). Using the prefix `_OPEN_LOOK_` is the obvious choice, but it makes all of the atoms too long. Therefore, all atoms unique to the OPEN LOOK interface are prefixed with `_OL_`.

Several terms in this chapter are used in specific ways that don't necessarily correspond to usage elsewhere. A *manager* is a dedicated client that manages a shared resource. Typically there should be exactly one manager of each type. In this chapter, the term *client* typically means any ordinary client that is not a manager. Each client is further divided into two parts, the *toolkit* and the *application*.

The terms *window manager* and *session manager* are used as defined in the ICCCM. (Note that the window and session managers might be two separate clients or merged into a single client.) A *workspace manager* is OPEN LOOK usage, and is equivalent to a session manager. The *file manager* is an OPEN LOOK-specific application that provides a graphic view of the file system.

Protocol Notes

Extensibility

This protocol is designed for extensibility. Atoms are used in fields wherever possible so that the range of values is not limited. Lists of atoms are preferred to bitmasks for specifying options. The **_OL_PROTOCOLS** property is a list of atoms that indicates which sub-protocols the client supports. This list is extensible.

Efficiency

Each X11 protocol request can update only one property at a time. Furthermore, each time a property is changed, the server generates a PropertyNotify event. As more properties are added, correspondingly more requests are required to update them and more events are generated. Therefore, adding a new property to the conventions is a very expensive step. If additional data is necessary, it should be added to existing properties (in an upwardly-compatible way) in preference to adding new properties.

Property Notation

The **Name**, **Type**, and **Format** headings are self-explanatory. The **Owner** heading indicates which party is responsible for maintaining the contents of the property. The **Reader** heading indicates who is responsible for reading and acting on the property. The **Effect** heading indicates when changes to this property take effect. Typical values are *immediate,* which means that the reader should track changes at all times; and *exit Withdrawn,* which means that the window manager reads the property only when the window leaves the Withdrawn state.

The names of fields within the property are used only for reference purposes within this chapter. They have no relevance to the X11 protocol. The **Default** for a particular field indicates what the reader should assume if the field isn't present or if the entire property is absent.

Window Properties

Window Decorations

These properties are used to communicate between clients and the window manager about how the clients' top-level windows should be decorated. In addition, the window manager sets some properties to inform the client of certain pieces of state, such as the pushpin, that are under the user's control. OPEN LOOK currently specifies that there be no window background next to a scroll bar, if the application has one. There currently is no method for a client to tell a window manager where its scroll bar is.

NOTE See the discussion on the OPEN LOOK VendorShell in *Appendix A: Introduction to General Resources* for more convenient ways of accessing window properties.

Standard Decorations

The client sets **_OL_WIN_ATTR** property on each top-level window to tell the window manager the window's type, along with other decoration options.

_OL_WIN_ATTR			
Type:	_OL_WIN_ATTR	**Owner:**	client
Format:	32	**Reader:**	window manager
Length:	5	**Effect:**	immediate

Field	Type	Value	Default	Description
flags	CARD32	1 = win_type 2 = menu_type 4 = pin_state 8 = cancel	—	this is a bitmask that indicates which fields are present.
win_type	XA_ATOM	_OL_WT_BASE _OL_WT_CMD _OL_WT_HELP _OL_WT_NOTICE _OL_WT_OTHER	_OL_WT_BASE	base window command window help window notice window[1] client-specified[2]
menu_type	XA_ATOM	_OL_MENU_FULL _OL_MENU_LIMITED _OL_NONE	[3]	full menu limited menu no menu
pin_state	CARD32	0 1	0	pin is out pin is in
cancel	CARD32	0 1	0	dismiss cancel

[1] This protocol allows the window manager to support notice frames as ordinary windows. Toolkits aren't required to use window manager windows for their notices. For example, a toolkit might choose to implement notices by grabbing the server and mapping an override-redirect window. The window manager doesn't have to know about these at all.

[2] If the *win_type* field contains **_OL_WT_OTHER**, the window manager will provide no decorations by default. The application can add decorations as it wishes by specifying them in the **_OL_DECOR_ADD** property (see below).

[3] The default menu type is implied by the window type. For base windows, the default menu is a full menu. For pop-ups, the default is a limited menu. For **_OL_WT_OTHER**, the default is no menu at all.

The following table indicates the default decorations that occur on a window depending on its type.

window type	header	close	pin	resize	menu
_OL_WT_BASE	X	X		X	Full
_OL_WT_CMD	X		X	X	Limited
_OL_WT_NOTICE					None
_OL_WT_HELP	X		X		Limited
_OL_WT_OTHER					None

An "X" indicates the presence of the decoration;
no "X" indicates its absence.

A full menu contains the following entries: Close, Full Size, Properties, Back, Refresh, Move, Resize, and Quit. A limited menu contains the following entries: Dismiss/Cancel, Back, Refresh, Move, Resize, and Owner?. The Dismiss menu item changes to Cancel if the client has requested it in the *cancel* field.

Clients should take care not to make gross changes to decorations while the window is mapped, such as changing a base window into a notice, because this would result in flickering that users would likely find objectionable. If a client really needs to reuse a window for a different purpose, it should unmap the window, make the changes, and then remap the window.

Customizing Decorations

There are certain cases where the client requires different decorations from those provided by default. To add or delete decorations from the default set provided for a window, the client can create one or both of the **_OL_DECOR_ADD** and **_OL_DECOR_DEL** properties. The type of each property should be ATOM. Each property is a variable-length list of atoms that indicates which decorations should be added to (in the case of **_OL_DECOR_ADD**) or deleted from (**_OL_DECOR_DEL**) the default set of decorations on this window.

For example, resize corners are present by default on most windows. An application could request that a window not be resizable by putting the **_OL_DECOR_RESIZE** atom in the **_OL_DECOR_DEL** property on that window.

NOTE

You must use the Xlib function, `XChangeProperty`, in order to place a property on a window and to change the value of a property on a window.

_OL_DECOR_ADD and **_OL_DECOR_DEL**

Type:	ATOM	**Owner:**	client
Format:	32	**Reader:**	window manager
Length:	variable	**Effect:**	immediate

Atom	Description
_OL_DECOR_CLOSE	close box
_OL_DECOR_RESIZE	resize corners
_OL_DECOR_HEADER	window header
_OL_DECOR_PIN	pushpin

The preferred implementation of footers is for the client to manage the footer itself. A typical implementation of a window footer would make it be a small pane at the very bottom of a stack of panes inside the client's top-level window. The advantage of this method is that it allows the client maximum flexibility in managing the footer. For example, the client could make the footer scrollable or be several lines high.

Clients that implement footers should take care not to select input on any of the mouse buttons in this window, because this area is logically part of the window background. Mouse events should be allowed to fall through to be handled by the window manager.

In certain cases, the application may wish to specify exactly what decorations occur on a window. To do this, it would specify a window type of **_OL_WT_OTHER** in the *win_type* field of the **_OL_WIN_ATTR** property, and put the appropriate decoration atoms in the **_OL_DECOR_ADD** property.

If the application puts the same atom into both the **_OL_DECOR_ADD** and **_OL_DECOR_DEL** properties, the behavior is undefined. The behavior is also undefined if the application requests a combination of decorations that doesn't make sense, such as a closed box and a pushpin.

The Pin State

If the current window has a pushpin, the window manager will create and maintain the property called **_OL_PIN_STATE**. The window manager is responsible for updating this property to reflect the state of the pin whenever the user changes it. The initial contents of this property are taken from **_OL_WIN_ATTR**.*pin_state*, if it exists.

_OL_PIN_STATE			
Type:	INTEGER	**Owner:**	window manager
Format:	32	**Reader:**	client
Length:	1	**Effect:**	immediate
Value		Description	
0		pin is out	
1		pin is in	

The client should inspect the state of the pin whenever the user clicks in a button on a pop-up window. If the window is not pinned, the client should withdraw the window after completing the function successfully. The client doesn't have to withdraw the window if the operation wasn't successful. The client should not inspect the state of the pin upon receipt of **WM_DELETE_WINDOW**.

The client shouldn't set this property to try to move the pin itself. It should instead change the **_OL_WIN_ATTR**.*pin_state* field. The window manager should respond by changing **_OL_PIN_STATE**.

If the client has requested a pin, but the **_OL_PIN_STATE** property does not exist, the client can use whatever state it last requested for the pin. For example, suppose the client requested the pin's initial state be *in* by setting **_OL_WIN_ATTR**.*pin_state* appropriately. If a non-OPEN LOOK window manager is running, it will not set the **_OL_PIN_STATE** property. If this is the case, the client can make the decision to withdraw the window based on the pin state that it last requested.

NOTE

In the case where the client requested to have the window pinned, there would be no way to unpin the window. It might be argued that this is a serious problem, because the window could never be removed. This is not the case. The foreign window manager would presumably have its own user interface for closing (iconifying) or deleting (with WM_DELETE_WINDOW) the window. These operations are independent of the state of the pin, so they will work as expected.

Window Colors

The client can specify different colors for the window background, foreground, and border. The foreground consists of the header text and window mark. The border consists of the inside border of the decorator (the one that thickens for selection highlighting) and the resize corners. The client specifies these colors as RGB triples in the _OL_WIN_COLORS property.

NOTE

Border is ignored for this property only.

_OL_WIN_COLORS

Type:	_OL_WIN_COLORS	**Owner:**	client
Format:	32	**Reader:**	window manager
Length:	10	**Effect:**	immediate

Field	Type	Value	Description
flags	CARD32	1 = foreground 2 = background 4 = border	This is a bitmask that indicates which fields are present.
fg_red fg_green fg_blue	CARD32 CARD32 CARD32	Reserved for future use.	
bg_red bg_green bg_blue	CARD32 CARD32 CARD32	Reserved for future use.	
bd_red bd_green bd_blue	CARD32 CARD32 CARD32	RGB values for border (ignored by this property)	

Busy Windows

When it wants to put a window in the busy state, the client should set the **_OL_WIN_BUSY** property on that window. If this property is not present, the window manager will assume that the window is not busy.

_OL_WIN_BUSY

Type:	INTEGER	**Owner:**	client
Format:	32	**Reader:**	window manager
Length:	1	**Effect:**	immediate

Value	Description
0	window is not busy
1	window is busy

When a window becomes busy, the window manager should gray out the window header. The window manager does not trap all keyboard and mouse input to the window. This is the responsibility of the application that owns that window. The window should beep in response to any input. (It can do this with one of the flavors of a grab or by mapping an Input Only window.) When a client is about to become unbusy, it should synchronize with the server and flush all input immediately prior to setting this property. This will help ensure that OPEN LOOK clients running in a non-OPEN LOOK environment will ignore input while they are busy.

Focus Warping

When an application brings up a pop-up window that is eligible for keyboard input, such as command window or property sheet, the OPEN LOOK Interface requires that the input focus be transferred there. This is the responsibility of the window manager.

The window manager should first determine whether the window is eligible to receive the input focus by checking which focus model the client has chosen for this window. Clearly, windows using the No Input model should not have the focus transferred to them. For the other models, the window manager should then query and save away the window that currently has the input focus. The window manager should then manipulate the focus as if the user had clicked SELECT on the window background. This action will be some combination of sending a **WM_TAKE_FOCUS** message or setting the focus to that window, depending on the focus model.

When the pop-up goes away, the window manager should attempt to restore the input focus to its previous location, again using the same focus action it would take as if the user had clicked SELECT on the window background.

Relationship to Inter-Client Conventions

All X11 clients should conform to the X11 inter-client conventions. These conventions are quite flexible in how window managers are required to deal with requests from clients. In particular, most of the window manager properties are called hints because the window manager is free to ignore them as it sees fit. For most of OPEN LOOK, however, it makes sense for window managers to honor application hints.

Refer to the *X11 Inter-Client Communication Conventions Manual* for the detailed formats of **`WM_NORMAL_HINTS`**, **`WM_HINTS`**, and **`WM_PROTOCOLS`** described below.

WM_NORMAL_HINTS

The window manager should honor the size of the window as created by the application.

If the USPosition flag is set, use the initial position of the window. If the USPosition flag is not set, the window manager should disregard the initial position of the window, instead positioning the window according to the standard window layout specified by OPEN LOOK.

The window manager should use the OPEN LOOK standard window layout policy even if the PPosition flag is set. The rationale for doing this is that quite a few programs always set the PPosition flag.

The window manager should attempt to honor the minimum, maximum, base, and incremental sizes. The maximum size, if present, should be used when the user zooms the window with the Full Size menu item. The base and incremental sizes will be used when the window manager needs to calculate the size of the window in rows and columns, such as on the window property sheet.

WM_HINTS

Window managers should use the icon window, if one is provided by the client. If none is provided, then the manager should use the icon pixmap and mask, if they are provided.

The window manager should honor the icon position, if it is provided. If it isn't, the window manager should position the icon using OPEN LOOK's default icon positioning strategy. Clients should generally not set the icon position fields except under certain circumstances, such as when the user gives command-line options for positioning.

WM_PROTOCOLS

WM_SAVE_YOURSELF

OPEN LOOK clients should elect for the **WM_SAVE_YOURSELF** protocol. In response to this message, they should behave exactly as the ICCCM specifies; that is, they should write a **WM_COMMAND** property and go into a quiescent state. Clients should not attempt user interaction in response to a **WM_SAVE_YOURSELF** message. Clients should also not exit of their own accord after receipt of the **WM_SAVE_YOURSELF** message.

WM_DELETE_WINDOW

Assuming the client has elected to receive **WM_DELETE_WINDOW** messages, the window manager should send this message when one of the following situations occurs:

- The user selects the Quit item on any base window menu.
- The user selects the Dismiss/Cancel item on a pop-up window menu.
- The user removes the pin from a pop-up window.

For clients that do not request **WM_DELETE_WINDOW**, the window manager should issue a Kill Client when the user selects Quit from the window menu. If a client requests a pop-up window but not **WM_DELETE_WINDOW**, the window manager should simply unmap the window when the user pulls the pin or selects the Dismiss menu item.

OPEN LOOK clients should elect to participate in the **WM_DELETE_WINDOW** protocol if they need to intercept or ask for user confirmation when the user requests to dismiss a window or quit an application. If a client receives **WM_DELETE_WINDOW** on a pop-up window, the client should withdraw the window. If a client receives **WM_DELETE_WINDOW** on a base window, the client should withdraw the base window and its pop-ups (perhaps after requesting confirmation). It is up to the application whether to exit entirely or just withdraw the base window family in this situation.

WM_TAKE_FOCUS

OPEN LOOK clients that require keyboard input should participate in the **WM_TAKE_FOCUS** protocol. This is explained further on in the section on input focus.

Window Groups

OPEN LOOK applications should always fill in the *window_group* field of the **WM_HINTS** property on each window that they expect to be managed by an OPEN LOOK window manager. Base windows should be designated as group leaders; that is, they should have their own window ID in the *window_group* field. Pop-ups (command windows, property sheets, help windows) should belong to the window group of the base window with which they are associated.

Notice Widgets, PopupWindows and Menus set their own window group so, in these cases, the application does not have to set the window group.

Windows (both group leaders and followers) can be in one of three states, according to the Inter-Client Conventions: Withdrawn, Iconic, and Normal. Two sources can instigate transitions between these states: the user (via the window manager) and the client. The OPEN LOOK Interface specifies that pop-up windows follow the state transitions of their associated base window. That is, if you close and reopen a base window, its pop-up windows disappear and reappear along with the base window. The OPEN LOOK interface further specifies that a pop-up window cannot appear on the screen unless its base window is also visible.

The following table lists the permitted combinations of base window (group leader) and pop-up window (follower) states:

leader is in	followers can be in
Withdrawn	only Withdrawn
Iconic	Iconic or Withdrawn
Normal	Normal or Withdrawn

The basic idea is that windows stay in Withdrawn until the client moves them to another state. The Withdrawn state means that the client never wants the window to be displayed unless it is explicitly moved out of the Withdrawn state. While a group leader is not in Withdrawn, all followers that aren't in Withdrawn track the state transitions of the group leader.

When a group leader is not in the Withdrawn state, its followers must be in the same state or in Withdrawn. When the leader is in Normal, the followers can either be in Normal (present on the screen) or in Withdrawn (not present). When a group leader is in Iconic, all of its followers must either be in Iconic or Withdrawn. Only one icon is displayed for the entire group: the group leader's. All followers are invisible to the user, regardless of whether they are in Iconic or Withdrawn. The significance of a follower being in Iconic (as opposed to Withdrawn) is that it will reappear on the screen — in the Normal state — when its leader is moved to the Normal state, whereas the Withdrawn followers remain Withdrawn.

In order to simplify things, it is convenient to disallow certain state transitions on group follower windows (pop-ups) when the base window is in certain states. The following table shows state transitions that the window manager should perform on the group follower windows when the group leader window undergoes a transition.

Leader changed from	to	Followers that were	change to
Withdrawn	Normal	[1]	Withdrawn
Withdrawn	Iconic	[1]	Withdrawn
Normal	Withdrawn	(any)	Withdrawn
Iconic	Withdrawn	(any)	Withdrawn
		Normal	Iconic
Normal	Iconic	Withdrawn	Withdrawn
		Iconic	[2]
		Iconic	Normal
Iconic	Normal	Withdrawn	Withdrawn
		Normal	[3]

[1] If the leader was in Withdrawn, all followers must have been in Withdrawn. Moving the leader out of Withdrawn leaves the followers as they were. The window manager will never implicitly move any window from the Withdrawn state; the client must do so explicitly.

[2] If the leader was in Normal, no follower could have been in Iconic.

[3] If the leader was in Iconic, no follower could have been in Normal.

If a client attempts a state transition on a follower that would result in an illegal combination, the window manager should ignore the request. For example, suppose a client attempts to change a follower from Normal to Iconic without changing the leader. This request should be ignored. The group leader must be in Normal because the follower was in Normal. Changing the follower to Iconic isn't allowed unless the leader changes to Iconic simultaneously. To do that, the client should request the transition on the leader, not the follower.

These state transitions can be initiated either by the window manager or the client. However, the burden of maintaining the states consistently lies on the window manager. For example, if the client iconifies its base window, the window manager is responsible for moving all Normal pop-up windows into Iconic. Similarly, if the user iconifies a base window, the window manager is again responsible for iconifying the pop-ups.

Input Focus

The OPEN LOOK Interface specifies that focus is transferred with mouse clicks. Since arbitrary windows (not just top-level windows) may have the input focus, it is impossible for the window manager to do all the focus management itself. Therefore, OPEN LOOK clients should use the Globally Active model of input focus described in the Inter-Client Conventions document. This model corresponds to **WM_HINTS**.*input* having the value False and the presence of the **WM_TAKE_FOCUS** atom in the **WM_PROTOCOLS** property.

Window managers in general, not just OPEN LOOK window managers, will send a **WM_TAKE_FOCUS** message to the client when they think the client should take the input focus. OPEN LOOK clients should respond by setting the input focus to the last subwindow that had the focus. If no subwindow ever had the focus, the client should set the focus to the default focus location. In addition, when the user clicks the SELECT mouse button in a client's subwindow, the client should set the input focus to that window.

NOTE The timestamp of the event that caused the focus change should be passed to the client in the **WM_PROTOCOLS** client message.

OPEN LOOK applications will generally not want to use the Locally Active model of focus, because this leads to unnecessary transfers of focus. In the Locally Active model, the window manager assigns the focus to the window, after which the application is free to move the focus around within its subwindows. Under this model, clicking in a scroll bar might transfer the focus. This is incorrect.

In rare cases, an OPEN LOOK application might want to use the Passive model. In this model, only the top-level window is allowed to have the focus. The window manager will assign the focus to this window as appropriate. If an OPEN LOOK application has only one top-level window, the application can use this model. However, most OPEN LOOK applications will want to have more than one window eligible to receive the focus, or their focus window will not be the top-level window, so the Passive model will be unsuitable for them.

If an OPEN LOOK application doesn't handle keyboard input, it should choose the No Input model of input focus. This corresponds to **WM_HINTS**.*input* having the value False and the absence of the **WM_TAKE_FOCUS** atom in **WM_PROTOCOLS**.

If the window that has the focus disappears (is dismissed or iconified) and the window manager does not restore the focus to its previous location (either because the window manager wasn't able to or wasn't supposed to), the input focus will likely end up as None. In this case, window manager should set the input focus to somewhere known (perhaps a root window) and beep whenever a keystroke occurs. (This is required by the OPEN LOOK specification.) The window manager can detect when this situation occurs by keeping track of which window has the input focus (by selecting for Focus In and Focus Out messages).

Workspace and File Manager Conventions

The following OPEN LOOK Communications Conventions have been established for the OPEN LOOK Workspace Manager and OPEN LOOK File Manager when communicating with the OPEN LOOK Window Manager and other OPEN LOOK clients.

To initiate the execution of a process, or other action by the Workspace Manager, an appropriately formatted *request* is appended to the **_OL_WSM_QUEUE** property of the Root Window. If the request is for process execution, then the success or failure of the request is reported by the setting of the **_OL_WSM_REPLY** property on the window specified in the request. Similarly, the **_OL_FM_QUEUE** and **_OL_FM_REPLY** properties are used to communicate file service requests and replies. The QUEUE properties may have multiple requests appended; however, the REPLY properties will contain only a single reply at any given time.

The enqueue routine should add requests to the queue using **PropModeAppend**. This way, new requests are added to the end of the queue without disturbing any prior contents.

On the first request, the dequeue routine should allot buffer space for the queue, move the entire contents of the queue into the buffer, specify True for the delete argument to **XGetWindowProperty**, and return the first request in the queue. For subsequent requests, the dequeue routine should parcel out requests from its buffer until the buffer is empty. At that time, the dequeue routine would again read the entire contents of the queue and continue request processing.

Property	Format
_OL_WSM_QUEUE	<type><window>:<serial>:<sysname>:<nodename>:<uid>:<gid>:<applname>:<command>:<atoms>:
_OL_WSM_REPLY	<type><serial>:<sysname>:<nodename>:<errno| pid>:
_OL_FM_QUEUE	<type><window>:<serial>:<sysname>:<nodename>:<uid>:<gid>:<applname>:<windowgroup>:<directory>:<pattern>:<label>:<atoms>:
_OL_FM_REPLY	<type><serial>:<sysname>:<nodename>:<path| message>:

NOTE The _OL_WSM_QUEUE and _OL_FM_QUEUE formats are each a single long sequence. In the table above, they were split across two lines due to their length.

The format of each of the requests and replies is an ASCII character sequence containing a fixed number of fields. The first field, *<type>*, is a fixed length one character field. The remaining fields are variable length character sequences separated by the ASCII *unit separator* (0x1f), which is represented in the table above by a colon. If the field is numeric, then the characters in the field are all ASCII digits.

The next several paragraphs define valid values for the *type* field for both Workspace Manager and File Manager requests. The remainder of this section then describes the other fields that are present in the various request and reply formats.

`Field:` *<type>*

The *<type>* field contains a binary numeric value identifying the type of the message. Valid values are given in the following two tables.

Message	Value	Meaning
_OL_WSM_QUEUE	1	WSM_EXECUTE
	2	WSM_TERMINATE
	3	WSM_SAVE_YOURSELF
	4	WSM_EXIT
	5	WSM_MERGE_RESOURCES
	6	WSM_DELETE_RESOURCES
_OL_WSM_REPLY	1	WSM_SUCCESS
	2	WSM_FORK_FAILURE
	3	WSM_EXEC_FAILURE

The properties are specified in the *command* field of **_OL_WSM_QUEUE** as described below:

- **WSM_EXECUTE** is used by a client to request that a program be executed. These are the only requests that receive a reply.
- **WSM_TERMINATE** and **WSM_SAVE_YOURSELF** are used by the Window Manager to request that a window and its associated program(s) be terminated; the second form is used if the SaveYourselfMessage bit is set.
- **WSM_EXIT** is used by the Window Manager to denote the end of a sequence of **WSM_TERMINATE**s and **WSM_SAVE_YOURSELF**s at session termination.
- **WSM_MERGE_RESOURCES** and **WSM_DELETE_RESOURCES** are used by a client to request that properties be merged into, or deleted from, the **.Xdefaults** file.
- **WSM_SUCCESS** indicates that the request was carried out successfully, while **WSM_FORK_FAILURE** and **WSM_EXEC_FAILURE** indicate failures that occurred in attempting to fork or execute the specified process.

Message	Value	Meaning
_OL_FM_QUEUE	1	FM_ACTIVATE
		FM_BROWSE
_OL_FM_REPLY	3	FM_COPY
	4	FM_MOVE
	9	FM_CANCEL
	10	FM_ACCEPT
	11	FM_INVALID

- **FM_ACTIVATE** is used by the Workspace Manager to request a stand-alone File Manager window, while **FM_BROWSE** is used by other clients to request a File Manager window in client service mode. All requests receive a reply.
- **FM_COPY** and **FM_MOVE** are used in drop mode to indicate that the user requested a copy or a move operation.
- **FM_CANCEL** is used in client service mode to indicate that a user has selected the cancel button.

- **FM_ACCEPT** is used in client service mode to indicate that the request was accepted and acted upon.
- **FM_INVALID** is used to indicate that the corresponding request was invalid.

Field: *<window>*

The *<window>* field contains the window id of the window whose **_OL_WSM_REPLY** or **_OL_FM_REPLY** property should be set in response to the current request.

Field: *<serial>*

The *<serial>* field contains a unique serial number that is supplied by the requesting routine for each request it appends. The same serial number is returned in the subsequent reply so that the reply may be associated with its corresponding request.

Fields: *<sysname>* and *<nodename>*

The *<sysname>* and *<nodename>* fields contain the system and node (as given by the uname(1) command) of the machine originating the request or reply.

Fields: *<uid>* and *<gid>*

The *<uid>* and *<gid>* fields are reserved for future use.

Field: *<applname>*

The *<applname>* field contains the name of the application making the request.

Field: *<command>*

For **WSM_EXECUTE**, the *<command>* field specifies a command to be executed by /bin/sh.

For **WSM_MERGE_RESOURCES** and **WSM_DELETE_RESOURCES**, the <*command*> field specifies the resource settings as

> *name:value\n. . .name:value\n*

where *name* is the name of the resource, *:* is the ASCII colon character, *value* is the value assigned to the resource, *\n* is the ASCII new-line character, and . . . indicates that there may be one or more occurrences of name-value pairs in this field.

For **WSM_DELETE_RESOURCES**, *value* can be null (that is, 0 characters). For *type*s other than **WSM_MERGE_RESOURCES** and **WSM_DELETE_RESOURCES**, this field is ignored.

Field: <*atom*>

The <*atoms*> field is reserved for future use and is currently ignored.

Field: <*errno*| *pid*>

The <*errno*| *pid*> field contains an error number from the **fork**(2) or **exec**(2) system calls if the the call failed, and the process id of the shell process if it succeeded.

Field: <*windowgroup*>

The <*windowgroup*> field contains the window group id associated with the window specified in the *window* field.

Field: <*directory*>

The <*directory*> field contains the full or relative pathname of a file system directory. It may contain shell patterns.

Field: <*pattern*>

The <*pattern*> field contains a file name or shell pattern that translates into one or more file names.

Field: <*label*>

The <*label*> field contains the label that will be used for the top button of the *file* menu.

`Field:` *<path| message>*

If the request succeeded, the *<path| message>* field contains a list of file names of the form *dirname filename . . . filename*, where *dirname* is the full path name of the directory and *filename . . . filename* is a list of blank-separated file names within the directory. If the request failed, the field contains an error message.

Miscellaneous Implementation Issues

Pinnable Menus and Override-Redirect

Currently, the X11 protocol has a deficiency where a window manager cannot tell when an application has changed the override-redirect window attribute. This situation comes up in the obvious implementation of pinned menus. Typically, a menu is manipulated with override-redirect set to True. However, when the menu is pinned, the owner of the menu would like the window manager to start managing the window. The obvious way to do this is for the client to simply set override-redirect to False. Unfortunately, the X11 protocol doesn't provide for automatic notification of the window manager in this case. A similar situation occurs when override-redirect is turned on. In this case, the window manager will simply stop receiving Request events on this window. Typical window managers will still have resources allocated for this window; these should be reclaimed.

In both of these situations, we need clients to explicitly tell the window manager that override-redirect has changed. One possible solution is to have the client unmap the window before changing override-redirect and map the window again afterwards. This will always work with all window managers. However, it forces the client to repaint a window that, from the user's point of view, should have stayed on the screen.

Another approach might be for the client to use synthetic Map Notify and UnmapNotify events to notify the window manager after the client has modified override-redirect. Unfortunately, this technique doesn't work well visually. Therefore, clients should unmap the window before changing its override-redirect attribute.

Full Size Window

When the user selects *Full Size* from the window menu, the window manager should use the max_width and max_height entries from the `WM_NORMAL_HINTS` properties. As per the OPEN LOOK specification, the origin of the window may have to be moved so that as much as possible of the resized window fits on the screen. If the client has not provided the maximum size fields, or if it hasn't provided the `WM_NORMAL_HINTS` property, the window manager should set its own policy for determining the dimensions of a full-sized window. Typically, on a large monitor with a landscape-style aspect ratio, the full height should be the height of the screen, and the width should stay unchanged from the current window width. On smaller monitors, the dimensions should be the full height and width of the screen.

When the user selects *Restore Size* from the window menu, the window manager should return the window to the size and location it had before the user selected *Full Size*.

5 Mouseless Operations

Overview

Mouseless operations is a generic term which encompasses all features at the user's and programmer's disposal for operating an OPEN LOOK application in an environment without a mouse. There are four major areas in mouseless operations:

- Keyboard Traversal
- Keyboard Accelerators
- Keyboard Mnemonics
- Widget Activation and Association

In addition to the above areas, the mouseless operation within the toolkit depends heavily on the widget's classing scheme and the event handling mechanism.

Each of the areas are discussed separately in the following sections.

NOTE Throughout this section words that are capitalized and begin with "OL_" are toolkit tokens used to represent OPEN LOOK commands. For example, `OL_NEXT_FIELD` is the toolkit token equivalent of the functional specification for the `NextField` command.

Keyboard Traversal

Keyboard traversal is the ability to use the key sequences to move the keyboard input focus visual to any control or text-input widget within a top level window or to move input focus from one top level window to another. Under normal conditions, there is one top level window on the screen which takes input focus. This window easily is identified as the window with its header colored with the *input-window* color. Within the input focus window, one of the controls or text widgets will have the input focus. If a control has input focus, the entire control is highlighted with the *input-focus* color; or if a text widget has focus, the text widget's caret is colored with the input focus color and is blinking.

Once input focus is within a top level window, traversal between controls and text widgets is achieved with the **OL_NEXT_FIELD** and **OL_PREV_FIELD** keyboard commands. By default, these commands are bound to the TAB (and Ctrl-TAB) and Shift-TAB keys (and Ctrl-Shift-TAB), respectively. As these keys are pressed, the input focus visual moves to the next control or text widget which will to accept it.

NOTE

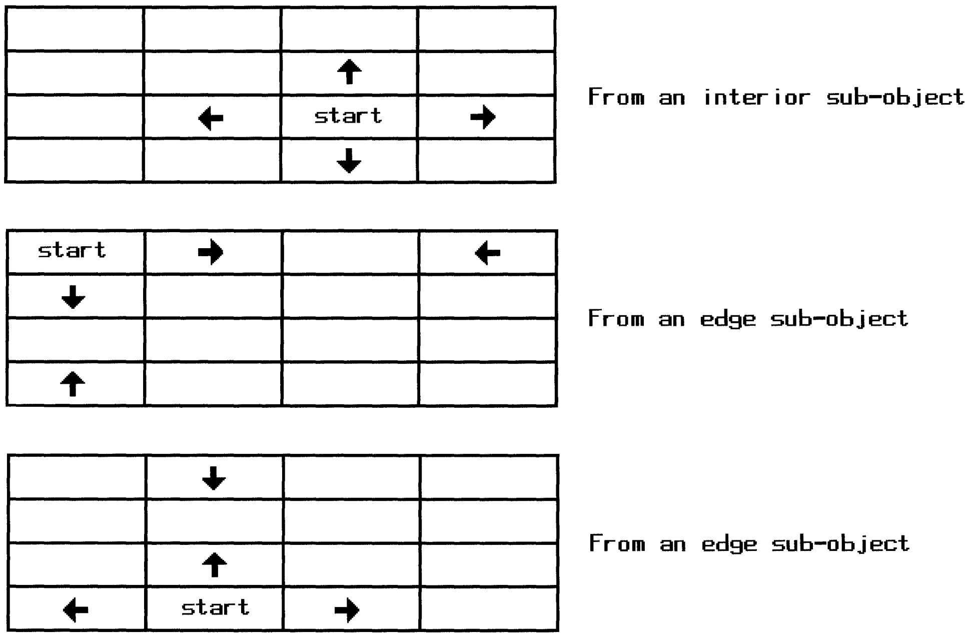
Most read-only text areas such as captions do not accept focus.

After traversing to a desired control, the user can activate that control by pressing the **OL_SELECTKEY** command (which is typically bound to the Spacebar). Activating the control with the **OL_SELECTKEY** command yields the same results as if the user had activated the control with a **OL_SELECT** mouse button click on the control.

Whenever focus is within a *container widget* such as an **Exclusives** or **Nonexclusives** setting or **ScrollingList,** the **OL_MOVERIGHT**, **OL_MOVELEFT**, **OL_MOVEUP** and **OL_MOVEDOWN** commands move focus between the rows and columns of the contained sub-objects. By default, these commands are bound to the arrow keys. Similarly, when input focus is within a text widget, the **CHARFWD**, **CHARBAK**, **ROWUP** and **ROWDOWN** commands move the input caret among the characters. By default, these commands also are bound to the arrow keys. The **OL_NEXT_FIELD** and **OL_PREV_FIELD** keys are used to move input focus in and out of container widgets.

Whenever the last control in a top level window has focus and the **OL_NEXT_FIELD** key is pressed or whenever a sub-object located on the container widget's border has focus and the direction of the traversal command points outside the container, *traversal wrapping* occurs. For the control in the top level window, traversal wrapping causes focus to move to the first control in the top level window. For the sub-object located on the border of its container, focus remains in the container widget but is set to a sub-object in an extreme row or column opposite the sub-object with focus. The following figure illustrates intra-container widget focus traversal for three different exclusives settings. For the following settings, each sub-object displaying an arrow glyph indicates the new focus location if a move command (**OL_MOVERIGHT**, **OL_MOVELEFT**, **OL_MOVEUP** or **OL_MOVEDOWN**) matching the glyph's direction is pressed while the focus is on the **start** sub-object.

Figure 5-1: Sub-Object Traversal within a Container Object



Traversal among a large number of sub-objects within a container widget can become tedious. An example of this scenario is the File Manager's Directory Pane that often displays directories containing many files. With many files, the required number of keystrokes needed to reach an arbitrary set of files is typically large. To alleviate this problem, accelerated focus movement between sub-objects is available through the **OL_MULTIRIGHT**, **OL_MULTILEFT**, **OL_MULTIDOWN** and **OL_MULTIUP** commands. Pressing one of these keys has the same effect as pressing one of the **OL_MOVERIGHT**, **OL_MOVELEFT**, **OL_MOVEDOWN** or **OL_MOVEUP** multiple times.

Besides moving focus between controls within a top level window, keyboard traversal also moves focus between top level windows within an application or to top level windows of other applications. The **OL_NEXTWINDOW** and **OL_PREVWINDOW** commands move focus between windows within an application while the **OL_NEXTAPP** and **OL_PREVAPP** commands move focus between applications. It should be noted that inter and intra application traversal requires the OPEN LOOK window manager to be running.

Keyboard Accelerators

Overview

All controls have the capability of having one or more attached accelerators. An accelerator is a one keystroke sequence that activates a control, giving the same result as if the control were visible and the **OL_SELECT** mouse button were clicked while the pointer was over that control.

An accelerator for an application can be activated if any window within that application has input focus, even if the control is not in the window with focus. Therefore, the main advantage of a keyboard accelerator over using a mouse is that the control does not have to be visible, allowing the user to limit the number of steps required to activate a particular control.

NOTE Accelerators do not install key passive grabs on any window by default. If a application wants accelerators to install passive grabs, the application must set the Boolean shell resource **XtNacceleratorsDoGrabs** to TRUE. If this resource is set to TRUE, a passive grab for each accelerator is installed on each shell within the widget's window group.

Examples

Here are two examples of how accelerators work:

- The Quit button on a window menu can be activated even though the window menu is not popped up.
- A top level window having a popup window descendant with a cancel button can be activated if an accelerator is bound to that button.

Side Effects

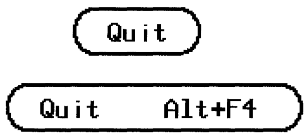
Since accelerators are global to an application, they must be unique for the entire application. If the application attempts to bind more than one control to the same accelerator key sequence, a warning is generated and the new accelerator is ignored. An application can override any OPEN LOOK standard command (for example, **OL_DEFAULTACTION**, **OL_CANCEL**, and so on) simply by binding an accelerator to the same key sequence as the OPEN LOOK command.

Visual Appearance

A workspace Miscellaneous Property Sheet setting indicates whether a string representation of an accelerator key sequence should appear in a control's label. When the accelerator text is visible, it appears to the right of the label. The following figure shows a Quit button with and without its accelerator text.

Note that even though the accelerator visual may not be shown (by selecting the `On-Don't Show` setting), the accelerator still functions.

Figure 5-2: Oblong Button with and without an Accelerator Visual



Mnemonics

Overview

Mnemonics provide a mechanism for traversing to a control and activating it. Once the control is activated, the control displays the appropriate keyboard input focus visual since all subsequent keyboard input is directed at that control.

A single keystroke is used to activate a mnemonic. But unlike accelerators which can be operated when any top level window has keyboard focus, a mnemonic's keystroke only has meaning if keyboard focus is within the top level window containing the desired control and mnemonic. By restricting mnemonics to a top level window, different top level windows can reuse mnemonics provided they are unique to their top level window and that no top level window has an accelerator with the same key sequence. Any keystrokes for mnemonics that exist outside the focus top level window are ignored.

NOTE Mnemonics never install passive key grabs on any window.

Mnemonic Modifier Prefix

A modifier prefix is required for mnemonics when the control is not on a menu. The modifier prefix is settable from the Workspace Miscellaneous Property Sheet and has the default binding of **Alt**. For example, since a property sheet's **Apply** button uses the letter "A" for its mnemonic, the keystroke **Alt <a>** is required to activate the mnemonic. But, if a control on a menu had a mnemonic "A," the unmodified keystroke **<a>** activates that menu control. Note that mnemonics are case insensitive.

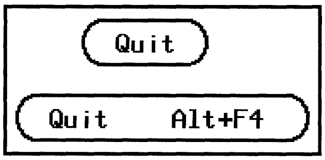
Visual Appearance

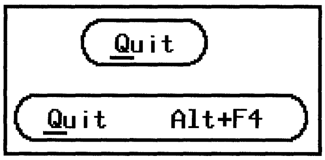
A workspace Miscellaneous Property Sheet setting indicates the type of the mnemonic visual feedback:

```
On-Underline
On-Highlight
On-Don't Show
Off
```

The figure below and to the left shows two Quit buttons with the mnemonic visual set to **Off**, while the figure on the right shows the same Quit buttons with the mnemonic visual set to **On-Underline**. (All the Quit buttons also have a visible accelerator.)

Figure 5-3: Oblong Button with and without a Mnemonic Visual





If the **On-Don't Show** visual preference is selected, the mnemonic visual is not shown, but the mnemonic keystroke still activates the control.

Widget Activation/Association

Widget Activation

All widgets (and gadgets) in the toolkit support programmatic activation through a convenience routine, **OlActivateWidget**. Indirect widget activation is a fundamental feature of the toolkit's event handling scheme. In mouseless operations, an widget's callbacks often must be activated from the keyboard or programmatically. In addition to callback activation, many widgets have several other types of activation. For example, scrollbars have activation types corresponding to each of its six scrolling operations. See the individual widget manual pages for their activation types.

```
Boolean OlActivateWidget(widget, activation_type, activation_data)
     Widget           widget;
     OlVirtualName    activation_type;
     XtPointer        activation_data;
```

Each widget has a class activation procedure for handling programmatic activation requests. When a widget receives a valid activation request, its class activation procedure does the necessary actions and returns TRUE, indicating that the request was granted. If a widget cannot satisfy the activation request (for example, an activation type or the widget is busy), the widget's class procedure returns FALSE. If the returned code is FALSE, **`OlActivateWidget`** attempts to activate any widgets that are *associated* with the widget that returned FALSE. This sequence happens recursively until one of the widgets returns TRUE or there are no more associated widgets.

Widget Association

Widgets are associated with other widgets by calling **`OlAssociateWidget`**. A good example of widget association is that of the ScrolledWindow widget since it has two child Scrollbar widgets which it associates with itself at creation time. Since the scrollbars are associated with the ScrolledWindow widget, calling **`OlActivateWidget`** using the scrolled window widget id and the command **`OL_PAGERIGHT`**, causes the contents of the scrolled window to move one pane to the right.

Also, when the application adds a child widget to the scrolled window widget, the scrolled window widget associates itself with that child. This means that calling **`OlActivateWidget`** on that child with a scrolling command will cause the view to scroll since the scrollbars are now indirectly associated with that child.

Since the association feature is used by the toolkit's event handling mechanism, the child of the scrolled window will scroll automatically if the child has focus and the user presses **`Alt+]`**.

NOTE The leftbracket modified by the Alt key is the default keyboard binding for the `OL_SCROLLRIGHT` command.

The scrolling occurs because the toolkit receives the keypress event (which arrived on the scrolled window widget's child) and attempts to activate that child by calling **`OlActivateWidget`** with the activation type **`OL_SCROLLRIGHT`**. Since the child doesn't know that activation type, **`OlActivateWidget`** attempts to activate the widgets associated with the child. This happens recursively and eventually, the scrollbar widget is activated and scrolls the view.

6 Internationalization

Introduction to Internationalization

The UNIX operating system has been used extensively in many countries. The applications developed for it have traditionally provided messages only in English and have operated using English language conventions.

In order for applications to operate correctly in any language, no assumptions may be made about language, code set or local conventions. All such information about "locale" must be stored externally to the application. To do this for both the UNIX system and the OPEN LOOK interface, library functions had to be enhanced and new functions provided to support localizing facilities.

UNIX System V Release 3.1 and later has removed the dependency of the UNIX system on the 7-bit US ASCII code set and includes new extensions which provide support for applications and commands for the non-English speaking user.

The key international capabilities of OPEN LOOK GUI are the following:

- Support of full 8-bit and mult-byte code sets. Commands can handle code sets in which all 8 bits are used.
- Support of alternative date and time formats.
- Enhanced support for character classification and conversion- functions which, for any code set, convert characters from upper to lower case or classify characters as alphabetic, printable, upper or lower case, and so on.
- ANSI C internationalization enhancements, Extended UNIX Characters (EUC) and multibyte processing.
- UNIX System commands which support the use of EUC and multibyte processing.

The OPEN LOOK Release 4i Toolkit provides tools to internationalize applications that make no assumptions about language, code set or local conventions.

Extended UNIX Code Set (EUC)

To enable the use of languages which require characters with encodings other than ASCII, Release 4i provides support for up to four code sets concurrently, at both file and process level.

The external code set represents the set of characters that can be presented to the computer system. The internal code set scheme is called the "Extended UNIX Code" or EUC. EUC comprises a primary code set (code set 0), which is always assigned to the US 7-bit ASCII character set, and three supplementary code sets. The choice of the supplementary code sets is at the system administrator's discretion and EUC can support multiple languages concurrently. EUC is provided mainly to support the huge number of ideograms needed for I/O in an Asian Language Environment.

For a given character, its EUC code set is distinguished by the value set of the most significant bit (MSB) of the EUC representation and by *single-shift characters*. The code sets used at any time (that is, within a single process) are determined by the selected locale. The default locale is the C locale. (See the second part of this chapter for information about choosing locale.) The primary code set (code set 0) is always 7-bit US ASCII. Each byte of any character in supplementary codes (code sets 1,2, and 3) has the high-order bit set; code sets 2 and 3 are distinguished from code set 1 and each other by their use of a "special shift" byte before each character. `SS2` is represented in hexadecimal by `0x8e`, `SS3` by `0x8f`.

Figure 6-1: EUC Code Set Representations

Code Set	EUC Representation
0	`0xxxxxxx`
1	`1xxxxxxx [ 1xxxxxxx [...]]`
2	`SS2 1xxxxxxx [ 1xxxxxxx [...]]`
3	`SS3 1xxxxxxx [ 1xxxxxxx [...]]`

Multibyte Processing and Wide Character Format

To work within the constraints of usual computer architectures, characters are encoded as sequences of bytes, or "multbyte characters." A multibyte character is character encoded using one or more bytes. An Ascii character is the simplest example of a multibyte character. Because multibyte characters are of varying widths, the sequence of bytes needed to encode a character must be self-identifying: regardless of the supplementary code set used, each byte of a multibyte character will have the high-order bit set; if code sets 2 or 3 are used, each multibyte character will also be preceded by a shift byte.

UNIX System V Release 3.1 introduced a new data type for C programs (`wchar_t`) which allows all the characters from different code sets, including the primary set, to be represented by codes or wide characters of a uniform length. `wchar_t` lets you manipulate variable width characters as uniformly sized data objects called "wide characters." Use of the **wchar_t** data type often simplifies code that deals with characters because the code need not concern itself with the memory width of every character.

For each wide character there is a corresponding multibyte character and vice versa; the wide character that corresponds to a regular single-byte Ascii character is required to have the same value as its single-byte value, including the null character.

Since there can be thousands or tens of thousands of characters in an Asian-language set, systems should use a 16-bit or 32-bit sized integral value to hold all members. Implementations provide corresponding 16-bit and 32-bit libraries with functions that you can use to manage multibyte and wide characters.

Figure 6-2: EUC and Corresponding 16-bit Wide-character Representation

Code Set	EUC Code Representation	Wide-character Representation
0	`0xxxxxxx`	`000000000xxxxxxx`
1	`1xxxxxxx`	`100000001xxxxxxx`
	`1xxxxxxx 1xxxxxxx`	`1xxxxxxx1xxxxxxx`
2	`SS2 1xxxxxxx`	`000000001xxxxxxx`
	`SS2 1xxxxxxx 1xxxxxxx`	`0xxxxxxx1xxxxxxx`
3	`SS3 1xxxxxxx`	`100000000xxxxxxx`
	`SS3 1xxxxxxx 1xxxxxxx`	`1xxxxxxx0xxxxxxx`

Figure 6-3: EUC and Corresponding 32-bit Wide-character Representation

Code Set	EUC Code Representation	Wide-character Representation
0	`0xxxxxxx`	`0000000000000000000000000xxxxxxx`
1	`1xxxxxxx`	`0011000000000000000000000xxxxxxx`
	`1xxxxxxx1xxxxxxx`	`001100000000000000xxxxxxxxxxxxxx`
	`1xxxxxxx1xxxxxxx1xxxxxxx`	`00110000000xxxxxxxxxxxxxxxxxxxxx`
2	`SS2 1xxxxxxx`	`0001000000000000000000000xxxxxxx`
	`SS2 1xxxxxxx1xxxxxxx`	`000100000000000000xxxxxxxxxxxxxx`
	`SS2 1xxxxxxx1xxxxxxx1xxxxxxx`	`00010000000xxxxxxxxxxxxxxxxxxxxx`
3	`SS3 1xxxxxxx`	`0010000000000000000000000xxxxxxx`
	`SS3 1xxxxxxx1xxxxxxx`	`001000000000000000xxxxxxxxxxxxxx`
	`SS3 1xxxxxxx1xxxxxxx1xxxxxxx`	`00100000000xxxxxxxxxxxxxxxxxxxxx`

The Internationalization of the OPEN LOOK Toolkit

A number of internal changes have been made to the OPEN LOOK Toolkit in order to make it compatible with internationalization requirements. The Toolkit uses several UNIX-based facilities and and a multilingual messaging system which permits all help messages, labels and error messages to be displayed in the end user's language. The Toolkit also has many routines that have been specifically designed to support an OPEN LOOK Input Method. The OPEN LOOK Input Method permits the use of a traditional keyboard to handle non-English character requirements.

Internationalization can be divided into two different concepts:

- Internationalization: writing a program that makes no assumptions about local customs by separating data from the program logic.
- Localization: providing the data specific to a language, cultural conventions, and code sets.

In order to support the former concept the OPEN LOOK Toolkit has been enhanced to include several routines which retrieve character strings in the end user's language. The entire widget set was modified to employ these routines. In addition, all the code set dependencies, such as the assumption that characters are always one byte long, were removed. The locale specific data for a particular language, is to be supplied by the various companies that are localizing the Toolkit for a particular language group.

Changes to the Toolkit

Several changes or adaptations had to be made to the OPEN LOOK Toolkit in order to support the concepts of internationalization and localization. They are as follows:

1. **Locale Announcement**: The behavior of an X application in an Internationalized environment is governed by information such as, language, character code set and so on. In order to operate correctly in a "localized" environment, an application needs to communicate this information to the underlying operating system. The OPEN LOOK Toolkit provides a *locale announcement* mechanism by which applications can ask the operating system to configure the appropriate environment.

2. **Text Drawing and Font Grouping Facility**: Different languages require different fonts for drawing characters. In addition, a string in certain languages may contain characters from more than one character set. More than one font may be needed to draw such strings. Since existing X11R4 functions are designed to handle strings from one code set only, a mechanism was designed that allows applications to specify a group of fonts to facilitate drawing of strings with characters from multiple code sets.
3. **Compound Text Translation Facility for ICCC**: The OPEN LOOK Toolkit provides a mechanism to translate EUC encoded strings to Compound Text format (and vice versa) for Inter-Client Communication.
4. **Implementation of an Input Method**: An Input Method enables mapping of keystrokes to characters, possibly with additional dictionaries or other linguistic help. The OPEN LOOK Toolkit provides necessary support for Input Method implementation.
5. **Localized Help Messages and Message Switching**: The help registration facility in the OPEN LOOK Toolkit provides a way for an application to display help messages in the local language. In addition, all references to strings in the Toolkit and clients are language independent.
6. **End User System Clients**: The OPEN LOOK clients in particular, the Work Space Manager, the Window Manager, the File Manager and xterm have been modified to operate in a localized environment. This involves *Language and Locale Announcement* by the Work Space Manager, supporting EUC file names in the File Manager and using localized text input mode in **xterm**.

Localizing OPEN LOOK Applications

The following section summarizes the changes necessary for localizing the Toolkit for a particular locale.

1. Translate OPEN LOOK Toolkit messages (for example **xol_msgs**) to the locale language.

2. Install the message catalogue in the file `/usr/X/lib/locale/`*locale_name*`/messages/xol_msgs`.
3. Translate all OPEN LOOK client messages files (for example `xterm_msgs`) to the locale language.
4. Install the client messages in `/usr/X/lib/local/`*locale_name*`/xterm_msgs`.
5. Create a locale definition file with resource values for the locale.
6. Install the locale definition file in `/usr/X/lib/locale/`*locale_name*`/ol_locale_def`
7. Write an input method library for the locale language (optional).
8. Install the library in `/usr/X/lib/locale/`*locale_name*`/libname.so`.

Internationalizing A Client

Use the following steps to internationalize a client:

1. Replace hardcoded ASCII strings with calls to `OlGetMessage`.
2. Create a default message file containing default (English) versions of messages.
3. Install default messages under `/usr/X/lib/app-defaults/`*appname_msgs* (where `appname_msgs` is the class name used by the client in calls to `OlGetMessage`, `OlVaDisplayWarningMessage`).
4. Replace the use of the `XFontstruct` data type with the `OlFontList` data type (see the following sections in this Chapter that describe the `OlFontList` data type).
5. Replace intrinsic-based text metric and drawing calls with the following OPEN LOOK Toolkit routines:

Intrinsics Routine	OPEN LOOK Routine
XTextWidth	OlTextWidth
font --> ascent	OlMaxFontInfo
XDrawString	OlDrawString

6. Link additional libraries **`-lw`** and **`-ldl`** (wide character and dynamic linking) when building applications. See the *OPEN LOOK GUI Programmer's Guide* for a complete description of the routines listed above.

Locale Announcement

The "localized" behavior of an X application in the International environment is governed by locale specific information such as language, character code set; and cultural conventions such as numeric,date and time formats. This information affects the resource file, text input, and fonts used by applications. For an X application to run correctly in a "localized" environment, it needs to announce the locale under which it intends to operate.

The OPEN LOOK Toolkit performs the locale announcement with the following limitations:

- Multiple locales in the same application are not supported.
- All resource names (as opposed to values) are encoded in the Latin-1 code set.
- The Window Manager always runs in the same locale as the Work Space Manager.
- Applications must make specific provisions to respond dynamically to a change in the value of locale specific resources.

The ol_locale_def File

To configure a localized environment, locale specific information is needed. The system administrator must provide such information in a locale definition file under the directory **/usr/X/lib/locale/***locale_name***/ol_locale_def**.

The information contained in this file is used to determine the localized environment and to look up default values for certain locale specific resources. The format of this file is shown below:

The entries **xnlLanguage**, **displaying**, **inputlang**, **numeric** and **time format** correspond to the **setlocale(3C)** categories **LC_ALL**, **LC_TYPE**, **LC_MSGS**, **LC, NUMERIC**, and **LC_TIME**, respectively. Each entry consists of the locale name (to be passed to **setlocale(3C)** by the OPEN LOOK Toolkit) and a quoted format string (to be used by the workspace manager to identify the locale category to the end user in the setlocale property sheet.

NOTE The representation for the date, the time and numeric for a locale correspond to formats found in files **LC_TIME** and **LC_NUMERIC** under **/lib/locale/***locale_name*. For example, if the date format in the file **LC_TIME** is "%m%d%y" then the format string for time format should be *mm/dd/yy*.

Also, note that, format strings specified in a locale definition file are intended to be used by the Work Space Manager only. Actual values of the resources *time format* and *numeric* are specified as a locale name for use with **setlocale()**.

Default Locale Definition File

The following default locale definition file **ol_locale_def** is installed in the directory **/usr/X/lib/locale/C**.

```
*xnlLanguage:      C "English"
*displayLang:      C "English"
*inputLang:        C "English"
*numeric:          C "10,000"
*timeFormat:       C "5:30PM" "12/31/90"
*fontGroup:
*fontGroupDef:
*inputMethod:
*imStatus:         False
*frontEndString:
```

The Example Japanese Locale Definition File

The following is an example locale definition resource file for the Japan locale that has been included as part of the Toolkit.

```
*xnlLanguage:     japan "Japan"
*displayLang:     japan "Japanese", C "English"
*inputLang:       japan "Japanese", English "English"
*numeric:         japan "10000",fr "10.000"
*timeFormat:      japan "5:30PM 31/12/90",C "17:30 12/31/90"
*fontGroup:       mincyo, gothic
*fontGroupDef:    mincyo=lucida/kanji/kana/hojo, \
                  gothic=goal/gokan/gokana/gokanji
*inputMethod:     libolim
*imStatus:        True
*frontEndString:
```

The resources specified in the local definition file are described below:

`xnlLanguage`
: This contains the name of the current locale under which an application operates.

`timeFormat`
: This resource specifies the name of the locale that supports the desired formats for time and date. The locale name specified by this resources corresponds to the `LC_TIME` category of `setlocale()`.

inputLang This resource contains the name of the locale that provides the necessary environment for processing text for the desired language.

displayLang
This resource specifies the name of the locale in which the messages should be displayed. It corresponds to the **LC_MESSAGES** category of the **setlocale()** function.

numeric This resource specifies the name of the locale that supports desired format for specifying a numeric value. The value of this resource corresponds to the **LC_NUMERIC** category of the **setlocale()** function.

inputMethod
This resource specifies the name of the Input Method used by the application for handling text input in local language. It determines the appropriate localization library name used to establish a connection with the specified Input Method.

imStatus Some languages need to display status information in text input mode. The Input Methods developed for such languages need a window (or widget) to display such information. This resource specifies a Boolean value to indicate whether or not an Input Method requires a status window.

fontGroup Text in some languages may be composed of characters from different code sets and hence requires more than one font to draw it. The **fontGroup** resource provides an alias for the set of fonts that are used to draw text in those languages.

fontGroupDef
This resource provides a way of associating a single name with set of fonts (known as a **fontGroup**). A single **fontGroupDef** may contain definitions for multiple **fontGroups** and separated by commas. It is used in constructing a list of **XFontStruct** structures for use by text drawing utilities.

frontEndString
The string that is atomized by the Input Method and used to identify IM messages sent to the client.

Dynamic Help Message Retrieval

To display help messages in the local language, the help widget was modified such that it reads a localized help message from the locale specific help message file. This file(s) resides under the following sub-directory:

/usr/X/lib/locale/*locale_name***/help/***app-name.*

General Message Handling Design

For upward compatibility, error and warning handling have been implemented using the current functions, **OlVaDisplayErrorMsg()** and **OlVaDisplayWarningMsg()** These functions, as well as others that they call, were modified to open one or more error databases, retrieve specific localized messages and (if desired) a custom message prefix, provide defaults for retrieval failures, and print formatted messages as before. An option is also provided for an application to silence a Toolkit error or warning message. All Toolkit and client code using other forms of error and warning handling have been converted to use one of these two functions. There is a default (locale C) error database (**libolc.a**) for the Toolkit, one for each supported client, one for the client library, and the capability for any other application to create an error database for itself.

There is also a general message retrieval function **OlGetMessage()** so that the Toolkit or any application can retrieve a localized message and use it for its own specific purpose.

Visible widget string resources fall into two categories: static and dynamic. An example of the former is a button label that remains constant for the duration of a program's execution while an example of the latter is a footer message which changes periodically at run-time. An application can use its **app-defaults** file to set static string resources but must use **OlGetMessage()** for dynamically changing string resources.

The message retrieval functions (**olGetMessage(), OlVaDisplay()**) take name, type, and class arguments to identify a message. The class identifies a file and is used to differentiate among the Toolkit, supported clients, and other applications.

The Class Defines

The reserved class defines for the clients are the following:

```
#define OleCOlClientOlamMsgs          "olam_msgs"
#define OleCOlClientOlamErrs          "olam_errs"
#define OleCOlClientOlfmMsgs          "olfm_msgs"
#define OleCOlClientOlfmErrs          "olfm_errs"
#define OleCOlCOlientOlpixmapMsgs     "olpix_msgs"
#define OleCOlCOlientOlpixmapErrs     "olpix_errs"
#define OleCOlClientOlprintscreenMsgs "olps_msgs"
#define OleCOlClientOlprintscreenErrs "olps_errs"
#define OleCOlClientOlwmMsgs          "olwm_msgs"
#define OleCOlClientOlwmErrs          "olwm_errs"
#define OleCOlClientOlwsmMsgs         "olwsm_msgs"
#define OleCOlClientOlwsmErrs         "olwsm_errs"
#define OleCOlClientXtermMsgs         "xterm_msgs"
#define OleCOlClientXtermErrs         "xterm_errs"
```

An application is free to use any other defined type for class, using the above file name format. The same is true for a message name and type, though it is suggested that the name and type be used in an efficient and self-documenting way.

Other reserved strings are ***_**stop** where "***" can be any OPEN LOOK supported client.

In addition to the files used by the message retrieval functions, the standard application **app-defaults** file is created as usual and contains any static widget string resources requiring localization. For each locale, the files are placed in the **/usr/X/lib/locale/**_locale_name_**/app-defaults** directory.

OPEN LOOK Toolkit files are placed in the **/usr/X/lib/locale/**_locale_name_**/messages** directory.

Internationalizing

There are three types of strings in the OPEN LOOK source code which need internationalizing: error/warning messages, dynamically changing strings or non-resource strings such as footer messages and widget resource strings such as button labels and mnemonics. String conversion is addressed in a number of ways:

- For both the OPEN LOOK Toolkit and clients, warning and error messages are internationalized using **`OlVaDisplayWarningMsg()`** and **`OlVaDisplayErrorMsg()`** calls. Both of these functions take variable argument lists.
- For both the OPEN LOOK Toolkit and clients, dynamically changing strings are internationalized with **`OlGetMessage()`** calls. Message classes used include **`xol_msg`** and **`xterm_msgs`**.
- For the OPEN LOOK Toolkit, application level resource strings are localized using **`OlGetMessage()`**.
- For clients only, static widget resource strings can be internationalized using the client's **`app-defaults`** *file.*
- Mnemonics should be in the **`app-defaults`** file also and internationalized, if desired.

NOTE A mnemonic is represented by a one byte character.

- File names, function names, and resource names are examples of strings which do not need to be internationalized.
- The UNIX utility **`exstr`** is used to determine what strings a source file contains. Refer to the UNIX System V Release 4 *Programmer's Reference Manual* for information on using the **`exstr`**(1) utility.

Internationalizing the Strings in an Application

You can internationalize the application strings by performing the following:

1. Run the UNIX utility **exstr** on the application source code to see what strings exist in the program. See the UNIX System V Release 4 *Programmer's Reference Manual* for information about **exstr**(1).
2. Convert all errors and warnings to **OlVaDisplayErrorMsg()** and **OlVaD-isplayWarningMsg()** calls. See the *OPEN LOOK GUI Programmer's Guide* and the information provided below.
3. Convert all miscellaneous strings (including string arguments to **OlVaD-isplayErrorMsg()** and **OlVaDisplayWarningMsg()**) to **OlGetMessage()** calls.

NOTE All three functions require a class, name, and type parameter; this is explained below.

4. English or default messages can be compiled into the application or reside in a default database, created by the application programmer, as explained below.
5. Define widget string resources and mnemonics in the standard **app-defaults**/*file*.

Creating the Application app-defaults Files

OPEN LOOK associates a message class, name, and type with each message. Class is currently used to differentiate among the OPEN LOOK Toolkit, the supported OPEN LOOK clients, and other OPEN LOOK applications. A name and type pair is used to map to a unique message within a database file. Thus an entry in an Resource database file for OPEN LOOK has the following format:

```
*name.type: <default or local error message string>
```

Processing Text within an Application

Languages other than English may require different code set schemes and fonts. In addition, a text string may contain characters from different code sets. Drawing of such text strings requires knowledge of the code set scheme used for a language and the availability of specific fonts for that language. A facility has been provided in the Internationalized OPEN LOOK Toolkit to handle the drawing of encoded strings. See the "Structures" section below.

NOTE

If an application is using a `wchar_t` string and it calls the function `OlDrawString()`, then it is the responsibility of the application to convert a `wchar_t` string to a multibyte string (using `wcstombs`(3X)) before passing it to the function.

Structures

The following data structures are used to parse an encoded string and to query and store code set and font related information to facilitate drawing of encoded strings. Please see the *OPEN LOOK GUI Programmer's Guide* for more details.

`OlStrSegment`

The String Segment Information structure **`OlStrSegment`** is primarily intended to be used by a parsing utility. The parsing utility parses an encoded string and returns a sub-string in which all characters belong to the same character code set. The structure definition is as follows:

```
Typedef struct _OlStrSegment {
     unsigned short   code_set; /* EUC code set number */
     int              len;      /* length of the string segment */
     unsigned char    *str;     /* string segment */
} OlStrSegment;
```

`OlFontList`

The font list structure **`OlFontList`** caches the **`XFontStructs`** for locale-specific groups of fonts specified via the fontGroup resource. The element **`num`** contains the number of entries in the list. This structure is intended to be used with text drawing routines where the supplied graphics context (gc) needs to be updated with the font ID *Font* of the locale specific font before initiating an actual drawing request.

```
typedef struct _OlFontList {
   int          num;        /* number of XFontStruct in the list */
   XFontStruct ** fontl;    /* list of XFontStruct for local fonts */
   int          *cswidth;   /* list of char. width in csname array */
   char         ** csname;  /* list of char. code set names */
   char         *fgrpdef;
   } OlFontList;
```

Functions

OlDrawString()

The **OlDrawString** function is a general purpose text drawing utility meant to replace the Xlib function **XDrawString()** for drawing an EUC encoded string.

NOTE

The function OlDrawString() is meant for drawing a text string only. The global replacement of XDrawString() with OlDrawString() is not recommended to internationalize an existing application if the application uses a special fonts.

```
int
OlDrawString(display, drawable, fontlist, gc, x, y, string, len)
Display        *display;   /* display pointer */
Drawable       drawable;   /* drawable resource, e.g. window */
OlFontList     *fontlist;  /* list XFontStruct of localized fonts */
GC             gc;         /* gc to draw */
int            x, y;       /* Initial position for drawing string */
unsigned char  *string;    /* encoded string to be drawn */
int            len;        /* length of the string in bytes */
```

OlDrawImageString()

The **OlDrawImageString** function is a general purpose text drawing utility meant to replace the Xlib function **XDrawImageString()** for drawing an EUC encoded string.

```
OlDrawImageString(dpy, drawable, fontlist,  gc, x, y, string, len)
Display         *display;  /* display pointer */
Drawable        drawable;  /* drawable resource, e.g. window */
OlFontList      *fontlist; /* list XFontStruct of localized fonts */
GC              gc;        /* gc to draw */
int             x, y;      /* Initial position for drawing string */
unsigned char   *string;   /* encoded string to be drawn */
int             len;       /* length of the string in bytes */
```

`OlGetNextStrSegment()`

The `OlGetNextStrSegment()` function is a parsing utility that parses an EUC encoded string and returns a pre-allocated structure that contains a sub-string and necessary information about the sub-string to enable caller to identify/draw it.

```
int  OlGetNextStrSegment(fontlist, parse, str, len)
OlFontList       *fontlist;
OlStrSegment     *parse;
unsigned char    **str;
int              *len;
```

`OlCvtFontGroupToFontStructList()`

This converter prepares a list of **`XFontStruct`** for a specified *fontGroup* and returns a pointer to **`OlFontList`** structure. The returned font list is intended to be used by an application with a call to function **`OlDrawImageString`** If **`OlFontList`** is not NULL, then widgets can use the OPEN LOOK text drawing utilities (for example, **`OlDrawImageString()`**).

```
static Boolean
OlCvtFontGroupToFontStructList (display, args, num_args, from, to, CacheRef)
Display       *display;
XrmValue      *args;
Cardinal      *num_args;
XrmValue      *from;
XrmValue      *to;
XtPointer     *cache_ref;
```

OlTextWidth()

The OlTextWidth function computes and returns the length of the given string in pixels. The functionality is similar to **XTextwidth** except that the string may be EUC encoded in multibyte format. The sub-string returned by **OlGet-NextStrSegment()** is used to compute the length of string in pixels.

```
int OlTextWidth(fontlist, string, len)
FontList      *fontlist;
unsigned char *string;
int           len;
```

OlFontInfo

This structure keeps track of the maximum values of various font properties for **XFontStruct** in the **OlFontList** structure. It is initialized and returned by the function **OlMaxFontInfo()**. The information is used by **Button** and **Caption** widget drawing routines and may be used by an application to determine maximum ascent, descent, height and width prior to calling drawing utilities. The structure definition is as follows:

```
typedef Struct _OlFontInfo
      {
      int  ascent;
      int  descent;
      int  height;
      int  width;
      } OlFontInfo;
```

OlMaxFontInfo()

This routine is a general purpose routine that returns a **OlFontInfo** structure that contains maximum values for various font properties, given an **OlFontList**.

```
OlFontInfo
OlMaxFontInfo(fontlist)
OlFontList * fontlist;
```

Input Method

Unlike English, some languages require several key strokes to enter one character. Moreover, the same set of key strokes may map to more than one character. For GUIs to behave correctly with these languages in text input mode, a mechanism must exist that maps key strokes to characters, possibly with some linguistic help and user interaction. Such a mechanism is widely known as the Input Method. The implementation of an Input Method may vary depending upon the language. However, all Input Methods perform two major tasks:

1. composing characters from key strokes (commonly known as pre-editing)
2. echoing user key strokes somewhere on screen as an acknowledgement of user action.

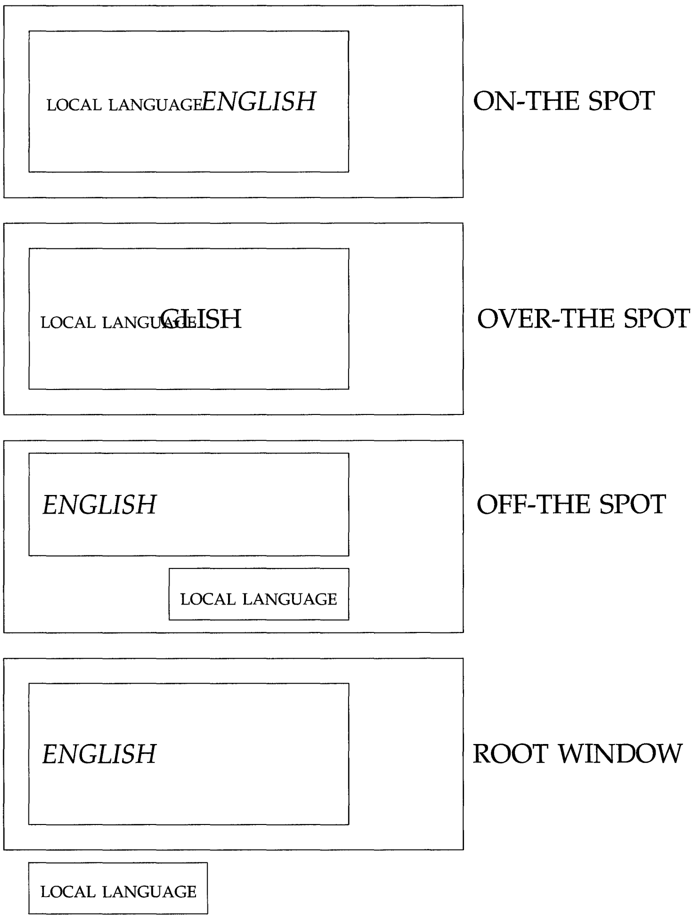
Besides variations in the Input Method implementation due to language specific requirements, a particular implementation may also be influenced by other factors such as, its placement of **`pre-edit`** window where user key strokes are echoed. The following paragraphs discuss various alternatives for pre-editing.

Based upon the placement of the **`pre-edit`** window, the pre-editing phase may be classified into four categories:

`on-the-spot`	In **`on-the-spot`** pre-editing, scrolling data lines displayed in the same window as the completed text. This is achieved by moving and scrolling data in the window along the caret every time new key strokes are entered or characters are composed.
`over-the-spot`	The **`over-the-spot`** pre-editing implements a separate window to display pre-edit key strokes. This window overlaps the text insertion window to provide a visual feedback which is similar to the **`on-the-spot`**. Although, scrolling of data is not required in this category, the pre-edit window itself may need to be moved, so as not to obscure newly completed text.
`off-the-spot`	**`off-the-spot`** pre-editing is a simplified version of **`over-the-spot`**, in which a pre-edit window is placed directly under the text insertion window. Doing so, does not require moving of pre-edit window since both pre-edit characters and composed characters are visible at the same time (in different windows).

root window — The last category, **root window** is similar to **off-the-spot** except that it employs one pre-edit window (usually, at bottom of the screen) for all applications.

Figure 6-4: Four kinds of Input Methods



The OPEN LOOK Toolkit provides the hooks for the **over-the-spot** method.

Additionally, an Input Method may be implemented either as a *front-end* or a *back-end* localized library. In the *front-end* implementation, Input Method intercepts all key (press) events coming from X server, filters some special keys (for example, "Compose" key), echoes user key strokes in pre-edit window, and sends composed characters to the application text insertion window, usually when a special *compose-key* is entered by the user. In the *back-end* implementation, user key strokes go to the application from X server as usual and the application passes the keys to an Input Method to receive composed character. Both methods may use a localized library or a server to compose characters from user key strokes.

The Localization Package for the Input Method

A set of locale dependent functions for the Input Method have been defined. The following list of routines should be provided by any Input Method that is designed to work with the OPEN LOOK Toolkit.

```
OlCloseIm
OlOpenIm
OlResetIc
OlImofIc
OlCreateIc
OlDestroyIc
OlGetImValues
OlSetIcFocus
OlUnsetIcFocus
OlGetIcValues
OlSetIcValues
OlLookupImString
OlDisplayOfIm
OlLocaleOfIm
```

A library containing these functions for a particular locale should be installed in *usr/X/lib/locale/*`locale_name`. The name of the library must be in the form *im_name.so*. At runtime, the Toolkit will automatically link in the input method library using the UNIX System V Release 4 dynamic linking facility.

NOTE

If you wish to use an alternate path for a dynamic Input Method library, then set the shell variable **OLIMLIBPATH** to the directory path that contains the IM library.

Structures

The Toolkit requires additional data structures to support Input Methods. These data structures communicate information between the client and the Input Method. They are initialized and manipulated by Input Method functions.

NOTE

Some of the fields provided in the following structure may not be used for a particular pre-edit implementation. This design assumes a shared pre-edit window, that can be used either as an *under-the-spot* or an *over-the-spot*.

OlImStyles

The **OlImStyles** structure contains supported style for the pre-edit window. A convenience function **OlGetImValues** returns a pointer to this structure.

```
typedef unsigned short OlImStyle;
typedef struct _OlImStyles {
        short styles_count;
        OlImstyle   * supported_styles;
        } OlImStyles;
```

OlIm

The Input Method data structure **OlIm** contains global information about an Input Method. It is created by the Input Method function **OlOpenIm** and destroyed by the **OlCloseIm** function when no longer needed. There is one instance of this structure per application (if the locale under which the application runs, requires one). The structure definition is as follows.

```
typedef struct _OlIm {
    struct _OlIc    *iclist;       /* Input context list */
    OlImStyles       im_styles;    /* supported pre-edit types */
    OlImValuesList   imvalues;
    char             *appl_name;   /* application name */
    char             *appl_class;  /* application class */
  long               version;      /* OPEN LOOK version */
  void               *imtype;      /* hook for IM specific data */
  } OlIm;
```

OlIc

The Input Context structure **OlIc** contains necessary information about a text window that is needed when the user enters into *pre-edit* mode. There is one such structure for each text window in an application. It is used to advise the Input Method on the placement of pre-edit window, status window, their attributes, fonts to use to draw text in the pre-edit window and so on. This structure is initialized by the Input Method **OlCreatIc** function and is destroyed by the **OlDestroy()** function when no longer needed. The structure definition is as follows.

```
struct _OlIc {
   Window          cl_win;    /* client window ID */
   XRectangle      cl_area;   /* client area for pre-edit window */
   Window          focus_win; /* focus window ID */
   OlIcWindowAttr  s_attr;    /* attributes for status window */
   XRectangle      s_area;    /* area for status window */
   OlIcWindowAttr  pre_attr;  /* attributes for pre-edit window */
   XRectangle      pre_area;  /* area for pre-edit window */
   OlImStyle       style;     /* styles needed for this IC */
   XPoint          spot;      /* cur. cursor location in text win. */
   struct _OlIm    *im;       /* ptr. to OlIm structure */
   struct _OlIc    *nextic;   /* ptr. to next in list */
   void            *ictype;   /* IM specific hook */
   } OlIc;
```

OlIcValues

The **OlIcValues** structure defines a list of input context attribute names and value pairs. It is used by the following:

1. an application to communicate to the Input Method the desired attributes for its input contexts
2. by **TextEdit** widget or *xterm* to alter/retrieve attribute values

The end of the list is indicated by a NULL value for the attribute name.

```
typedef struct _OlIcValues {
            char * attr_name;
            void * attr_value;
            } OlIcValues;

typedef OlIcValues * OlIcValuesList;
```

Attribute Name	Attribute Value Type
OlclientArea	XRectangle
OlclientWindow	Window
OlclientAttributes	pointer to OlImWinAttributes
OlstatusArea	XRectAngle
OlstatusAttributes	pointer to OLImWinAttributes
OlcursorLocation	XPoint
OlImFontList	pointer to OlFontList
OlLineSpacing	unsigned short (number of pixels)

OlImFunctions

This structure contains addresses of locale dependent Input Method functions. The structure is initialized by an Input Method stub function **OlSetupInput-Method()**, at the initialization time (and subsequently when an application wants to switch Input Method based on a change in its current locale). On UNIX System V Release 4 systems, the localization package is provided as a dynamic shared library, and in that case the functions' addresses are initialized using the dynamic library linker functions from section (3X). The structure definition is as follows:

```
typedef struct _OlImFunctions {
        OlIm     *(*OlOpenIm)();
        void      (*OlCloseIm)();
        OlIc     *(*OlCreateIc)();
        int       (*OlLookupImString)();
        void      (*OlDestroyIc)();
        void      (*OlSetIcFocus)();
        void      (*OlUnsetIcFocus)();
        char     *(*OlGetIcValues)();
        char     *(*OlSetIcValues)();
        char     *(*ResetIc)();
        OlIm     *(*OlImOfIc)();
        Display  *(*OlDisplayOfIm)();
        char     *(*OlLocaleOfIm)();
        void      (*OlGetImValues)();
        } OlImFunctions;
```

The following list briefly describes each of the above functions. More information is offered in the next subsection and in the *OPEN LOOK GUI Programmer's Guide*.

`OlOpenImI()`
: is responsible for opening the locale dependent Input Method and initializing the **OlIm** structure.

`OlCloseIm()`
: is responsible for closing the Input Method and destroying data structure associated with it.

`OlCreateIc()`
: is responsible for creating an "input context" within the Input Method. The function also creates and initializes an **OlIc** structure.

`OlDestroyIc()`
: destroys an input context created by **OlCreateIc()** function and removes any data structures associated with it.

`OlLookupImString()`
: is responsible for obtaining a string and/or keysym associated with user key strokes in pre-edit mode.

`OlSetIcFocus()`
: sets and keeps track of Input Focus for an input context.

`OlUnsetIcFocus()`
: unsets the Input Focus from an input context.

`OlGetIcValues()`
: is a convenience function to retrieve input context attributes.

`OlSetIcValues()`
: is a convenience function to set/alter input context attributes and description.

`OlImOfIc()`
: returns a pointer to an **`OlIM`** structure associated with the specified Input Context.

`OlResetIc()`
: resets the input context to its initial state.

`OlDisplayOfIm()`
: returns a pointer to the display corresponding to the given Input Method.

`OlLocaleOfIm()`
: returns a locale name string under which the specified Input Method runs.

`OlGetImValues()`
: returns a list of properties and features supported by the Input Method.

`OlIcWindowAttr`

This structure contains some window attributes that are needed by an Input Method to implement Toolkit-defined *look and feel* of the pre-edit window (and perhaps status window). The *line_spacing* field specifies the space in pixels between lines in a text window. This information may be used by the Input Method for proper placement of a pre-edit window. The *cursorcolor* and *colormap* information may remain unused. The structure definition is as follows.

NOTE

The `OlImCallback` structure provides support for the use of on-the-spot Input Methods. It is used by an application to pass the addresses of pre-editing callback functions to the input method. See **OlSetIcValues** (the attribute of **OlNcallbacks**) for a description of the callback functions to be provided. Note that the TextEdit widget supports over-the-spot Input Methods and does not use pre-edit callbacks.

```
typedef struct _OlImCallback {
    OlImValues   client_data;
    OlImProc     callback;
    } OlImCallback;

typedef struct _OlIcWindowAttr {
    Pixel       background;   /* background pixel */
    Pixel       foreground;   /* background pixel */
    Colormap    colormap;     /* colormap for pre-edit to use */
    Colormap    std_colormap;
    Pixmap      back_pixmap;  /* background pixmap for IM to use */
    OlFontList  fontlist;     /* font list for text drawing */
    int         spacing;      /* line spacing for text lines in PE */
    Cursor      cursor;       /* cursor to use for PE window */
    OlImCallback callback[NUM_IM_CALLBACKS];
    } OlIcWindowAttr;
```

Functions

All of the functions described in this section are provided by the localization library for the Input Method. These functions are used by the TextEdit widget and the **xterm** client.

`OlCreateIc()`

The **OlCreateIc()** is used to register a client text insertion window with Input Method. It is responsible for creating a *context* within an Input Method and initializing necessary data structures for later use by other Input Method functions that manipulate a pre-edit window or its contents.

```
OlIc *OlCreateIc(im, icvalues_list)
OlIm       *im;
OlIcValues *icvalues;
```

OlDestroyIc() The **OlDestroyIc** function is responsible for destroying the input context associated with a text insertion window that was created by the **OlCreateIc** function. The Input Method destroys all internal data structures for the input context.

```
void OlDestroyIc(ic)
OlIc * ic;
```

OlSetIcFocus()

The **OlSetIcFocus()** function should set the internal state of an input method to indicate that the text insertion window associated with the **ic** argument has received the input focus.

```
void OlSetIcFocus(ic)
OlIc * ic;
```

OlUnsetIcFocus()

The **OlUnsetIcFocus** function should set the internal state of an input method and indicate that the last insertion window associated with the **ic** argument has lost input focus.

```
void OlUnsetIcFocus(ic)
OlIc * ic;
```

OlGetIcValues()

The caller of the **OlGetIcValues** function passes a **OlIcValues** list with a set of attribute names whose values are desired. The function fills in the values for those attributes and returns it to the caller. The input method may unmap the status window for the input context and ungrab the keyboard.

```
char* OlGetIcValues(ic, icvalues)
OlIc * ic;
OlIcValues icvalues;
```

OlSetIcValues()

The **OlSetIcValues** function is responsible for setting/altering the fields of the **OlIc** structure based on the attribute values passed. The caller of this function passes an **OlIcValues** list containing a list of *(attribute, value-name,)* pairs. The function updates the **OlIc** structure appropriately.

```
char
OlSetIcValues(ic, icvalues)
OlIc * ic;
OlIcValues icvalues;
```

`OlLookupImString()`

The **OlLookupImString** function is similar to the Xlib function, **XLookup-String()** except that it takes an extra **ic** argument and may or may not return any string for the given key(press) event. It serves as an entry-point into the Input Method. The function sets up the necessary environment for pre-edit mode. It returns a composed character when available.

```
int
OlLookupImString(event, ic, buffer_return, buffer_len,
             keysym_return, status_return)
KeyEvent     *event;
OlIc         *input_context;
char         *buffer_return;
int           buffer_len;
KeySym       *keysym_return;
OlImStatus   *status_return;
```

Other Changes

The following changes are here for your information only. The changes are for the most part internal to the Toolkit.

TextEdit Widget

The **TextEdit** widget provides full text editing functionality in the OPEN LOOK widget set. The **TextEdit** widget supports the input and storage of multibyte characters. It hides details of the Input Method from the application programmer. All OPEN LOOK utilities that manipulate TextEdit widget data have been modified to handle multibyte characters. (Backwards compatibility has been preserved.) The **TextEdit** widget supports over-the-spot input methods. (Both front-end and back-end input methods are supported.)

xterm

`xterm` provides terminal emulation capabilities in the OPEN LOOK environment. It provides users with a UNIX shell environment and text editing ability. Because xterm is a self-contained application in the sense that it does not rely on a **`TextEdit`** widget for text processing, it provides the same Input Method mechanism provided by the **`TextEdit`** widget. Being an OPEN LOOK application, xterm uses the **`OlInitialize()`** routine and hence it automatically inherits the locale announcement mechanism.

7 Extensive Widget Sampler Program

Design Objectives

The sampler program includes all of the widgets, gadgets, and flattened widgets that comprise the OPEN LOOK toolkit.

The program is of value both to the applications programmer and to the end-user. The end-user can get a practical sense of what it is like to work with each of the widgets. The applications programmer can use it as a springboard for initial development since it presents a step-by-step approach to creating and using each one of the OPEN LOOK widgets.

The program is densely commented and, therefore, is not annotated.

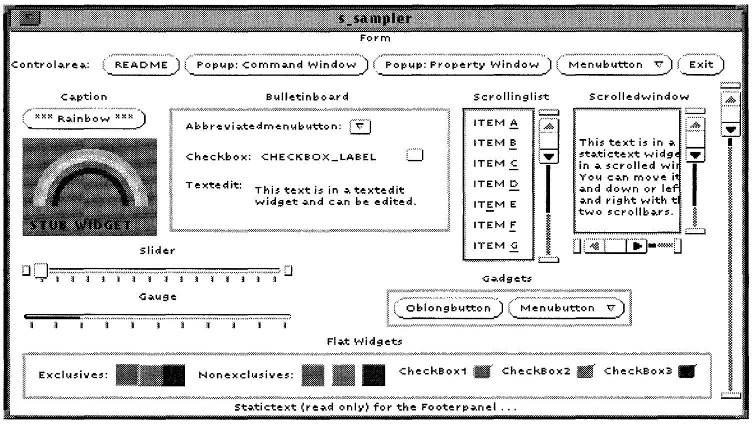
Most of the widget definitions use at least a subset of possible resources to demonstrate some of its functionality. Often, where a particular coding objective could be achieved in several ways, both are used as illustration - for example, in naming widgets and setting widget resources.

Excerpts from this example appear as a section in Chapter 3 of this document. The excerpts include the creation and use of the textfield widget to enter data, the slider widget, the stub widget and the placement of widgets on the form. The excerpts are heavily annotated.

The source code of the program is included in the product release and can be found in **/usr/X/lib/tutorial/Xol/s_sampler.c**.

The following figure shows the output of the widget sampler.

Figure 7-1: The Open Look Widget Sampler



This text is in a textedit widget and can be edited.

This text is in a statictext widge
in a scrolled wi
You can move it
and down or lef
and right with t
two scrollbars.

Statictext (read only) for the Footerpanel ...

Program Description

```
/**************************************************************
/*     OPEN LOOK WIDGET SAMPLER : prototype widgets and use of form
/*
/*     Copyright (c) 1989 AT&T
/*     Copyright (c) 1988 Hewlett-Packard Company
/*     Copyright (c) 1988 Massachusetts Institute of Technology
/**************************************************************

#include <stdio.h>

/*
 * Headers required for all OPEN LOOK applications.
 */

#include <X11/Intrinsic.h>
#include <X11/StringDefs.h>
#include <Xol/OpenLook.h>

/*
 * Headers required for creating widget instances.
 */

#include <Xol/AbbrevMenu.h>
#include <Xol/BulletinBo.h>
#include <Xol/Button.h>
#include <Xol/Caption.h>
#include <Xol/CheckBox.h>
#include <Xol/ControlAre.h>
#include <Xol/Exclusives.h>
#include <Xol/FooterPane.h>
#include <Xol/Form.h>
#include <Xol/Gauge.h>
#include <Xol/MenuButton.h>
#include <Xol/Nonexclusi.h>
#include <Xol/Notice.h>
#include <Xol/OblongButt.h>
#include <Xol/PopupWindo.h>
#include <Xol/RectButton.h>
#include <Xol/Scrollbar.h>
```

```
#include <Xol/ScrolledWi.h>
#include <Xol/ScrollingL.h>
#include <X11/Shell.h>
#include <Xol/Slider.h>
#include <Xol/StaticText.h>
#include <Xol/Stub.h>
#include <Xol/TextEdit.h>
#include <Xol/TextField.h>

/*
 * Headers required for creating flat widget instances.
 */

#include <Xol/FExclusive.h>
#include <Xol/FNonexclus.h>
#include <Xol/FCheckBox.h>

/*
 * icon.xpm is the pixmap for the application's icon
 */

#include "icon.xpm"

/*
 * Defines.
 */

#define MAXTEXT 1000
#define MAXBUF  100

/*
 * Ol_PointToPixel scales to the current screen resolution.
 */

#define N1_H_PIXEL Ol_PointToPixel(OL_HORIZONTAL,1)
#define N1_V_PIXEL Ol_PointToPixel(OL_VERTICAL,1)
#define N10_H_PIXELS Ol_PointToPixel(OL_HORIZONTAL,10)
#define N10_V_PIXELS Ol_PointToPixel(OL_VERTICAL,10)
#define N50_V_PIXELS Ol_PointToPixel(OL_VERTICAL,50)
#define N100_H_PIXELS Ol_PointToPixel(OL_HORIZONTAL,100)
```

```
#define N100_V_PIXELS Ol_PointToPixel(OL_VERTICAL,100)
#define N150_H_PIXELS Ol_PointToPixel(OL_HORIZONTAL,150)
#define N150_V_PIXELS Ol_PointToPixel(OL_VERTICAL,150)
#define N200_H_PIXELS Ol_PointToPixel(OL_HORIZONTAL,200)

/*
 * Global variables.
 */

static Pixel     red_pixel,blue_pixel,purple_pixel,green_pixel,
                 yellow_pixel,orange_pixel,skyblue_pixel;

static int       i;

static Boolean   rainbow = FALSE;

/*
 * Note: In many cases, a widget is labelled by making it the
 * child of a caption, which itself is a child of the form.
 */

static Widget    toplevel,
                 controlarea,cabutton,
                 form,
                 gauge,
                 abbmenu_caption, /* caption for abbreviatedmenubutton */
                 bb_caption,      /* caption for bulletinboard */
                 ca_caption,      /* caption for controlarea */
                 caption,         /* "True" caption */
                 cb_caption,      /* caption for checkbox */
                 f_caption,       /* caption for flats */
                 fm_caption,      /* caption for form */
                 gd_caption,      /* caption for gadgets */
                 g_caption,       /* caption for gauge */
                 slist_caption,   /* caption for scrollinglist */
                 slider_caption,  /* caption for slider */
                 te_caption,      /* caption for textedit */
                 sw_caption,      /* caption for scrolledwindow */
                 nonexclusives,nebutton2,nebutton3,
                 noticeshell,noticebox,
                popupshell0,
                popupshell1,
                popupshell2,
                scrollbar,
                stub,
                footer_text;

/*
 * Form constraint resources used for most widgets in application.
 */

static Arg genericARGS[] = {

        { XtNxRefName, NULL },
        { XtNyRefName, NULL },
        { XtNxOffset,(XtArgVal) 0 },     /* to be initialized below */
        { XtNyOffset,(XtArgVal) 0 },     /* to be initialized below */
        { XtNxAddWidth,(XtArgVal) TRUE },
        { XtNyAddHeight,(XtArgVal) TRUE },
};

/*
 * UTILITY FUNCTIONS
 */

/*
 * Function to vary value displayed in gauge widget.
 */

static void
ChangeGauge(widget)
        Widget widget;
{
        Arg arg;
        int current_value;

        XtSetArg(arg,XtNsliderValue,&current_value);
        XtGetValues(widget,&arg,1);

        current_value+=10;
        if(current_value>100)
                current_value=0;

/*
 * The following convenience routine is faster than a SetValues.
 */
        OlSetGaugeValue(gauge,current_value);
}

/*
 * Xt and Xlib examples to give functionality to the stub widget.
 */

static void
DrawAndPrint(widget,xevent,region)
        Widget widget;
        XEvent *xevent; /* not used */
        Region region;  /* not used */
{
        Display *display;
        static Window window;
        static Boolean done1 = FALSE, done2 = FALSE;
        static GC gc[6];
        XGCValues values;
        int i, ix5, ix10, coord, axis, finish = 180*64;
        static int hpixel,vpixel;
        Font fid = (Font)0;
        char *fontname = "*12bluci";
        XtGCMask mask;

        display = XtDisplay(widget);
        window = XtWindow(widget);

        if(!done1) {
                hpixel = (int) N1_H_PIXEL;
                vpixel = (int) N1_V_PIXEL;
                if(hpixel==0)
                        hpixel=1;
                if(vpixel==0)
                        vpixel=1;
                done1 = TRUE;
        }

        if(rainbow) {

                values.line_width = 5*hpixel;

                if(!done2) {
                        mask = (XtGCMask) (GCForeground | GCLineWidth);

                        values.foreground = red_pixel;
                        gc[0]= XtGetGC(widget,mask, &values);
                        values.foreground = orange_pixel;
                        gc[1]= XtGetGC(widget,mask, &values);
                        values.foreground = yellow_pixel;
                        gc[2]= XtGetGC(widget,mask, &values);
                        values.foreground = green_pixel;
                        gc[3]= XtGetGC(widget,mask, &values);
                        values.foreground = blue_pixel;
                        gc[4]= XtGetGC(widget,mask, &values);
                        values.foreground = purple_pixel;
                        gc[5]= XtGetGC(widget,mask, &values);
                }

                for(i=0;i<6;i++) {

                        ix5 = i*5;
                        ix10 = i*10;

                        axis = 95 - ix10;
                        coord = ix5 + 5;

                        XDrawArc(    display, window, gc[i],
                                     coord*hpixel,
                                     coord*vpixel,
                                     (unsigned int) (axis*hpixel),
                                     (unsigned int) (axis*vpixel),
                                     0,finish);
                }
        }
        else
                XClearWindow(display,window);

/*
 * Get font for this screen resolution.
 */

        fontname[0] = OlGetResolution(XtScreen(widget));
        fid = XLoadFont(display,fontname);

/*
 * If successful, label the widget.
 */

        if(fid != (Font)0) {
        values.font = fid;
        gc[0] = XtGetGC(widget,(XtGCMask) GCFont, &values);
        XDrawString(display,window,gc[0],5*hpixel,
                        70*vpixel,"STUB WIDGET",11);
        XtReleaseGC(stub,gc[0]);
        XUnloadFont(display,fid);
        }
/*
 * This function merely varies the value displayed in the gauge.
 */

        ChangeGauge(gauge);
}

/*
 * Function for changing the footer message.
 */

static void FooterMessage(footer_text,buf)
Widget footer_text;
char buf[];
{
        Arg arg;

        XtSetArg(arg,XtNstring,buf);
        XtSetValues(footer_text,&arg,1);
}

/*
 * Function for getting color values for the display.
 */

static void
GetColors
{
        XrmValue fromValue,toValue;

        static char *colors[] = {
                "purple","blue","green",
                "yellow","orange","red","skyblue"
        };

        int ncolors = 7;

        for(i=0;i<7;i++) {
                fromValue.size = sizeof(colors[i]);
                fromValue.addr = colors[i];
                XtConvert(toplevel,
                        XtRString,&fromValue,XtRPixel,&toValue);
                switch(i) {
                        case 0:
                                purple_pixel = *((Pixel *)toValue.addr);
                                break;
                        case 1:
                                blue_pixel = *((Pixel *)toValue.addr);
                                break;
                        case 2:
                                green_pixel = *((Pixel *)toValue.addr);
                                break;
                        case 3:
                                yellow_pixel = *((Pixel *)toValue.addr);
                                break;
                        case 4:
                                orange_pixel = *((Pixel *)toValue.addr);
                                break;
                        case 5:
                                red_pixel = *((Pixel *)toValue.addr);
                                break;
                        case 6:
                                skyblue_pixel= *((Pixel *)toValue.addr);
                                break;
                }
        }
}

/*
 * Function for positioning widgets on the form.
 *
 * Note: XtNx[y]RefName are used instead of XtNx[y]RefWidget so
 * that resources for each widget can be set in an .Xdefaults
 * file.  In addition, this also allows specifying the placement
 * of any widget on the form without first having to place the
 * corresponding reference widget(s) on the form.  (This would
 * NOT be the case with the XtNx[y]RefWidget resource).
 */

static void
SetPosition(widget, xwidget, ywidget)
Widget widget;
char *xwidget, *ywidget;
{
        static int nargs;

        if(nargs == 0)
                nargs = XtNumber(genericARGS);

        genericARGS[0].value = (XtArgVal) xwidget;
        genericARGS[1].value = (XtArgVal) ywidget;
        XtSetValues(widget,genericARGS,nargs);
}

/*
 * Function for creating a custom icon for the application.
 */
```

```
static void
SetProgramIcon(toplevel)
        Widget toplevel;
{
        Pixmap program_icon;
        Arg arg[2];
        int i;
        Screen *screen;

        screen = XtScreen(toplevel);

/*
 * "icon_" values from icon.xpm
 */

        program_icon = XCreatePixmapFromData( XtDisplay(toplevel),
                                RootWindowOfScreen(screen),
                                DefaultColormapOfScreen(screen),
                                icon_width,icon_height,
                                DefaultDepthOfScreen(screen),
                                icon_ncolors,
                                icon_chars_per_pixel,
                                icon_colors,
                                icon_pixels);
        i=0;
        XtSetArg(arg[i],XtNiconPixmap,(XtArgVal) program_icon); i++;
        XtSetArg(arg[i],XtNiconName,(XtArgVal) "s_sampler"); i++;
        XtSetValues(toplevel,arg,i);
}

/*
 * Function for creating a special cursor for the stub widget.
 */

static void
SetStubCursor(widget)
        Widget widget;
{
        static Cursor cursor;
/*
 * See OlCorsor.c for other cursor possibilities.
 */

        cursor = GetOlQuestionCursor(XtScreen(widget));
        XDefineCursor(XtDisplay(widget),XtWindow(widget),cursor);
}

/*
 *  Event handler example to give functionality to the stub widget.
 */

static void
StubEventHandler(widget,clientData,event)
        Widget widget;
        XtPointer clientData;
        XEvent *event;
{
        XCrossingEvent *xce;

/*
 * The xce pointer allows referencing to event specifics - see Xlib.h
 */

        if(event->type==EnterNotify || event->type==LeaveNotify)
                xce = (XCrossingEvent *) &(event->xcrossing);
        else
                return;

        if(event->type ==EnterNotify)
                FooterMessage(footer_text,
                        "Footerpanel: Pointer entered STUB widget");
        else
                FooterMessage(footer_text,
                        "Footerpanel: Pointer left STUB widget");
}

/*
 * CALLBACKS FOR WIDGETS
 */
```

```
/*
 * With this callback, each widget passes its index as
 * clientData and thus maps to its own footerpanel message.
 */
static void
genericCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        int n = (int) clientData;
        switch(n) {
                case 1:
                FooterMessage(footer_text,
                        "Footerpanel: OBLONGBUTTON callback");
                break;
                case 2:
                case 3:
                case 4:
                {
                char buf[MAXBUF];

                sprintf(buf,
                "Footerpanel: [NON] EXCLUSIVES callback for button %d",n-1);
                FooterMessage(footer_text,buf);
                }
                break;
                case 5:
                FooterMessage(footer_text,
                        "Footerpanel: POPUP apply callback");
                break;
                case 6:
                    FooterMessage(footer_text,
                            "Footerpanel: POPUP setdefaults callback");
                    break;

                    case 7:

                    FooterMessage(footer_text,
                            "Footerpanel: POPUP reset callback");
                    break;

                    case 8:

                    FooterMessage(footer_text,
                            "Footerpanel: POPUP resetfactory callback");
                    break;

                    case 9:

                    FooterMessage(footer_text,
                            "Footerpanel: OBLONGBUTTONGADGET callback");
                    break;

                    case 10:

                    FooterMessage(footer_text,
                            "Footerpanel: FLAT select callback");
                    break;
        }
}

static void
checkboxCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData, callData;
{
        Arg arg;
        OlDefine position;
/*
 * Get the current value.
 */
        XtSetArg(arg,XtNposition,&position);
        XtGetValues(widget,&arg,1);

/*
 * Toggle it.
 */
        if(position == (OlDefine) OL_LEFT)
                XtSetArg(arg,XtNposition,OL_RIGHT);
        else
                XtSetArg(arg,XtNposition,OL_LEFT);

        XtSetValues(widget,&arg,1);
}

/*
 * The MenuSelectCB callback is used by the pulldown menu
 * popup menu, and abbreviatedmenubutton widget and gadget.
 */

static void
menuSelectCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        int n = (int) clientData;
        char buf[MAXBUF];

        sprintf(buf,"Footerpanel: Button %d selected",n);
        FooterMessage(footer_text,buf);
}

static void
nonexclusivesCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        Widget parent = (Widget) clientData;

/*
```

```
 * If only "More" button, create "Fewer" button.
 */
        if(widget == nebutton2 && nebutton3 == (Widget) 0) {
                nebutton3 = XtCreateManagedWidget
                        ("Fewer",rectButtonWidgetClass,parent,NULL,0);
                XtAddCallback(nebutton3,XtNselect,
                        nonexclusivesCB,(XtPointer) nonexclusives);
                XtAddCallback(nebutton3,XtNselect,
                        genericCB,(XtPointer) 4);

        }

/*
 * If all three buttons, delete "Fewer" button.
 */

        else if(widget == nebutton3 && nebutton3 != (Widget)0) {
                XtDestroyWidget(nebutton3);
                nebutton3 = (Widget) 0;
        }
}

static void
noticeCB1(widget,callData,clientData)
        Widget widget;  /* w = emanating button:
                                        where notice does popup */
        XtPointer callData, clientData;
{
        Arg arg;

        XtSetArg(arg, XtNemanateWidget, (XtArgVal)widget);
        XtSetValues(noticebox, &arg, 1);
        XtPopup(noticeshell, XtGrabExclusive);
}

static void
noticeCB2(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        FooterMessage(footer_text,"Footerpanel: ADIOS !!!");
        exit(0);
}

static void
popupCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        XtPopup(clientData,XtGrabNone);
}

/*
 * The rainbowCB callback is for the RAINBOW button.
 */

static void
rainbowCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        if(rainbow)
                rainbow=FALSE;
        else
                rainbow=TRUE;

        DrawAndPrint(stub,(XEvent *)0,(Region)0);
}

/*
 * This callback is used by all three scrollbars.
 */

static void
scrollbarCB(widget,clientData,callData)
    Widget widget;
    XtPointer clientData,callData;
{
        OlScrollbarVerify *sbv = (OlScrollbarVerify *) callData;
        int n = (int) clientData;
        char buf[MAXBUF];

        sbv->ok = TRUE;

        switch(n) {
                case 0:

                sprintf(buf,
                "Footerpanel: Form scrollbar moved to %d%%",
                        sbv->new_location);

                break;

                case 1:

                sprintf(buf,
                "Footerpanel: Scrolledwindow vertical scrollbar moved");

                break;

                case 2:

                sprintf(buf,
                "Footerpanel: Scrolledwindow horizontal scrollbar moved");

                break;
        }

        FooterMessage(footer_text,buf);

/*
 * Update the form's scrollbar page indicator.
 */
        if(widget==scrollbar)
                sbv->new_page = (int) (sbv->new_location/10) + 1;
}

static void
scrollinglistCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        OlListToken token = (OlListToken) callData;
        OlListItem *selected_listitem;
        char buf[MAXBUF];

/*
 * This macro identifies the item selected.
 */

        selected_listitem = OlListItemPointer(token);


        sprintf(buf,
                "Footerpanel: SCROLLING LIST : Item label %s Data stored %d",
                selected_listitem->label,selected_listitem->user_data);
        FooterMessage(footer_text,buf);
}

static void
sliderCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        Arg arg;

/*
 * Slider returns current value.
 */
        arg.value = (XtArgVal) *callData;
        XtSetArg(arg,XtNbackground,arg.value);
        XtSetValues(stub,&arg,1);
}

static void
textfieldCB(widget,clientData,callData)
        Widget widget;
        XtPointer clientData,callData;
{
        OlTextFieldVerify *tfv = (OlTextFieldVerify *) callData;
        char buf[MAXBUF];
        Arg arg;


        sprintf(buf,"Footerpanel: TEXTFIELD User Input: %s0,
                tfv->string);
        FooterMessage(footer_text,buf);

        XtSetArg(arg,XtNstring,(XtArgVal) "");
        XtSetValues(widget,&arg,1);
}

/*
 * THE WIDGET TREE:
 *
 *                              Toplevel
 *                                 |
 *                            Footerpanel
 *                               /    x
 *                            Form     Statictext
 *                             /
 *                 Remaining OPEN LOOK widgets, gadgets, and flats
 */

/*
 * MAIN
 */

int main(argc,argv)
        int argc;
        char *argv[];
{

        Arg arg[10];

/*
 * Initialize the environment.
 */

{
        toplevel = OlInitialize( "s_sampler",
                                "s_sampler",
                                (XrmOptionDescRec *) NULL,
                                (Cardinal) 0,
                                &argc,
                                argv);

        i=0;
        XtSetArg(arg[i],XtNtitle,(XtArgVal) "s_sampler");i++;
        XtSetValues(toplevel,arg,i);

/*
 * Get colors to use later.
 */
        GetColors;

/*
 * Set the pixmap for program icon window
 */
        SetProgramIcon(toplevel);

/*
 * Set FORM resources for the specific screen.
 */

        genericARGS[2].value = (XtArgVal) N10_H_PIXELS;
        genericARGS[3].value = (XtArgVal) N10_V_PIXELS;
}

/*
 * Make all the widgets and then do placement on the form last.
 */

/*
 * FOOTERPANEL: This will be the child of toplevel, with
 * the FORM as the topchild and STATICTEXT as the footer child.
 */

{
        Widget footerpanel;
        footerpanel = XtCreateManagedWidget("footerpanel",
                footerPanelWidgetClass,toplevel,NULL,0);

/*
 * FORM: Form's caption is the top child of the footerpanel.
 */

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Form"); i++;
        fm_caption = XtCreateManagedWidget("fm_caption",
                captionWidgetClass,footerpanel,arg,i);

        form = XtCreateManagedWidget("form",
                        formWidgetClass,fm_caption,NULL,0);

/*
 * Register help for the form, using the file "form.help"
 */

        (void) OlRegisterHelp(   OL_WIDGET_HELP,(XtPointer) form,
        "Form Widget",OL_DISK_SOURCE,"/usr/X/lib/tutorial/Xol/form.help");

/*
 * Make STATICTEXT as the footer child of the footerpanel.
 */

        i = 0;
        XtSetArg(arg[i], XtNstring,
                (XtArgVal) "Statictext (read only) for the Footerpanel . . . ");
        i++;
        footer_text = XtCreateManagedWidget("statictext",
                staticTextWidgetClass,footerpanel,arg,i);
}

/*
 * All the remaining widgets will be on the form.
 */
```

```
/*
 * CAPTION: to label the controlarea, latter to be created next.
 */

        i = 0;
        XtSetArg(arg[i],XtNxResizable,(XtArgVal) TRUE); i++;
        XtSetArg(arg[i],XtNxAttachRight,(XtArgVal) TRUE); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Controlarea: "); i++;
        ca_caption = XtCreateManagedWidget("ca_caption",
                captionWidgetClass,form,arg,i);

/*
 * CONTROLAREA: the control area contains a README oblongbutton with
 * with a popup statictext message, a popup command window, a popup
 * property window, and an EXIT button with a notice widget which pops
 * up when the button is selected.
 */

{
        Widget widget,popupca01;
        static char stext[MAXTEXT];
        FILE *fp = (FILE *) NULL;

        controlarea = XtCreateManagedWidget("controlarea",
                controlAreaWidgetClass,ca_caption,NULL,0);

        widget = XtCreateManagedWidget("README",
                oblongButtonWidgetClass,controlarea,NULL,0);
        i=0;
        XtSetArg(arg[i],XtNtitle,"README"); i++;
        popupshell0 = XtCreatePopupShell("popupshell0",
                popupWindowShellWidgetClass,widget,arg,i);

        XtAddCallback(widget,XtNselect,popupCB,popupshell0);

        i = 0;
        XtSetArg(arg[i], XtNupperControlArea, &popupca01); i++;
        XtGetValues (popupshell0, arg, i);
```

```
/*
 * STATICTEXT: This is used as a README for the application.
 */

        if((fp=fopen("/usr/X/lib/tutorial/Xol/statictext.text","r"))) {
                fread(stext,sizeof(char),MAXTEXT,fp);
                fclose(fp);
        }
        else
                strcpy(stext,"Statictext message for README0);

        i = 0;
        XtSetArg(arg[i], XtNstring, stext); i++;
        XtCreateManagedWidget("statictext",
                staticTextWidgetClass,popupca01,arg,i);
}

/*
 * POPUP: Used for Command Window.
 */

{
        Widget widget,popupca11,popupca12,popupfooter1,popupbutton1;

        popupbutton1 = XtCreateManagedWidget("Popup: Command Window",
                oblongButtonWidgetClass,controlarea,NULL,0);

/*
 * Make the popup shell first.
 */
        i = 0;
        XtSetArg(arg[i],XtNtitle,"Command Window"); i++;
        popupshell1 = XtCreatePopupShell("POPUPSHELL",
                popupWindowShellWidgetClass,popupbutton1,arg,i);

/*
 * Add callback to popup button now that we have popupshell widget ID.
 */
        XtAddCallback(popupbutton1, XtNselect, popupCB, popupshell1);
```

```
/*
 * The popup window automatically makes three children: upper and
 * lower control areas and footer: get widget IDs to populate them.
 */
        i = 0;
        XtSetArg(arg[i], XtNupperControlArea, &popupca11); i++;
        XtSetArg(arg[i], XtNlowerControlArea, &popupca12); i++;
        XtSetArg(arg[i], XtNfooterPanel, &popupfooter1); i++;
        XtGetValues (popupshell1, arg, i);

/*
 * Populate popup upper control area.
 */

/*
 * Make a caption as a label/prompt for the TEXTFIELD.
 */

        i=0;
        XtSetArg(arg[i],XtNlabel,
                (XtArgVal) "Textfield: type & type <return> :"); i++;
        widget = XtCreateManagedWidget("caption",
                captionWidgetClass,popupca11,arg,i);

        widget = XtCreateManagedWidget("textfield",
                textFieldWidgetClass,widget,NULL,0);

/*
 * Callback to "read" user input when <return> typed.
 */

        XtAddCallback(widget,XtNverification,textfieldCB,NULL);

/*
 * Populate popup lower controlarea with buttons: one must be a default.
 */
        i = 0;
        XtSetArg(arg[i], XtNdefault,(XtArgVal) TRUE); i++;
        XtCreateManagedWidget("Option 1",
                oblongButtonWidgetClass,popupca12,arg,i);

        XtCreateManagedWidget("Option 2",
                oblongButtonWidgetClass,popupca12,NULL,0);

/*
 * Add text to the popup footer.
 */
        i = 0;
        XtSetArg(arg[i], XtNborderWidth, 0); i++;
        XtSetArg(arg[i], XtNstring, "Footer widget for messages"); i++;
        XtCreateManagedWidget("footer",
                staticTextWidgetClass,popupfooter1,arg,i);
}

/*
 * End of POPUP: Command Window.
 */

/*
 * POPUP: Used for Property Sheet.
 */

{
        Widget exclusives,widget,popupca21,popupfooter2,popupbutton2;

/*
 * XtCallbackRec used for widget SetValues.
 */

        static XtCallbackRec popup_applyCBR[] = {
                { genericCB, (XtPointer) 5 },
                { (XtCallbackProc) NULL, (XtPointer) NULL },
        };

        static XtCallbackRec popup_setdefaultsCBR[] = {
                { genericCB, (XtPointer) 6 },
                { (XtCallbackProc) NULL, (XtPointer) NULL },
        };
        static XtCallbackRec popup_resetCBR[] = {
                { genericCB, (XtPointer) 7 },
                { (XtCallbackProc) NULL, (XtPointer) NULL },
        };

        static XtCallbackRec popup_resetfactoryCBR[] = {
                { genericCB, (XtPointer) 8 },
                { (XtCallbackProc) NULL, (XtPointer) NULL },
        };

        popupbutton2 = XtCreateManagedWidget("Popup: Property Window",
                oblongButtonWidgetClass,controlarea,NULL,0);

/*
 * Make the popup shell first:
 * NOTE: callbacks must be set for creation of the automatic buttons.
 * In this example, mapping is to one function but does not have to be.
 */
        i = 0;
        XtSetArg(arg[0],XtNtitle,"Property Window"); i++;
        XtSetArg(arg[i],XtNreset,(XtArgVal) popup_resetCBR); i++;
        XtSetArg(arg[i],XtNapply,(XtArgVal) popup_applyCBR); i++;
        XtSetArg(arg[i],
                XtNresetFactory,(XtArgVal) popup_resetfactoryCBR);i++;
        XtSetArg(arg[i],
                XtNsetDefaults, (XtArgVal) popup_setdefaultsCBR);i++;
        popupshell2 = XtCreatePopupShell("POPUPSHELL",
                popupWindowShellWidgetClass,popupbutton2,arg,i);

/*
 * Add callback to popup button now that we have popupshell widget ID.
 */
        XtAddCallback(popupbutton2, XtNselect, popupCB, popupshell2);

/*
 * Get widget IDs of popup children needed.
 * Note that lower control area ID not needed
 * since automatic buttons are created by code above.
 */
        i = 0;
```

```
            XtSetArg(arg[i], XtNupperControlArea, &popupca21); i++;
            XtSetArg(arg[i], XtNfooterPanel, &popupfooter2); i++;
            XtGetValues (popupshell2, arg, i);

    /*
     * Populate popup upper control area with EXCLUSIVES and NONEXLCUSIVES.
     * Note that there is no need to populate popup lower controlarea.
     */
            i=0;
            XtSetArg(arg[i],XtNlayoutType,OL_FIXEDCOLS);i++;
            XtSetValues(popupca21,arg,i);

            widget =XtCreateManagedWidget("Exclusives: ",
                    captionWidgetClass,popupca21,NULL,0);

            i = 0;
            XtSetArg(arg[0],XtNlayoutType,(XtArgVal) OL_FIXEDROWS); i++;
            XtSetArg(arg[0],XtNmeasure,(XtArgVal) 1); i++;
            exclusives = XtCreateManagedWidget("exclusives",
                    exclusivesWidgetClass,widget,arg,i);

            i = 0;
            XtSetArg(arg[0],XtNlabel,(XtArgVal) "Choice 1"); i++;
            widget = XtCreateManagedWidget("rbutton",
                    rectButtonWidgetClass,exclusives,arg,i);
            XtAddCallback(widget,XtNselect,genericCB,(XtPointer) 2);

            widget = XtCreateManagedWidget("Choice 2",
                    rectButtonWidgetClass,exclusives,NULL,0);
            XtAddCallback(widget,XtNselect,genericCB,(XtPointer) 3);

            widget = XtCreateManagedWidget("Choice 3",
                    rectButtonWidgetClass,exclusives,NULL,0);
            XtAddCallback(widget,XtNselect,genericCB,(XtPointer) 4);

            widget = XtCreateManagedWidget("Nonexclusives: ",
                    captionWidgetClass,popupca21,NULL,0);

            i = 0;
            XtSetArg(arg[i],XtNlayoutType,(XtArgVal) OL_FIXEDROWS); i++;
```

```
        XtSetArg(arg[i],XtNmeasure,(XtArgVal) 1); i++;
        nonexclusives = XtCreateManagedWidget("nonexclusives",
                nonexclusivesWidgetClass,widget,arg,i);

        widget = XtCreateManagedWidget("Choice 1",
                rectButtonWidgetClass,nonexclusives,NULL,0);
        XtAddCallback(widget,XtNselect,genericCB,(XtPointer) 2);

        nebutton2 = XtCreateManagedWidget("More",
                rectButtonWidgetClass,nonexclusives,NULL,0);
        XtAddCallback(nebutton2,XtNselect,nonexclusivesCB,nonexclusives);
        XtAddCallback(nebutton2,XtNselect,genericCB,(XtPointer)3);

/*
 * Add text to the popup footer.
 */
        i = 0;
        XtSetArg(arg[i], XtNborderWidth, 0); i++;
        XtSetArg(arg[i], XtNstring, "Footer widget for messages"); i++;
        XtCreateManagedWidget("footer",
                staticTextWidgetClass,popupfooter2,arg,i);
}

/*
 * End of POPUP: Property Sheet.
 */

/*
 * TO MAKE A MENU:
 *
 * Widget Tree for creating menu:
 *
 *             ( parent widget )
 *                      |
 *        menubutton ( visible/mouse sensitive symbol for menu )
 *                      |
 *       pane ( used for placement of menu button set )
 *                      |
 *                    / x
 *                   /   x
 *                button1   button2
 */

/*
 * Create a menubutton and menu with a pushpin.
 */

{
        static Widget menubutton,menupane,widget;

        i = 0;
        XtSetArg(arg[i],XtNpushpin,(XtArgVal) OL_OUT); i++;
        XtSetArg(arg[i],XtNlabelType,(XtArgVal) OL_STRING); i++;
        XtSetArg(arg[i],XtNlabelJustify,(XtArgVal) OL_LEFT); i++;
        XtSetArg(arg[i],XtNrecomputeSize,(XtArgVal) TRUE); i++;
        menubutton = XtCreateManagedWidget("Menubutton",
                menuButtonWidgetClass,controlarea,arg,i);

/*
 * Get the Widget id of the menupane of the menubutton.
 */
        i = 0;
        XtSetArg(arg[i], XtNmenuPane,(XtArgVal) &menupane); i++;
        XtGetValues(menubutton, arg, i);

/*
 * Make two oblongbuttons on the menupane, with select callbacks.
 */

        widget = XtCreateManagedWidget("One",
                oblongButtonWidgetClass,menupane,NULL,0);
        XtAddCallback(widget,XtNselect,menuSelectCB,(XtPointer) 1);

        widget = XtCreateManagedWidget("Two",
                oblongButtonWidgetClass,menupane,NULL,0);
        XtAddCallback(widget,XtNselect,menuSelectCB,(XtPointer) 2);
}

/*
 * End of MENU
 */

/*
 * NOTICE: attach to an EXIT button in the control area.
 */

{

        static Widget noticetext;
        Widget widget;

        static Arg noticeARGS[] = {
                {XtNtextArea, (XtArgVal) &noticetext},
                {XtNcontrolArea, (XtArgVal) &noticebox},
        };

        cabutton = XtCreateManagedWidget("Exit",
                oblongButtonWidgetClass,controlarea,NULL,0);

/*
 * Attach notice popup callback to "EXIT" controlarea button.
 */

        XtAddCallback(cabutton, XtNselect, noticeCB1,NULL);

/*
 * Create notice popup shell.
 */

        noticeshell = XtCreatePopupShell("notice",
                noticeShellWidgetClass,cabutton,NULL,0);

/*
 * Get the widget ids of noticebox and textarea of noticebox.
 */

        XtGetValues(noticeshell, noticeARGS, XtNumber(noticeARGS));

/*
 * Add text to text area of noticebox.
 */

        i = 0;
        XtSetArg(arg[i],
                XtNstring,(XtArgVal)"NOTICE WIDGET:Oonfirm EXIT");
        i++;
        XtSetValues(noticetext,arg,i);

/*
 * Add two buttons to noticebox.
 */

/*
 * First button has an exit callback.
 */

        widget = XtCreateManagedWidget("Okay",
                oblongButtonWidgetClass,noticebox,NULL,0);
        XtAddCallback(widget, XtNselect,noticeCB2,noticebox);

/*
 * Second button is a no-op that pops down
 * notice widget without exiting.
 */

        XtCreateManagedWidget("Cancel",
                oblongButtonWidgetClass,noticebox,NULL,0);
}

/*
 * CAPTION
 */

{
        static Widget widget;

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Caption"); i++;
        caption = XtCreateManagedWidget("caption",
                captionWidgetClass,form,arg,i);

        widget = XtCreateManagedWidget("*** Rainbow ***",
                oblongButtonWidgetClass,caption,NULL,0);
        XtAddCallback(widget, XtNselect, rainbowCB, NULL);
}

/*
 * STUB WIDGET: this will be used as a drawing canvas.
 */

/*
 * First two arguments scale widget to resolution of screen.
 */

        i = 0;
        XtSetArg(arg[i],XtNheight,(XtArgVal) N100_V_PIXELS); i++;
        XtSetArg(arg[i],XtNwidth,(XtArgVal) N100_H_PIXELS); i++;
        XtSetArg(arg[i],XtNbackground, skyblue_pixel); i++;
/*
 * DrawAndPrint will be called with an Expose event;
 */
        XtSetArg(arg[i],XtNexpose, DrawAndPrint); i++;
        stub = XtCreateManagedWidget("stub",stubWidgetClass,form,arg,i);

/*
 * Add an eventhandler to track when the pointer
 * enters and leaves the stub widget window.
 */

        XtAddEventHandler(stub,EnterWindowMask | LeaveWindowMask,
                FALSE, StubEventHandler, (XtPointer)NULL);

/*
 * Set the special cursor for stub widget window
 * below once tree realized.
 */

/*
```

```
 * BULLETINBOARD: with ABBREVIATEDMENUBUTTON, CHECKBOX,
 * and TEXTEDIT widgets in it, each within a caption
 * labelling the widget.
 */

{
        Widget widget,bulletinboard,abbmenubutton,abbmenupane,checkbox;
        Dimension       height,yvalue,
                        xpad = (Dimension) N10_H_PIXELS,
                        ypad = (Dimension) N10_V_PIXELS;

        static char     textedit_string[] =
"This text is in a textedit0idget and can be edited.";

/*
 * BULLETINBOARD.
 */

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Bulletinboard"); i++;
        bb_caption = XtCreateManagedWidget("bb_caption",
                captionWidgetClass,form,arg,i);

        bulletinboard = XtCreateManagedWidget("bulletinboard",
        bulletinBoardWidgetClass,bb_caption,NULL,0);

/*
 * Set some resources for the bulletinboard.
 */

        i = 0;
        XtSetArg(arg[i],XtNborderWidth, (XtArgVal) 2); i++;
        XtSetArg(arg[i],XtNborderColor, (XtArgVal) orange_pixel); i++;
        XtSetValues(bulletinboard,arg,i);

/*
 * ABBREVIATEDMENUBUTTON.
 */
```

```
        yvalue = ypad;

        i = 0;
        XtSetArg(arg[i],XtNx,(XtArgVal) xpad); i++;
        XtSetArg(arg[i],XtNy,(XtArgVal) yvalue); i++;
        XtSetArg(arg[i],XtNlabel, (XtArgVal) "Abbreviatedmenubutton: ");
        i++;
        abbmenu_caption = XtCreateManagedWidget("abbmenu_caption",
                captionWidgetClass,bulletinboard,arg,i);

        abbmenubutton = XtCreateManagedWidget("abbmenubutton",
                abbrevMenuButtonWidgetClass,abbmenu_caption,arg,i);

/*
 * Get the Widget ID of the menupane of the abbreviated menu button.
 */

        i = 0;
        XtSetArg(arg[i], XtNmenuPane,(XtArgVal) &abbmenupane); i++;
        XtGetValues(abbmenubutton, arg, i);

        i = 0;
        widget = XtCreateManagedWidget("Button 1",
                oblongButtonWidgetClass,abbmenupane,arg,i);
        XtAddCallback(widget,XtNselect,menuSelectCB,(XtPointer) 1);

        i = 0;
        widget = XtCreateManagedWidget("Button 2",
                oblongButtonWidgetClass,abbmenupane,arg,i);
        XtAddCallback(widget,XtNselect,menuSelectCB,(XtPointer) 2);

/*
 * CHECKBOX.
 */

        i=0;
        XtSetArg(arg[i],XtNheight, &height); i++;
        XtGetValues(abbmenubutton,arg,1);
        yvalue = yvalue + height + ypad;

        i = 0;
        XtSetArg(arg[i], XtNx,xpad); i++;
        XtSetArg(arg[i],XtNy, yvalue); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Checkbox: "); i++;
        cb_caption = XtCreateManagedWidget("cb_caption",
                captionWidgetClass,bulletinboard,arg,i);

        i=0;
        checkbox = XtCreateManagedWidget("CHECKBOX_LABEL" ,
                checkBoxWidgetClass,cb_caption, arg,i);
        XtAddCallback(checkbox,XtNselect,checkboxCB,NULL);

/*
 * TEXTEDIT WIDGET.
 */

        i=0;
        XtSetArg(arg[i],XtNheight, &height); i++;
        XtGetValues(checkbox,arg,1);

        yvalue = yvalue + height + ypad;

        i = 0;
        XtSetArg(arg[i],XtNx,(XtArgVal) xpad); i++;
        XtSetArg(arg[i],XtNy, (XtArgVal) yvalue); i++;
        XtSetArg(arg[i],XtNalignment, (XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Textedit:"); i++;
        te_caption = XtCreateManagedWidget("te_caption",
                captionWidgetClass,bulletinboard,arg,i);

        i = 0;
        XtSetArg(arg[i],XtNheight, (XtArgVal) N50_V_PIXELS); i++;
        XtSetArg(arg[i],XtNwidth, (XtArgVal) N150_H_PIXELS); i++;
        XtSetArg(arg[i],XtNsourceType, (XtArgVal)OL_STRING_SOURCE); i++;
        XtSetArg(arg[i],XtNsource, (XtArgVal) textedit_string); i++;
        XtCreateManagedWidget("textedit",
                        textEditWidgetClass,te_caption,arg,i);
}
```

```
/*
 * SCROLLINGLIST
 */

{
        static Widget scrollinglist;
        static OlListToken  (*scrollinglistADDfn);
        static OlListItem sl_item[10];

        int natoi;
/*
 * Use a caption to label the scrollinglist.
 */

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Scrollinglist"); i++;
        slist_caption = XtCreateManagedWidget("slist_caption",
                captionWidgetClass,form,arg,i);

        i = 0;
        XtSetArg(arg[i], XtNviewHeight, (XtArgVal) 7); i++;
        scrollinglist = XtCreateManagedWidget("scrollinglist",
                scrollingListWidgetClass,slist_caption,arg,i);

/*
 * Get the pointer to the scrollinglist function in order to add items.
 */

        i = 0;
        XtSetArg(arg[i],
                XtNapplAddItem, (XtArgVal) &scrollinglistADDfn); i++;
        XtGetValues(scrollinglist,arg,i);

        natoi = (int) 'A';

        for(i=0; i<10; i++) {
                sl_item[i].label_type = (OlDefine) OL_STRING;
```

```
                        sl_item[i].label =
                                strcpy(XtMalloc((unsigned)7),"ITEM   ");
                        sl_item[i].label[5] = natoi;
                        sl_item[i].mnemonic = tolower(natoi++);
/*
 * This field is for storing any type of data desired.
 */
                        sl_item[i].user_data = (XtPointer) i ;
                        (*scrollinglistADDfn)
                                (scrollinglist,NULL,NULL,sl_item[i]);
                }

/*
 * Callback to be invoked when user selects an item.
 */

                XtAddCallback(scrollinglist,
                        XtNuserMakeCurrent,scrollinglistCB,NULL);
}


/*
 * SCROLLED WINDOW
 */

{
static Widget scrolledwindow;

static char     swstring[] =

"This text is in a\n\
statictext widget\n\
in a scrolled window.\n\
You can move it up\n\
and down or left\n\
and right with the\n\
two scrollbars.\n";

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Scrolledwindow"); i++;
        sw_caption = XtCreateManagedWidget("sw_caption",
                captionWidgetClass,form,arg,i);

        i = 0;
        XtSetArg(arg[i], XtNheight,N150_V_PIXELS); i++;
        XtSetArg(arg[i], XtNwidth, N100_H_PIXELS); i++;
        XtSetArg(arg[i], XtNvStepSize, 20); i++;
        XtSetArg(arg[i], XtNhStepSize, 20); i++;
        scrolledwindow = XtCreateManagedWidget("scrolledwindow",
                scrolledWindowWidgetClass,sw_caption,arg,i);
        XtAddCallback(scrolledwindow,
                        XtNvSliderMoved,scrollbarCB,(XtPointer)1);
        XtAddCallback(scrolledwindow,
                        XtNhSliderMoved,scrollbarCB,(XtPointer)2);

/*
 * Make a statictext widget in the scrolled window
 * to scroll with the scrollbars.
 */

        i = 0;
        XtSetArg(arg[i], XtNheight,N150_V_PIXELS); i++;
        XtSetArg(arg[i], XtNstring, swstring); i++;
        XtCreateManagedWidget("statictext",
                staticTextWidgetClass,scrolledwindow,arg,i);
}

/*
 * SLIDER
 */

/*
 * The slider will be used to change the background of the stub widget:
 * calculate the number of colors for the screen and set the slider
 * range from 0 to (N-1) with a granularity of 1; see the sliderCB
 * function for the rest of the code/functionality.
 */
```

```
{
        Display *display = XtDisplay(toplevel);
        int screen = XDefaultScreen(display);
        int n, ncolors=2;
        Widget w;

        n= XDefaultDepth(display,screen);

        for(i=1; i<n; i++) {
                ncolors= ncolors*2;
        }

        ncolors = ncolors -1 ;

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Slider"); i++;
        slider_caption = XtCreateManagedWidget("slider_caption",
                captionWidgetClass,form,arg,i);

        i = 0;
        XtSetArg(arg[i], XtNwidth, (XtArgVal) N200_H_PIXELS); i++;
        XtSetArg(arg[i],XtNorientation, (XtArgVal) OL_HORIZONTAL); i++;
        XtSetArg(arg[i],XtNsliderMax, (XtArgVal) ncolors); i++;
        XtSetArg(arg[i],XtNgranularity, (XtArgVal) 1); i++;
        XtSetArg(arg[i], XtNticks, (XtArgVal) 1); i++;
        XtSetArg(arg[i], XtNtickUnit, (XtArgVal) OL_SLIDERVALUE); i++;
        XtSetArg(arg[i], XtNdragCBType, (XtArgVal) OL_RELEASE); i++;
        w = XtCreateManagedWidget("slider",
                sliderWidgetClass,slider_caption,arg,i);
        XtAddCallback(w,XtNsliderMoved,sliderCB,NULL);
}

/*
 * GAUGE
 */

        i = 0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Gauge"); i++;
        g_caption = XtCreateManagedWidget("g_caption",
                captionWidgetClass,form,arg,i);

        i = 0;
        XtSetArg(arg[i],XtNwidth,(XtArgVal) N200_H_PIXELS); i++;
        XtSetArg(arg[i],XtNorientation, (XtArgVal) OL_HORIZONTAL); i++;
        XtSetArg(arg[i],XtNsliderMax, (XtArgVal) 100); i++;
        XtSetArg(arg[i],XtNgranularity, (XtArgVal) 10); i++;
        XtSetArg(arg[i], XtNticks, (XtArgVal) 10); i++;
        XtSetArg(arg[i], XtNtickUnit, (XtArgVal) OL_SLIDERVALUE); i++;
        gauge = XtCreateManagedWidget("gauge",
                                gaugeWidgetClass,g_caption,arg,i);

/*
 * GADGETS: the oblongbutton gadget and menubutton
 * gadget are displayed in a bulletinboard, the latter in a
 * caption entitled, "Gadgets."
 */

{
        Widget carea,button,menubutton,menupane;

        i=0;
        XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
        XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
        XtSetArg(arg[i],XtNlabel,(XtArgVal) "Gadgets"); i++;
        gd_caption = XtCreateManagedWidget("gd_caption",
                captionWidgetClass,form,arg,i);

        i=0;
        XtSetArg(arg[i],XtNborderWidth, (XtArgVal) 2); i++;
        XtSetArg(arg[i],XtNborderColor, (XtArgVal) orange_pixel); i++;
        carea = XtCreateManagedWidget("controlarea",
                controlAreaWidgetClass,gd_caption,arg,i);

        i=0;
        XtSetArg(arg[i],XtNlabel, (XtArgVal) "Oblongbutton" ); i++;
        XtSetArg(arg[i],XtNx,(XtArgVal) N10_H_PIXELS); i++;
        XtSetArg(arg[i], XtNy,(XtArgVal) N10_V_PIXELS); i++;
        button = XtCreateManagedWidget("buttongadget",
                oblongButtonGadgetClass,carea,arg,i);
        XtAddCallback(button,XtNselect,genericCB,(XtPointer) 9);

        i = 0;
        XtSetArg(arg[i],XtNlabel, (XtArgVal) "Menubutton"); i++;
        XtSetArg(arg[i],XtNx,(XtArgVal) N100_H_PIXELS);
        XtSetArg(arg[i],XtNy,(XtArgVal) N10_V_PIXELS); i++;
        menubutton = XtCreateManagedWidget("menubutton",
                menuButtonGadgetClass,carea,arg,i);
        i = 0;
        XtSetArg(arg[i], XtNmenuPane,(XtArgVal) &menupane); i++;
        XtGetValues(menubutton,arg,i);

        i = 0;
        button = XtCreateManagedWidget("Button 1",
                oblongButtonGadgetClass,menupane,arg,i);
        XtAddCallback(button,XtNselect,menuSelectCB,(XtPointer) 1);

        i = 0;
        button = XtCreateManagedWidget("Button 2",
                oblongButtonGadgetClass,menupane,arg,i);
        XtAddCallback(button,XtNselect,menuSelectCB,(XtPointer) 2);
}

/*
 * FLAT WIDGETS: the flatexclusives, flatnonexclusives, and
 * flatcheckbox are displayed in a bulletinboard, the latter
 * in a caption entitled, "Flat Widgets."
 */

{
        Widget widget,carea;
        WidgetClass class;
        int num_subobjects = 3;
        Dimension hspace = N10_H_PIXELS,
                  vspace = N10_V_PIXELS;

/*
```

```
 * For flatexclusives and flatnonexclusives: note "customized" fields.
 */

        static String fields1[] = {
                XtNbackground, XtNlabel, XtNselectProc, XtNclientData
        };

        typedef struct {
                XtArgVal background;     /* item's background */
                XtArgVal label;          /* item's label */
                XtArgVal select;         /* item's select callback */
                XtArgVal clientData;     /* clientData for callback */
        } FlatData1;

        static FlatData1 *items1;

/*
 * For flatcheckbox: note "customized" fields.
 */

        static String fields2[] = {
                XtNbackground, XtNlabel, XtNset,
                XtNselectProc, XtNclientData
        };

        typedef struct {
                XtArgVal background;     /* item's background */
                XtArgVal label;          /* item's label */
                XtArgVal set;            /* item's set status */
                XtArgVal select;         /* item's select callback */
                XtArgVal clientData;     /* clientData for callback */
        } FlatData2;

        static FlatData2 *items2;

        items1 = (FlatData1 *)XtMalloc((Cardinal)
                (num_subobjects*sizeof(FlatData1)));

        items2 = (FlatData2 *)XtMalloc((Cardinal)
                (num_subobjects*sizeof(FlatData2)));
```

```
i=0;
XtSetArg(arg[i],XtNposition,(XtArgVal) OL_TOP); i++;
XtSetArg(arg[i],XtNalignment,(XtArgVal) OL_CENTER); i++;
XtSetArg(arg[i],XtNlabel,(XtArgVal) "Flat Widgets"); i++;
f_caption = XtCreateManagedWidget("f_caption",
        captionWidgetClass,form,arg,i);

i=0;
XtSetArg(arg[i],XtNborderWidth,(XtArgVal) 2); i++;
XtSetArg(arg[i],XtNborderColor,(XtArgVal) orange_pixel); i++;
XtSetArg(arg[i],XtNhSpace,hspace); i++;
XtSetArg(arg[i],XtNvSpace,vspace); i++;
XtSetArg(arg[i],XtNhPad,hspace); i++;
XtSetArg(arg[i],XtNvPad,vspace); i++;

carea = XtCreateManagedWidget("controlarea",
        controlAreaWidgetClass,f_caption,arg,i);

widget =XtCreateManagedWidget("Exclusives: ",
        captionWidgetClass,carea,NULL,0);

items1[0].background = (XtArgVal) red_pixel;
items1[1].background = (XtArgVal) green_pixel;
items1[2].background = (XtArgVal) blue_pixel;
items1[0].label =
        items1[1].label = items1[2].label = (XtArgVal) "  ";
items1[0].select = items1[1].select = items1[2].select
                = (XtArgVal) genericCB;
items1[0].clientData =
        items1[1].clientData =
        items1[2].clientData = (XtArgVal) 10;

class = flatExclusivesWidgetClass;
i=0;
XtSetArg(arg[i],XtNitems,items1);i++;
XtSetArg(arg[i],XtNnumItems,num_subobjects);i++;
XtSetArg(arg[i],XtNitemFields,fields1); i++;
XtSetArg(arg[i],XtNnumItemFields,XtNumber(fields1)); i++;
XtCreateManagedWidget("flatexclusives",class,widget,arg,i);
```

```
        widget =XtCreateManagedWidget("Nonexclusives: ",
                captionWidgetClass,carea,NULL,0);

        class = flatNonexclusivesWidgetClass;
        XtCreateManagedWidget("flatnonexclusives",class,widget,arg,i);

        items2[0].background = (XtArgVal) red_pixel;
        items2[1].background = (XtArgVal) green_pixel;
        items2[2].background = (XtArgVal) blue_pixel;
        items2[0].label = (XtArgVal) "CheckBox1";
        items2[1].label = (XtArgVal) "CheckBox2";
        items2[2].label = (XtArgVal) "CheckBox3";
        items2[0].set = items2[1].set = items2[2].set = (XtArgVal) TRUE;
        items2[0].select = items2[1].select = items2[2].select
                        = (XtArgVal) genericCB;
        items2[0].clientData =
                items2[1].clientData =
                items2[2].clientData = (XtArgVal) 10;

        class = flatCheckBoxWidgetClass;
        XtSetArg(arg[i],XtNitems,items2);i++;
        XtSetArg(arg[i],XtNnumItems,num_subobjects);i++;
        XtSetArg(arg[i],XtNitemFields,fields2); i++;
        XtSetArg(arg[i],XtNnumItemFields,XtNumber(fields2)); i++;
        XtCreateManagedWidget("flatcheckbox",class,carea,arg,i);
}

/*
 * SCROLLBAR: attach to the right & bottom of the form.
 */

{

static Arg scrollbarARGS[] = {

/*
 * Widget resources.
 */
```

```
                { XtNproportionLength, 10 },
                { XtNshowPage, OL_LEFT },

        /*
         * Form resources.
         */

                { XtNyResizable,(XtArgVal) TRUE },
                { XtNyAttachBottom,(XtArgVal)TRUE },
                { XtNxAttachRight,(XtArgVal) TRUE },
                { XtNxVaryOffset,(XtArgVal) TRUE },
        };

                scrollbar = XtCreateManagedWidget("scrollbar",
                        scrollbarWidgetClass,form,scrollbarARGS,
                        XtNumber(scrollbarARGS));
                XtAddCallback(scrollbar,
                        XtNsliderMoved,scrollbarCB,(XtPointer) 0);
        }

        /*
         * Position all the widgets on the form.  Note that reference
         * names are used.  Note that 10 horizontal and vertical pixels
         * are used in most cases; in a few cases special values are used.
         */

        {
                Arg arg;
                static Dimension width1, width2;
                static Position x1, x2;

                static Arg getArgs1[] = {
                        { XtNx, (XtArgVal) &x1},
                        { XtNwidth, (XtArgVal) &width1}
                };

                static Arg getArgs2[] = {
                        { XtNx, (XtArgVal) &x2},
                        { XtNwidth, (XtArgVal) &width2}
                };
        genericARGS[2].value = (XtArgVal) 0;
        genericARGS[3].value = (XtArgVal) 0;
        SetPosition(ca_caption,"form","form");
        genericARGS[2].value = (XtArgVal) N10_H_PIXELS;
        genericARGS[3].value = (XtArgVal) N10_V_PIXELS;

        SetPosition(caption,"form","ca_caption");
        SetPosition(stub,"form","caption");

/*
 * Position bulletinboard to right of
 * caption or stub, whichever is wider.
 */

        XtSetArg(arg,XtNwidth,&width1);
        XtGetValues(caption,&arg,1);
        XtSetArg(arg,XtNwidth,&width2);
        XtGetValues(stub,&arg,1);
        if(width1>width2)
                SetPosition(bb_caption,"caption","ca_caption");
        else
                SetPosition(bb_caption,"stub","ca_caption");

        SetPosition(slider_caption,"form","stub");
        SetPosition(g_caption,"form","slider_caption");
        SetPosition(f_caption,"form","gd_caption");
        SetPosition(slist_caption,"bb_caption","ca_caption");
        SetPosition(sw_caption,"slist_caption","ca_caption");

        genericARGS[2].value = (XtArgVal) (7 * N10_H_PIXELS);
        SetPosition(gd_caption,"slider_caption","slist_caption");
        genericARGS[2].value = (XtArgVal) N10_H_PIXELS;

/*
 * Position scrollbar to right of flat widgets or scrolledwindow,
 * whichever extends further to the right of the form.
 */
        genericARGS[3].value = (XtArgVal) 0;
        XtGetValues(f_caption,getArgs1,XtNumber(getArgs1));
        XtGetValues(sw_caption,getArgs2,XtNumber(getArgs2));

        width1 = width1 + (Dimension) x1;
        width2 = width2 + (Dimension) x2;

        if(width1>width2)
                SetPosition(scrollbar,"f_caption","ca_caption");
        else
                SetPosition(scrollbar,"sw_caption","ca_caption");

        genericARGS[3].value = (XtArgVal) N10_V_PIXELS;
}

/*
 * Realize the widget tree.
 */

        XtRealizeWidget(toplevel);

/*
 * The special cursor for the stub widget can be set now
 * that it has been realized as part of the widget tree.
 */

        SetStubCursor(stub);

/*
 * Turn control over to the Xt intrinsics and OPEN LOOK.
 */

        XtMainLoop;

} /* MAIN */
```

A Manual Pages: Introduction

Introduction to the Manual Pages

This part of the OPEN LOOK® Programmer's Guide offers a detailed description of the various OPEN LOOK widgets, gadgets, and convenience routines that are available to programmers writing client applications for the OPEN LOOK interface. The reference manual is divided into 4 sections.

Section 1 introduces the widgets and routines available to the application programmer and Section 2 discusses General Resources. Resources are the visual and functional characteristics of a particular widget or gadget. Widgets inherit resources from common classes. Some of these super-classes are standard Intrinsics classes such as Core and Shell. Others are OPEN LOOK specific such as Flat, Manager, and Primitive. The section on General Resources is broken down into 6 sub-sections. Each sub-section lists resources of a particular class of widgets. The frequently used resources are grouped as follows:

- Application Resources
- Core Resources
- Common Flat Container Resources
- Manager Widget Resources
- Primitive Widget Resources
- Shell Resources

Section 3 contains the various Convenience Routines available to the application programmer. These routines are presented in alphabetical order without regard to upper or lower case distinctions. The introduction to Section 3 lists the routines by functional groups making it easier to find those routines which perform specific functions such as updating dynamic resources. Other routines work with specific widgets such as TextField and TextEdit. There are also some special Convenience Routines useful for performing such activities as creating widget trees, initializing the OPEN LOOK toolkit, or routines that support input focus. Examples of the functional groups are as follows:

- Cursor/Bitmap Utilities
- Dynamic Setting Utilities
- Regular Expression Utilities

- Text Buffer Utilities
- Database Utilities
- and others

See the introduction to Section 3 for a full listing of these routines.

Section 4, offers a complete discussion of each widget in alphabetical order in formal manual page format. The widgets are presented in the order below:

- AbbreviatedMenuButton
- BulletinBoard
- Caption
- CheckBox
- ControlArea
- Exclusives
- FlatCheckBox
- FlatExclusives
- FlatNonexclusives
- FooterPanel
- Form
- Gauge
- Menu
- MenuButton (Widget and Gadget)
- Nonexclusives
- Notice
- OblongButton (Widget and Gadget)
- PopupWindow
- RectButton

- Scrollbar
- ScrolledWindow
- ScrollingList
- Slider
- Static Text
- Stub
- TextEdit
- TextField

Section 5, "Obsolete Routines" presents routines and Widgets that were a part of the toolkit but are no longer supported and being phased out. They are here for reference only.

Introduction to General Resources

The following section lists and describes the general resources available to several widgets within a class. We have grouped them here to avoid redundancy on each widget manual page. The resources/operations are grouped according to widget class:

- Application
- Core
- Flat Container
- Manager
- Primitive
- Shell

Application Resources

The OPEN LOOK toolkit uses several resources to determine the state of an OPEN LOOK application. These can be accessed using the **`OlGetApplicationValues`** function [see **`OlGetApplicationValues`**(3W)]. In order to maintain a consistent *look and feel* between applications running simultaneously on the same display device, applications do not set these resources directly since the Workspace Manager preference property sheets are responsible for maintaining their values by updating the appropriate resource files.

Application Resource Set

Name	Class	Type	Default	Access
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	G
XtNbeep	XtCBeep	OlDefine	OL_BEEP_ALWAYS	G
XtNbeepVolume	XtCBeepVolume	int	0	G
XtNcontrolName	XtCControlName	String	"Ctrl"	G
XtNdontCare	XtCDontCare	OlBitMask	LockMask| Mod2Mask	G
XtNdragRightDistance	XtCDragRightDistance	Dimension	20 (pixels)	G
XtNfontColor	XtCFontColor	Pixel	Black	G
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	G
XtNhelpDirectory	XtCHelpDirectory	String	(calculated)	G
XtNhelpModel	XtCHelpModel	OlDefine	OL_POINTER	G
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	G
XtNinputWindowColor	XtCInputWindowColor	Pixel	Yellow	G
XtNlockName	XtCLockName	String	"Lock"	G
XtNmenuMarkRegion	XtCMenuMarkRegion	Dimension	10 (pixels)	G
XtNmnemonicPrefix	XtCMnemonicPrefix	Modifiers	Alt	G
XtNmod1Name	XtCMod1Name	String	"Alt"	G
XtNmod2Name	XtCMod2Name	String	"Mod2"	G
XtNmod3Name	XtCMod3Name	String	"Mod3"	G
XtNmod4Name	XtCMod4Name	String	"Mod4"	G
XtNmod5Name	XtCMod5Name	String	"Mod5"	G
XtNMouseDampingFactor	XtNmouseDampingFactor	Cardinal	4 (points)	G
XtNmouseStatus	XtCMouseStatus	Boolean	True	G
XtNmultiClickTimeout	XtCMultiClickTimeout	Cardinal	300 (millisec)	G
XtNmultiObjectCount	XtCMultiObjectCount	Cardinal	3	G
XtNselectDoesPreview	XtCNSelectDoesPreview	Boolean	TRUE	G
XtNshiftName	XtCShiftName	string	"Shift"	G
XtNshowMnemonics	XtCShowMnemonics	OlDefine	OL_UNDERLINE	G
XtNshowAccelerators	XtCShowAccelerators	OlDefine	OL_DISPLAY	G
XtNtextBackground	XtCTextBackground	Pixel	XtDefaultBackground	G
XtNtextFontColor	XtCTextFontColor	Pixel	XtDefaultForeground	G
XtNthreeD	XtCThreeD	Boolean	TRUE	G

XtNbackground

This resource reflects the default background color used by objects which are not scrolling lists or textEdit widgets.

XtNbeep

Range of values:

```
OL_BEEP_NEVER/"never"
OL_BEEP_ALWAYS/"always"
OL_BEEP_NOTICES/"notices"
```

This resource determines the type of objects that can generate audible warnings to the user. `OL_BEEP_NEVER` implies no objects should generate audible warnings. `OL_BEEP_ALWAYS` implies any object can generate audible warnings. `OL_BEEP_NOTICES` implies only Notices should generate audible warnings.

XtNbeepVolume

Range of Values:

-100 to +100

This resource specifies a percentage of the keyboard's normal beep that should be used when generating audible warnings to the user.

XtNcontrolName
XtNlockName
XtNmod1Name
XtNmod2Name
XtNmod4Name
XtNmod5Name
XtNshiftName

These resources define the names used to display the accelerator in buttons and labels. They are provided as resources so that they can be easily changed for a particular keyboard. For example, the mod1Name is usually "Alt," but on some keyboards it may be labeled "Meta."

XtNdontCare

Range of Values are determined by ORing the following bit masks:

> `LockMask` (typically the mask associated with the CAPS LOCK key)
> `Mod1Mask`
> `Mod2Mask` (typically the mask associated with the NUM LOCK key)
> `Mod3Mask`
> `Mod4Mask`
> `Mod5Mask`
> `ShiftMask`
> `ControlMask`

This resource specifies the modifier bits that are ignored when processing mouse button events. For example, assume the **`Mod2Mask`** bit is in the **`XtNdontCare`** bits. Now if the NUM LOCK key is in a set state and the user presses the SELECT mouse button, the press is interpreted as a SELECT button press because the **`Mod2Mask`** bit is ignored. But if the **`Mod2Mask`** bit is not in the **`XtNdontCare`** bits, the press is not interpreted as a SELECT button press because the internal event handling routine honors the **`Mod2Mask`** bit in the **`XEvent`**.

XtNdragRightDistance

This resource represents the number of pixels the pointer must be dragged over a MenuButton with the **MENU** mouse button depressed to post the MenuButton's submenu. The direction of the drag is to the right. This resource only applies to MenuButtons on *press-drag-release* menus.

XtNfontColor

This resource reflects the default font color used by objects which are not scrolling lists or text widgets.

XtNforeground

This resource reflects the default foreground color used by objects which are not scrolling lists or textEdit widgets.

XtNhelpDirectory

This resource specifies the directory in which all help files for an application are located. It is locale-specific. The default value depends on the user's **XFILESEARCHPATH** environment variable and system configuration, but a typical value is **/usr/X/lib/locale/C/help/app-classname**, where everything before "C" is hardcoded somewhere in the **XFILESEARCHPATHDEFAULT** variable.

This resource is used by the **OlFindHelpFile** call and should normally only be set once per application instance.

XtNhelpModel

Range of Values:

```
OL_POINTER/"pointer"
OL_INPUTFOCUS/"inputfocus"
```

The OPEN LOOK help model defaults to follow the mouse pointer. So, when the **HELP** key is pressed, the item under the pointer is the subject of the help message. When this resource is set to **OL_INPUT_FOCUS**, the subject of the help message follows input focus.

XtNfont

Range of Values:

(any valid return from `XLoadQueryFont`)

Default:

(chosen to match the scale and screen resolution)

This resource identifies the font to be used to display the text of the widget.

The default value points to a cached font structure; an application should not expect to get this value with a call to `XtGetValues` and use it reliably thereafter.

XtNfontColor

Range of Values:

(any `Pixel` value valid for the current display)/(any name from the `rgb.txt` file)

This resource specifies the color for the font.

See the note about the interaction of this resource with other color resources under the description of the `XtNbackground` resource in Core Resources, "Introduction to General Resources", Appendix A.

XtNfontGroup

Range of Values:

(valid fontgroupname from the `ol_locale_def file`)

This resource specifies a set of up to 4 fonts to be to be used when drawing internationalized text with the OPEN LOOK text drawing routines (for example, `OlDrawString`, `OlTextWidth`). The first font should always be an ASCII font.

XtNforeground

This resource defines the foreground color for the widget.

See the note about the interaction of this resource with other color resources under the description of the `XtNbackground` resource in Core Resources, "Manual Pages: Introduction", Appendix A.

XtNinputFocusColor

This resource reflects the default color that controls display whenever the control has input focus.

XtNinputWindowColor

This resource determines the color of the OPEN LOOK window header when it has input focus.

XtNmenuMarkRegion

This resource represents the width (in pixels) of the MenuButton's *menu mark region*. If the pointer is moved into this region with the **MENU** mouse button depressed, the MenuButton's submenu is posted.

XtNmnemonicPrefix

This resource specifies the modifier key that must accompany the mnemonic character when activating an object from the keyboard if that object is not on a menu. Note: this value is not settable.

XtNmouseDampingFactor

This resource specifies the number of pixels the pointer can be moved before a drag operation is initiated.

XtNmouseStatus

This Boolean resource indicates whether there is a mouse on the server.

XtNmultiClickTimeout

This resource specifies the number of milliseconds that determines when two mouse button clicks is considered a multi-click, provided the pointer does not move beyond the **`XtNmouseDampingFactor`** value.

XtNmultiObjectCount

This resource determines the number of times the **OL_MULTIRIGHT**, **OL_MULTILEFT**, **OL_MULTIUP** and **OL_MULTIDOWN** keys repeat the **OL_MOVERIGHT**, **OL_MOVELEFT**, **OL_MOVEUP** and **OL_MOVEDOWN** keys, respectively.

XtNselectDoesPreview

This Boolean resource reflects the behavior of the SELECT mouse button when it is pressed over a MenuButton or an Abbreviated MenuButton. If its value is **TRUE**, pressing SELECT will cause the MenuButton to preview the submenu's default item and releasing the SELECT button will activate the default item. If its value is **FALSE**, pressing SELECT will post the submenu.

XtNshowAccelerators

Range of Values:

> **OL_DISPLAY**/"display"
> **OL_INACTIVE**/"inactive"
> **OL_NONE**/"none"

When this resource is set to **OL_DISPLAY**, the keyboard accelerators on the controls will be displayed. When this resource is set to **OL_NONE**, the keyboard accelerators on the controls will not be displayed. Setting this resource to **OL_INACTIVE** will cause the keyboard accelerators to not be displayed and will cause the controls to ignore the accelerator action.

XtNshowMnemonics

Range of Values:

> **OL_DISPLAY**/"**display**"
> **OL_HIGHLIGHT**/"**highlight**"
> **OL_INACTIVE**/"**inactive**"
> **OL_NONE**/"**none**"
> **OL_UNDERLINE**/"**underline**"

This resource determines if the keyboard mnemonics on the controls should be displayed. Setting it to **OL_UNDERLINE** will cause the mnemonics to be displayed in the primitive children by drawing a line under the character in the font color. Setting it to **OL_HIGHLIGHT** will display the mnemonic character with the background and foreground colors reversed. When highlighting a character that is displayed on a pixmap background, the mnemonic character will be drawn in a solid color. The mnemonic accelerator will not be displayed if this resource is set to **OL_NONE**. The resource set to **OL_INACTIVE** turns off the mnemonic display as well as making the mnemonic key inactive.

XtNtextBackground

This resource reflects the default color used in the scrolling list and textEdit widgets.

XtNtextFontColor

This resource reflects the default font color used in the scrolling list and textEdit widgets.

XtNthreeD

This resource determines how the visuals are rendered. The default value, **TRUE**, displays the visuals with a three dimensional look. Setting this resource to **FALSE** will cause the visuals to have a two dimensional appearance.

Core Resources

These are the resources of the Core class, of which all widget classes are subclasses. They are described here to avoid repeating their descriptions for each widget.

Core Resource Set

Name	Class	Type	Access
XtNaccelerators	XtCAccelerators	XtTranslations	G
XtNancestorSensitive	XtCSenstitive	Boolean	G*
XtNbackground	XtCBackground	Pixel	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	SGI†
XtNborderColor	XtCBorderColor	Pixel	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	SGI
XtNcolormap	XtCColormap	Colormap	SGI
XtNdepth	XtCDepth	Cardinal	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	SI
XtNheight	XtCHeight	Dimension	SGI
XtNmanaged	XtCManaged	Boolean	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	SGI
XtNscreen	XtCScreen	int	GI
XtNsensitive	XtCSensitive	Boolean	GI*
XtNtranslations	XtCTranslations	XtTranslations	G
XtNwidth	XtCWidth	Dimension	SGI
XtNx	XtCPosition	Position	SGI
XtNy	XtCPosition	Position	SGI

XtNancestorSensitive

Range of Values:

`TRUE`
`FALSE`

This argument specifies whether the immediate parent of the widget will receive input events. To preserve data integrity, the application should use the **XtSetSensitive** routine if it wants to change the resource (see **XtNsensitive** below).

XtNaccelerators

This resource should not be set by an application.

XtNbackground

Range of Values:

(any valid current display **Pixel** value)

This resource specifies the background color for the widget.

Note that the OPEN LOOK workspace manager arranges for a "normal video" (or "reverse video") effect on monochrome displays by setting the **XtNback-ground** resource to white (black) and the **XtNforeground**, **XtNfontColor**, and **XtNborderColor** resources to black (white) where appropriate. The workspace manager also provides end user access to some of these resources on poly-chrome displays. However, any color set by the application when a widget is created or in a later call to **XtSetValues** will override the colors set by the user. Thus applications should consider this and avoid setting these resources directly, letting the user have control over them.

XtNbackgroundPixmap

The application can specify a pixmap to be used for tiling the background. The first tile is placed at the upper left hand corner of the widget's window.

This resource takes precedence over the **XtNbackground** resource.

See the note about the interaction of this resource with other color resources under the description of the **XtNbackground** resource above.

XtNborderColor

Range of Values:

(any valid current display `Pixel` value)/(any name from the **rgb.txt** file)

This resource specifies the color of the border.

See the note about the interaction of this resource with other color resources under the description of the **XtNbackground** resource above.

XtNborderPixmap

The application can specify a pixmap to be used for tiling the border. The first tile is placed at the upper left hand corner of the border.

This resource takes precedence over the **XtNborderColor** resource.

See the note about the interaction of this resource with other color resources under the description of the **XtNbackground** resource above.

XtNborderWidth

Range of Values:

`0 ≤ XtNborderWidth ≤ min(XtNwidth, XtNheight) / 2`

This resource sets the width of the border for a widget. Typically the border surrounds the widget's window on all four sides, but in some widgets it is inside the widget, surrounding a view or control area contained in the widget. The width is specified in pixels, and a width of zero means no border will show.

XtNcolormap

Range of Values:

```
StaticGray
GrayScale
StaticColor
PseudoColor
TrueColor
DirectColor
```

This is the colormap to be used for the widget. While the range of values listed here is the entire list recognized, the actual valid values depend on the X server being used.

By default, a widget inherits its parent widget's colormap. If the widget is a top level shell, the default is the default colormap for the screen (see the **XtNscreen** resource).

XtNdepth

Range of Values:

`0` *or* (any value supported by the current display)

Determines how many bits should be used for each pixel in the widget's window. The value of this resource is used by the X Toolkit Intrinsics to set the depth of the widget's window when the widget is created. A value of zero causes a normal widget to inherit the depth of its parent, or a pop-up widget to inherit the default depth of the screen.

XtNdestroyCallback

This is a pointer to a callback list containing routines to be called when the widget is destroyed.

XtNheight

Range of Values:

`0 ≤ XtNheight`

This resource contains the height of the widget's window in pixels, not including the border area. Programs may request a value at creation or through later calls to **XtSetValues**, but the request may not succeed because of layout requirements of the parent widget.

The visual representations for some widgets have a fixed height for a given scale. For these widgets, the **XtNheight** resource gives the height of the space that contains the widget's representation; the representation is centered vertically in this space unless otherwise specified.

XtNmanaged

Range of Values:

TRUE
FALSE

If this resource is set to **TRUE**, the widget is included in the geometry calculations of its parent. If **FALSE**, the widget is ignored by its parent and is not included in the geometry calculations.

XtNmappedWhenManaged

Range of Values:

TRUE
FALSE

If set to **TRUE**, the widget will be mapped (made visible) as soon as it is both realized and managed. If set to **FALSE**, the program is responsible for mapping and unmapping the widget. If the value is changed from **TRUE** to **FALSE** after the widget has been realized and managed, the widget is unmapped.

XtNscreen

This resource should not be set by an application.

XtNsensitive

Range of Values:

TRUE
FALSE

This resource determines whether a widget will receive input events. If a widget is sensitive, the X Toolkit Intrinsic's event manager will dispatch to the widget all keyboard, mouse button, motion, window enter/leave, and focus events. Insensitive widgets do not receive these events. Also, insensitive widgets that appear on the screen are stippled with a 50% gray pattern to show that they are inactive, as a visual indication that the user can't interact with the widget. The 50% gray pattern is one that makes every other pixel of the widget the background color, in a checkerboard pattern.

An application should use the **XtSetSensitive** routine if it wants to change this resource. That way it ensures that if a parent widget has **XtNsensitive** set to **FALSE**, the **XtNancestorSensitive** flag of all its descendants will be appropriately set.

XtNtranslations

This resource should not be set by an application.

XtNwidth

Range of Values:

0 ≤ XtNwidth

This resource contains the width of the widget's window in pixels, not including the border area. Programs may request a value at creation or through later calls to **XtSetValues**, but the request may not succeed because of layout requirements of the parent widget.

The visual representations for some widgets have a fixed width for a given scale. For these widgets, the **XtNwidth** resource gives the width of the space that contains the widget's representation; the representation is centered horizontally in this space unless otherwise specified.

XtNx

Range of Values:

0 ≤ XtNx

This argument contains the x-coordinate of the widget's upper left hand corner (excluding the border) relative to its parent widget. Programs may request a value at creation or through later calls to **XtSetValues**, but the request may not succeed because of layout requirements of the parent widget.

XtNy

Range of Values:

`0 ≤ XtNy`

This resource contains the y-coordinate of the widget's upper left hand corner (excluding the border) relative to its parent widget. Programs may request a value at creation or through later calls to **`XtSetValues`**, but the request may not succeed because of layout requirements of the parent widget.

Flat Widget Layout

All of the flat containers have the same layout characteristics. The superclass of all flat widgets is a generic row/column manager. Though each column has its own width and each row has its own height, all columns can have the same width and all rows can have the same height, if desired.

NOTE As a programming note, the efficiency in both processing steps and data requirements increases as the grid becomes more regular in shape. For example, a grid specifying that all rows must have the same height and all columns must have the same width is the most efficient configuration.

The flat row/column manager lays out each managed sub-object in row-major order or in column-major order depending on the attributes of the container, starting with the NorthWest corner of the container.

NOTE Row-major order implies every column in the current row is filled before filling any columns in the next row. Column-major order implies every row in the current column is filled before filling any rows in the next column.

Sub-objects of flat containers are placed within the grid. If the sub-object's width (or height) is less than the column's width (or row's height), the sub-object is positioned in accordance to the **`XtNitemGravity`** resource. The following table lists the layout resources of all flat containers:

NOTE See the resource tables for each flat container for a more accurate accounting of the default/allowable values for each layout resource.

Common Flat Container Layout Resources

Name	Class	Type	Default	Access
XtNgravity	XtCGravity	int	CenterGravity	SGI
XtNhPad	XtCHPad	Dimension	0	SGI
XtNhSpace	XtCHSpace	Dimension	0	SGI
XtNitemGravity	XtCItemGravity	int	NorthWestGravity	SGI
XtNitemMaxHeight	XtCItemMaxHeight	Dimension	OL_IGNORE	SGI
XtNitemMaxWidth	XtCItemMaxWidth	Dimension	OL_IGNORE	SGI
XtNitemMinHeight	XtCItemMinHeight	Dimension	OL_IGNORE	SGI
XtNitemMinWidth	XtCItemMinWidth	Dimension	OL_IGNORE	SGI
XtNlayoutHeight	XtCLayoutHeight	OlDefine	OL_MINIMIZE	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNlayoutWidth	XtCLayoutWidth	OlDefine	OL_MINIMIZE	SGI
XtNmeasure	XtCMeasure	int	1	SGI
XtNsameHeight	XtCSameHeight	OlDefine	OL_ALL	SGI
XtNsameWidth	XtCSameWidth	OlDefine	OL_COLUMNS	SGI
XtNvPad	XtCVPad	Dimension	0	SGI
XtNvSpace	XtCVSpace	Dimension	0	SGI

XtNgravity

Range of Values:

```
EastGravity/"east"
WestGravity/"west"
CenterGravity/"center"
NorthGravity/"north"
NorthEastGravity/"northEast"
NorthWestGravity/"northWest"
SouthGravity/"south"
SouthEastGravity/"southEast"
SouthWestGravity/"southWest"
```

The gravity resource specifies the position of all sub-objects (that is, as a group) whenever a tight-fitting bounding box that surrounds the sub-objects has a width, or height, less than the container's width or height, respectively. Essentially, this resource specifies how the sub-objects, as a group, float within its container.

XtNhPad/XtNvPad

Range of Values:

$0 \leq$ **XtNhPad**
$0 \leq$ **XtNvPad**

These resources specify the minimum spacing to leave round the edges of the container, left and right, and top and bottom, respectively.

XtNhSpace/XtNvSpace

Range of Values:

$0 \leq$ **XtNhSpace**
$0 \leq$ **XtNvSpace**

These resource specify the amount of space to leave between sub-objects horizontally and vertically, respectively. If the sub-objects are of different sizes in a row or column, the spacing applies to the widest or tallest dimension all sub-objects in the row or column.

XtNitemGravity

Range of Values:

```
EastGravity/"east"
WestGravity/"west"
CenterGravity/"center"
NorthGravity/"north"
NorthEastGravity/"northEast"
NorthWestGravity/"northWest"
SouthGravity/"south"
SouthEastGravity/"southEast"
SouthWestGravity/"southWest"
```

This resource specifies how an item fits into its row or column whenever the item's width or height is less than the column's width or the row's height. The values of **XtNsameWidth** and **XtNsameHeight** govern the column's width and the row's height.

XtNitemMaxHeight/XtNitemMaxWidth

Range of Values:

```
OL_IGNORE != XtNitemMaxHeight
OL_IGNORE != XtNitemMaxWidth
```

These resources specify the maximum allowable width and height (respectively) of all sub-objects. If either of these resources have a value of **OL_IGNORE**, the maximum size constraint is ignored.

XtNitemMinHeight/XtNitemMinWidth

Range of Values:

```
OL_IGNORE != XtNitemMinHeight
OL_IGNORE != XtNitemMinWidth
```

These resources specify the minimum allowable width and height (respectively) of all sub-objects. If either resource has a value of **OL_IGNORE**, it is ignored.

XtNlayoutHeight/XtNlayoutWidth

Range of Values:

> **OL_MINIMIZE**/"**minimize**"
> **OL_MAXIMIZE**/"**maximize**"
> **OL_IGNORE**/"**ignore**"

These resources specify the resize policy of flat containers whenever a sub-object is added, removed or altered. These resources have no affect when an external force applies a size change to the container, for example, if the application resizes a container. The explanation of the values are:

OL_MINIMIZE	The container will modify its width (or height) to be just large enough to tightly wrap around its sub-objects regardless of its current width (or height). Thus the container will grow and shrink depending on the size needs of its sub-objects.
OL_MAXIMIZE	The container will increase its width (or height) to be just large enough to tightly wrap around its sub-objects regardless of its current width (or height), but will not give up extra space. Thus the container will grow but never shrink depending on the size needs of its sub-objects.
OL_IGNORE	The container will honor its own width and height, for example, it will not grow or shrink in response to the addition, deletion or altering of its sub-objects.

XtNlayoutType

Range of Values:

> **OL_FIXEDCOLS**/"**fixedcols**"
> **OL_FIXEDROWS**/"**fixedrows**"

This resource controls the number of rows and columns used to layout the sub-objects.

OL_FIXEDCOLS	The layout should have a maximum number of columns equal to the value specified by the **XtNmeasure** resource, and there will be enough rows to hold all sub-objects. Sub-objects are placed in row-major order, for example, the columns of the current row are filled before filling any columns in the next row.

`OL_FIXEDROWS`	The layout should have a maximum number of rows equal to the value specified by the **`XtNmeasure`** resource, and there will be enough columns to hold all sub-objects. Sub-objects are placed in column-major order, for example, the rows of the current column are filled before filling any rows in the next column.

XtNmeasure

Range of Values:

```
0 < XtNmeasure
```

This resource gives the number of rows or columns that were requested from the **`XtNlayoutType`** resource.

XtNsameHeight

Range of Values:

```
OL_ALL/"all"
OL_ROWS/"rows"
OL_NONE/"none"
```

This resource defines which sub-objects are forced to be the same height within the container:

`OL_ALL`	All sub-objects are to be the same height.
`OL_ROWS`	All sub-objects appearing in the same row should be the same height.
`OL_NONE`	The sub-objects are placed in fixed-height rows but the height of each item is left alone. The height of each row is the height of the tallest sub-object.

XtNsameWidth

Range of Values:

```
OL_ALL/"all"
OL_COLUMNS/"columns"
OL_NONE/"none"
```

This resource defines that sub-objects are forced to be the same width within the container:

`OL_ALL`	All sub-objects are to be the same width.
`OL_COLUMNS`	All sub-objects appearing in the same column should be the same width.
`OL_NONE`	The sub-objects are placed in fixed-width columns but the width of each item is left alone. The width of each column is the width of the widest sub-object.

Manager Widget Resources

The following resources are available to the widgets that are a subclass of the Manager class.

Manager Resource Set

Name	Class	Type	Default	Access
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNinputFocusColor	XtCInputFocusColor	Pixel	red	SGI
XtNreferenceName	XtCReferenceName	String	NULL	GI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	GI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI

XtNconsumeEvent

The resource overrides the OPEN LOOK handling of events. Whenever an event is processed by the standard OPEN LOOK translation table, the **XtNConsumeEvent** list is called for the widget in question allowing the application to consume the **XEvent**. To consume an event, the application should turn on (set to **TRUE**) the consumed field in the **call_data** argument when a given event is processed. If the **XEvent** is consumed, the widget doesn't use it. If it is not consumed the widget uses it.

```
typedef struct {
        Boolean         consumed;
        XEvent          xevent;
        Modifiers       dont_care;
        OlVirtualName   virtual_name;
        KeySym          keysym;
        String          buffer;
        Cardinal        length;
        Cardinal        item_index;
} OlVirtualEventRec, *OlVirtualEvent;
```

XtNreferenceName

Range of Values:

valid name of a widget

This resource specifies a position for inserting this widget in its managing ancestor's traversal list. If the named widget exists in the managing ancestor's traversal list, this widget will be inserted in front of it. Otherwise, this widget will be inserted at the end of the list.

If both the **XtNreferenceName** and **XtNreferenceWidget** resources are set, they must refer to the same widget. If not, a warning is issued and the widget referred to by name is used.

XtNinputFocusColor

Range of Values:

(valid Pixel value for the display)/(valid color name)

This resource specifies the color used to show that the widget has input focus. Normally, this color is derived from the value of **`XtNinputFocusColor`** resource and is dynamically maintained. This dynamic behavior is abandoned if the application explicitly sets this resource either at initialization or through a call to **`XtSetValues`**.

XtNreferenceWidget

This resource specifies a position for inserting this widget in its managing ancestor's traversal list. If the reference widget is non-null and exists in the managing ancestor's traversal list, this widget will be inserted in front of it. Otherwise, this widget will be inserted at the end of the list.

If both the **`XtNreferenceName`** and **`XtNreferenceWidget`** resources are set, they must refer to the same widget. If not, a warning is issued and the widget referred to by name is used.

XtNtraversalOn

This resource specifies whether this widget is accessible through keyboard traversal.

XtNuserData

This resource provides storage for application-specific data. It is not used or set by the widget.

Primitive Widget Resources

The following resources are available to the Widgets that are a subclass of the Primitive class.

Primitive Resource Set

Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	Dynamic	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNFont	XtCFont	XFontStruct*	(OPEN LOOK font) SI	
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNfontGroup	XtCFontGroup	OlFontList	NULL	SGI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Black	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI

XtNaccelerator

This resource is used to define a single **KeyPress** event that will select a Primitive widget. The format of this string is identical to the translation manager syntax. Virtual Keys can be used in this translation.

XtNacceleratorText

This resource specifies a string that describes the Primitive's accelerator. For example, a **Help** button may set the resource to the string "F1" to remind the users that function key 1 is the HELP button. This text will be displayed to the right of the Primitive's label or image if the return from **OlQueryAccelerator-Display** is **OL_DISPLAY**.

This resource defaults to the **XtNaccelerator** string with "+"s inserted between multiple key sequences.

XtNconsumeEvent

The resource overrides the OPEN LOOK handling of events. Whenever an event is processed by the standard OPEN LOOK translation table, the **XtNConsumeEvent** list is called for the widget in question allowing the application to consume the **XEvent**. To consume an event, the application should turn on (set to **TRUE**) the consumed field in the **call_data** argument when a given event is processed. If the **XEvent** is consumed, the widget doesn't use it. If it is not consumed the widget uses it.

```
typedef struct {
      Boolean         consumed;
      XEvent          xevent;
      Modifiers       dont_care;
      OlVirtual Name  virtual_name;
      KeySym          keysym;
      String          buffer;
      Cardinal        length;
      Cardinal        item_index;
} OlVirtualEventRec, *OlVirtualEvent;
```

XtNfont

XtNfontcolor

XtNfontGroup

XtNforeground

XtNinputFocusColor

Range of Values:

(valid Pixel value for the display)/(valid color name)

This resource specifies the color used to show that the widget has input focus. Normally, this color is derived from the value of **XtNinputFocusColor** resource and is dynamically maintained. This dynamic behavior is abandoned if the application explicitly sets this resource either at initialization or through a call to **XtSetValues**.

XtNmnemonic

This resource is a single character that is used as a mnemonic accelerator for keyboard operation. Typing this character modified with the **`XtNmnemonic-Prefix`** will be equivalent to clicking select on the Primitive widget. Note that in a Menu shell, the mnemonicPrefix modifier is not needed. The Primitive widget may visually display this character.

XtNreferenceName

Range of Values:

(the name of a widget already created in the traversal list)

This resource specifies a position for inserting this widget in its managing ancestor's traversal list. If the the named widget exists in the managing ancestor's traversal list, this widget will be inserted in front of it. Otherwise, this widget will be inserted at the end of the list.

If both the **`XtNreferenceName`** and **`XtNreferenceWidget`** resources are set, they must refer to the same widget. If not, a warning is issued and the widget referred to by name is used.

XtNreferenceWidget

This resource specifies a position for inserting this widget in its managing ancestor's traversal list. If the reference widget is non-null and exists in the managing ancestor's traversal list, this widget will be inserted in front of it. Otherwise, this widget will be inserted at the end of the list.

If both the **`XtNreferenceName`** and **`XtNreferenceWidget`** resources are set, they must refer to the same widget. If not, a warning is issued and the widget referred to by name is used.

XtNtraversalOn

This resource specifies whether this widget is accessible through keyboard traversal.

XtNuserData

This resource provides storage for application-specific data. It is not used or set by the widget.

Shell Resources

These are resources that are common to all widget classes that are subclasses of Shell. They are described here to avoid repeating their descriptions for each shell widget.

NOTE The behavior described for many of these resources assume the OPEN LOOK window manager for the X Window System is being used.

Base Windows and Popup Windows

All OPEN LOOK base windows are created using one of the routines: **OlInitialize** or **XtCreateApplicationShell**. OPEN LOOK pop-up windows (the **PopupWindow**, **Menu**, and **Notice** widgets) are created using **XtCreatePopupShell**. An application may define other pop-up windows that can be created using **XtCreatePopupShell**.

The following table lists generic resources available to the base windows (that is, **TopLevelShell** and **ApplicationShell** widgets):

Base WindowShell Resource Set

Name	Class	Type	Access
XtNiconic	XtCIconic	Boolean	GI
XtNiconMask	XtCIconMask	Pixmap	SGI
XtNiconName	XtCIconName	String	SGI
XtNiconPixmap	XtCIconPixmap	Pixmap	SGI
XtNiconWindow	XtCIconWindow	Window	SGI
XtNiconX	XtCIconX	Position	GI
XtNiconY	XtCIconY	Position	GI

The following resources are typical of base windows and generic pop-up windows, but not all are available for the pop-up windows defined in this toolkit.

See the list of resources for the **PopupWindow**, **Menu**, and **Notice** widgets to see which are available. The Access column in this table identifies the access for base windows only.

Pop-up and Base Window Resource Set

Name	Class	Type	Access (Base Window)
XtNallowShellResize	XtCAllowShellResize	Boolean	SGI
XtNgeometry	XtCGeometry	String	GI
XtNheightInc	XtCHeightInc	int	SGI
XtNinitialState	XtCInitialState	int	GI
XtNinput	XtCInput	Boolean	G
XtNmaxAspectX	XtCMaxAspectX	Position	SGI
XtNmaxAspectY	XtCMaxAspectY	Position	SGI
XtNmaxHeight	XtCMaxHeight	Dimension	SGI
XtNmaxWidth	XtCMaxWidth	Dimension	SGI
XtNminAspectX	XtCMinAspectX	Position	SGI
XtNminAspectY	XtCMinAspectY	Position	SGI
XtNminHeight	XtCMinHeight	Dimension	SGI
XtNminWidth	XtCMinWidth	Dimension	SGI
XtNoverrideRedirect	XtCOverrideRedirect	Boolean	SGI
XtNpopdownCallback	XtCCallback	XtCallbackList	SI
XtNpopupCallback	XtCCallback	XtCallbackList	SI
XtNsaveUnder	XtCSaveUnder	Boolean	SGI
XtNtitle	XtCTitle	String	SGI
XtNtransient	XtCTransient	Boolean	SGI
XtNwaitForWm	XtCWaitForWm	Boolean	G
XtNwidthInc	XtCWidthInc	int	SGI
XtNwindowGroup	XtCWindowGroup	Window	SGI
XtNwmTimeout	XtCWmTimeout	int	G

The previous two tables listed generic resources available to most shells. The table below, however, lists resources necessary to support the OPEN LOOK look and feel. These resources are implemented in the **VendorShell** widget class; and therefore, apply only to shells which are subclasses of the **VendorShell** widget class (that is, **TransientShell**, **MenuShell**, **PopupWindowShell**, **NoticeShell**, **TopLevelShell** and **ApplicationShell**). Since some of these resources do not apply to all shells (for example, **XtNresizeCorners** on menus), see the individual manual pages for a more accurate description of the applicable resources and their default values.

OPEN LOOK look and feel Resource Set
(**VendorShell** and its subclasses)

Name	Class	Type	Access
XtNbusy	XtCNBusy	Boolean	FALSE
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	SGI
XtNfocusWidget	XtCFocusWidget	Widget	SGI
XtNmenuButton	XtCMenuButton	Boolean	GI
XtNmenuType	XtCMenuType	OlDefine	SGI
XtNpushpin	XtCPushpin	OlDefine	SGI
XtNresizeCorners	XtCResizeCorners	Boolean	SGI
XtNuserData	XtCUserData	XtPointer	SGI
XtNwindowHeader	XtCWindowHeader	Boolean	GI
XtNwmProtocol	XtCWMProtocol	XtRCallbackList	SGI †
XtNwmProtocolInterested	XtCWMProtocolInterested	int	I †

† Access value is conditional. Please see resource description for more information.

NOTE

OlAddCallback must be used instead of **XtAddCallback** when adding callbacks to the **XtNconsumeEvent** and **XtNwmProtocol** callback lists. This restriction is due to a limitation in the Release 4 X Toolkit Intrinsics class extension mechanism with respect to callback lists. Likewise, **OlRemoveCallback**, **OlHasCallbacks** and **OlCallCallbacks** should be used instead of **XtRemoveCallback**, **XtHasCallbacks** and **XtCallCallbacks**, respectively. All four of these OPEN LOOK routines has the same arguments and semantics of their Intrinsic's counterparts.

Resource Description

XtNallowShellResize

Range of Values:

> **TRUE**
> **FALSE**

This resource controls whether the shell widget is allowed to resize itself in response to a geometry request from its child. If set to **TRUE**, it will attempt to resize itself as requested by the child. The attempt may be refused by the window manager, which will cause the shell widget to refuse the geometry management request of its child. Otherwise, it accepts the request. If the **XtNallowShellResize** request is set to **FALSE**, the shell widget will immediately refuse the geometry management request.

XtNbusy

Setting this resource to TRUE makes the application window associated with this shell busy. When a window becomes busy, the window manager grays the window header (if there is one). Setting the **XtNbusy** resource back to **FALSE** causes the window to return to its normal appearance and event processing.

NOTE Neither the window manager or the toolkit grabs mouse or keyboard events when an application window becomes busy.

XtNconsumeEvent

The resource overrides the OPEN LOOK handling of events. Whenever an event is processed by the standard OPEN LOOK translation table, the **XtNConsumeEvent** list is called for the widget in question allowing the application to consume the **XEvent**. To consume an event, the application should turn on (set to **TRUE**) the consumed field in the **call_data** argument when a given event is processed.

NOTE

OlAddCallback must be used instead of **XtAddCallback** when adding callbacks to the **XtNconsumeEvent** callback list.

XtNcreatePopupChildProc

This resource defines a pointer to a single function (not a callback list) that is called during the process of popping up the shell widget. It is called after the **XtNpopupCallback** callbacks are issued but before the shell widget is realized and mapped. The function is passed a single argument, the ID of the shell widget.

XtNfocusWidget

This resource controls which widget gets the input focus when a pop-up or base window gains input focus. If this resource is non-NULL, focus is set it. If this resource is NULL or the widget to which it refers is unwilling to accept input focus, the pop-up or base window sets focus to either the default widget in the window or the first widget willing to accept focus. As focus changes within the shell, this resource is updated to reflect the last widget with focus.

A resource converter will translate widget names specified in a resource file to a widget id for this resource.

XtNgeometry

Range of Values:

(any syntactically correct argument to the **XParseGeometry** function)

This resource can be used to specify the size and position of the shell widget when it pops up.

XtNheightInc/XtNwidthInc

Range of Values:

0 ≤ XtNheightInc
0 ≤ XtNwidthInc

These resources define an arithmetic progression of sizes, from **XtNminHeight** and **XtNminWidth** to **XtNmaxHeight** and **XtNmaxWidth**, into which the shell widget prefers to be resized by the window manager.

XtNiconic

Range of Values:

> **TRUE**
> **FALSE**

This resource provides an equivalent method of setting the **XtNinitialState** resource to **IconicState**.

XtNiconMask

This resource defines an image that specifies which pixels of the **XtNiconPixmap** resource should be used for the base window's icon. This image must be a single plane pixmap.

XtNiconName

This resource defines a name that the window manager will display in the shell widget's icon. If the **XtNtitle** resource is not defined or is NULL, this resource is used instead. If this resource is NULL, the name of the application is used in its place.

XtNiconPixmap

This resource defines the image to be used as the base window's icon. It must be a single plane pixmap.

XtNiconWindow

Range of Values:

> (ID of any existing window)

This resource defines the ID of a window that the window manager should use for the base window's icon, in place of **XtNiconPixmap**. The **XtNiconWindow** takes precedence over the **XtNiconPixmap** resource.

XtNiconX/XtNiconY

Range of Values:

```
-1 ≤ XtNiconX
-1 ≤ XtNiconY
```

These resources define the location where the base window's icon should appear. If the value of one of these resources is -1, the window manager automatically picks a value, according to its icon placement requirements.

XtNinitialState

Range of Values:

```
NormalState/"1"
IconicState/"3"
```

This resource defines how the base window (and associated pop-up windows) appears when the application starts up.

`NormalState`	When set to this value, the application starts up with its base window open.
`IconicState`	When set to this value, the application starts up with its base window closed into an icon.

NOTE Other values are defined by the X Window System for this resource, but the OPEN LOOK window manager recognizes only the iconic and normal states.

XtNinput

This resource controls the type of input focus behavior of the application. It should not be set by an application.

XtNmenuButton

This Boolean resource determines if the menu button decoration should be drawn in the upper left corner of the shell window's header The default, `TRUE`, indicates that it should be drawn. If the `XtNpushpin` resource is not `OL_NONE`, this resource is ignored.

XtNmenuType

Range of Values:

```
OL_MENU_FULL/"full"
OL_MENU_LIMITED/"limited"
OL_MENU_CANCEL/"cancel"
OL_NONE/"none"
```

This resource provides the application access to the type of window menu that the OPEN LOOK window manager creates. The default value is `OL_MENU_FULL` for a base shell. This full menu contains the following entries: Close, Full Size, Properties, Back, Refresh, and Quit. Setting this resource to `OL_MENU_LIMITED` results in a window menu with the following buttons: Dismiss (a MenuButton), Back, Refresh, and Owner?. PopupWindow and Help shells set this resource to `OL_MENU_LIMITED`. The menu type `OL_MENU_CANCEL` provides the same menu as the `OL_MENU_LIMITED` with the exception that the Dismiss button is replaced with a Cancel button. When the `XtNmenuType` resource is `OL_NONE`, the window manager does not create a menu or a menu mark.

XtNmaxAspectX/XtNmaxAspectY

XtNminAspectX/XtNminAspectY

Range of Values:

```
-1 = XtNmaxAspectX, 1 ≤ XtNmaxAspectX
-1 = XtNmaxAspectY, 1 ≤ XtNmaxAspectY
-1 = XtNminAspectX, 1 ≤ XtNminAspectX
-1 = XtNminAspectY, 1 ≤ XtNminAspectY
```

$$\frac{\texttt{XtNminAspectX}}{\texttt{XtNminAspectY}} \leq \frac{\texttt{XtNmaxAspectX}}{\texttt{XtNmaxAspectY}}$$

These resources define the range of aspect ratios allowed for the size of the shell widget's window. Assuming the width and height of the window are given by *width* and *height*, the following relation shows how the window size is constrained:

$$\frac{\texttt{XtNminAspectX}}{\texttt{XtNminAspectY}} \leq \frac{width}{height} \leq \frac{\texttt{XtNmaxAspectX}}{\texttt{XtNmaxAspectY}}$$

If the end user tries to resize the window to a narrower or wider aspect ratio than allowed by these resources, the window manager adjusts the window to the closest allowed aspect ratio. If possible, it will do this by increasing the width or height to compensate. The **`XtNmaxHeight`** and **`XtNmaxWidth`** resources may force the window manager to reduce the width or height instead.

If the values of these resources are -1, the window manager does not constrain the size of the window to any aspect ratio.

NOTE An application should either set all values to -1 (the default) or should set all to a positive value. An application should never set a value of zero to any of these resources.

XtNmaxHeight/XtNmaxWidth/XtNminHeight/XtNminWidth

Range of Values:

`XtNminHeight` ≤ **`XtNmaxHeight`**
`XtNminWidth` ≤ **`XtNmaxWidth`**
(or `OL_IGNORE` for any of these resources)

These resources define the range allowed for the size of the shell widget's window. If the end user tries to resize the window smaller or larger than these values allow, the window manager adjusts the width and/or height to compensate.

The default value of `OL_IGNORE` keeps the window manager from constraining the window's size.

XtNoverrideRedirect

Range of Values:

> **TRUE**
> **FALSE**

This resource controls whether the shell widget's window is managed by the window manager. Since this OPEN LOOK toolkit is designed to have a certain pop-up window behavior, this resource should not be set by an application for the shell widgets defined in this toolkit (**Menu**, **Notice**, and **PopupWindow**).

XtNpopdownCallback

This resource defines callbacks automatically issued right after the shell widget's window has been unmapped (that is, popped down.)

XtNpopupCallback

This resource defines callbacks automatically issued right before the shell widget is realized and mapped (that is, popped up.)

XtNpushpin

Range of Values:

> **OL_NONE**/"**none**"
> **OL_OUT**/"**out**"
> **OL_IN**/"**in**"

This resource controls whether the pushpin is included in the window's decorations. The default for the base shell type is **OL_NONE**, indicating that the pushpin is not included in the window's decorations. Setting this resource to **OL_OUT** adds the pushpin to the window's decorations, and sets its state to be unpinned. **OL_OUT** is the default value for this resource in PopupWindow shells. Setting this resource to **OL_IN** adds the pushpin to the window's decorations, and sets its state to be pinned. **OL_IN** is the default value for this resource in Help shells. Applications can query the state of the pushpin by getting the value of this resource, since it is updated when the pushpin's state changes.

If the shell does not have an OPEN LOOK header (**XtNwindowHeader** set to **FALSE**), then **XtNpushpin** is always **OL_NONE**, and attempts to change the value are ignored.

XtNresizeCorners

This Boolean resource determines if the OPEN LOOK resize corners should be part of the window decorations. The default for the base shell is **TRUE**, that resize corners are present. PopupWindow also defaults to having resize corners, but Notice, Help and Menu shells do not have resize corners.

XtNsaveUnder

Range of Values:

TRUE
FALSE

This resource directs the shell widget to instruct the server to attempt to save the contents of windows obscured by the shell when it is mapped, and to restore the contents when the shell widget is unmapped.

XtNtitle

This resource gives the title to include in the header of the base or pop-up window. Widgets of other classes besides **Shell** may have a resource with the same name.

XtNtransient

Range of Values:

TRUE
FALSE

This resource controls whether the shell widget's window is "transient" and is to be unmapped when the associated base window is iconified (see **XtNwindow-Group**). Since this OPEN LOOK toolkit is designed to have a certain pop-up window behavior, this resource should not be set by an application for the shell widgets defined in this toolkit (**Menu**, **Notice**, and **PopupWindow**).

XtNuserData

This resource provides storage for application-specific data. It is not used or set by the widget. Its default value is NULL.

XtNwaitForWm

This resource should not be set by an application.

XtNwindowGroup

Range of Values:

(ID of any existing window)

This resource identifies the base window associated with this shell widget's window. When the end user closes the base window, all its associated windows are unmapped (pop-up windows or other shell widget windows with **XtNtransient** set to **TRUE**) or closed (base windows with **XtNtransient** set to **FALSE**).

XtNwindowHeader

This Boolean resource determines if the window manager should provide a header for the window. The header is the area of the window that contains the pushpin, title, and window mark. The default for the base shell is **TRUE**, that the window does have a header. The PopupWindow and Help shells also have default headers, but the Notice shell would default to **FALSE**. This resource can only be set at initialization.

XtNwmProtocol

Range of Values:

OL_WM_TAKE_FOCUS
OL_WM_SAVE_YOURSELF
OL_WM_DELETE_WINDOW

This resource controls the action that is taken whenever a shell widget (which is a subclass of a **VendorShell** widget class) receives **WM_PROTOCOL** messages. If no callback list is specified, the shell performs its default action(s). If a callback list is specified, it is invoked and no default action(s) is taken. The application can, however, simulate the default action(s) at its convenience by calling **OlWM-ProtocolAction** with the **action** parameter set to **OL_DEFAULTACTION**. (See **OlWMProtocolAction**(3W) for more information on this routine.)

When the application's callback procedure is invoked, the **call_data** field is a pointer to the following structure:

```
typedef struct {
    int         msgtype;          /* type of WM msg */
    XEvent *    xevent;
} OlWMProtocolVerify;
```

The field **msgtype** is an integer constant indicating the type of protocol message which invoked the callback and has a range of values of:

```
OL_WM_TAKE_FOCUS
OL_WM_SAVE_YOURSELF
OL_WM_DELETE_WINDOW
```

NOTE: **OlAddCallback** must be used instead of **XtAddCallback** when adding callbacks to the **XtNwmProtocol** callback list.

XtNwmProtocolInterested

This specifies the types of protocol messages that interest the application. By default, it is both **OL_WM_DELETE_WINDOW** and **OL_WM_TAKE_FOCUS**. Furthermore, these two types are always turned on and cannot be turned off. Thus, setting **XtNwmProtocolInterested** to **OL_WM_SAVE_YOURSELF** will get all three types.

XtNwmTimeout

This resource should not be set by an application.

B Manual Pages: Convenience Routines

Introduction to the Convenience Routines

This section describes the format of the man pages for convenience routines. Each routine starts on a new page and has the layout described below.

- The top of the first page for each major feature gives the feature name on both the top left and top right of the page, followed by a "3W" in parentheses. (3W is the numbering convention assigned to all OPEN LOOK programming manual pages.) Many of the routines are grouped by similar function (for example, Dynamic Setting or a Cursor Utility). The group name appears directly under the page header. When the routine has several variations a general or meaningful form was used for the page header.
- Some manual pages have several versions of a routine each with its own syntax and function. See the Synopsis or Description sub-sections for explanation.
- A synopsis is given that shows, briefly, how to invoke the function.
- Most routines have a description.
- The description is sometimes broken up into minor features, each starting with a separate heading.
- Some routine pages have SEE ALSO sections which direct you towards other commands that deal with a similar function.
- As a final item, some of the routines have an associated return value.

General Routines

```
Error
Flattened Widget Utilities
Input Focus
Mnemonic/AcceleratorDisplay
OlGetApplicationValues
OlInitialize
OlRegisterHelp
OlWMProtocolAction
OlWidgetToClassName
OlWidgetClassToClassName
PackedWidget
```

Pixel Conversion
Widget Activation/Association

Dynamic Settings Utilities

GetOlMoveCursor
GetOlDuplicateCursor
GetOlBusyCursor
GetOlPanCursor
GetOlQuestionCursor
GetOlTargetCursor
GetOlStandardCursor
OlGet50PercentGrey
OlGet75PercentGrey
OlGrabDragPointer
OlUngrabDragPointer
OlDragAndDrop
OlRegisterDynamicCallback
OlUnregisterDynamicCallback
OlCallDynamicCallbacks

Text Buffer Utilities

Buffer Macros
AllocateBuffer
AllocateTextBuffer
BackwardScanTextBuffer
CopyBuffer
CopyTextBufferBlock
EndCurrentTextBufferWord
ForwardScanTextBuffer
FreeBuffer
FreeTextBuffer
GetTextBufferBlock
GetTextBufferBuffer
GetTextBufferChar
GetTextBufferLine

GetTextBufferLocation
GrowBuffer
IncrementTextBufferLocation
InsertIntoBuffer
LastTextBufferLocation
LastTextBufferPosition
LineOfPosition
LocationOfPosition
NextLocation
NextTextBufferWord
PositionOfLine
PositionOfLocation
PreviousLocation
PreviousTextBufferWord
ReadFileIntoTextBuffer
ReadFileIntoBuffer
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TextEdit Routines

OlTextEditClearBuffer
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TextField Routines

OlTextFieldCopyString
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Obsolete Routines

NOTE Please see the "Manual Pages: Obsolete Routines" chapter in this guide for descriptions of routines that are no longer supported.

Abbrevstack Widget
Buttonstack Widget
LookupOlInputEvent
OlDetermineMouseAction
OlGetApplicationResources
OlReplayBtnEvent
Text Widget
Virtual Key/Button

Text Buffer Utilities

NAME

`AllocateBuffer`

SYNOPSIS

```
#include <buffutil.h>
  ...
extern Buffer * AllocateBuffer(element_size, initial_size)
int element_size;
int initial_size;
```

DESCRIPTION

The **`AllocateBuffer`** function allocates a Buffer for elements of the given **`element_size`**. The used member of the Buffer is set to zero and the size member is set to the value of **`initial_size`**. If **`initial_size`** is zero the pointer p is set to NULL, otherwise the amount of space required (**`initial_size * element_size`**) is allocated and the pointer p is set to point to this space. The function returns the pointer to the allocated Buffer.

SEE ALSO

`FreeBuffer`(3W)

Text Buffer Utilities

NAME

`AllocateTextBuffer`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextBuffer * AllocateTextBuffer(filename, f, d)
char * filename;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **`AllocateTextBuffer`** function is used to allocate a new TextBuffer. After it allocates the structure itself, initializes the members of the structure, allocating storage, setting initial values, etc. The routine also registers the update function provided by the caller. This function normally need not be called by an application developer since the **`ReadFileIntoTextBuffer`** and **`ReadStringIntoTextBuffer`** functions call this routine before starting their operation. The routine returns a pointer to the allocated TextBuffer.

The **`FreeTextBuffer`** function should be used to deallocate the storage allocated by this routine.

SEE ALSO

`FreeTextBuffer`(3W)
`ReadFileIntoTextBuffer`(3W)
`ReadStringIntoTextBuffer`(3W)

Text Buffer Utilities

NAME

`BackwardScanTextBuffer`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern ScanResult BackwardScanTextBuffer(text, exp, location)
TextBuffer * text;
char * exp;
TextLocation * location;
```

DESCRIPTION

The **`BackwardScanTextBuffer`** function is used to scan, towards the beginning of the buffer, for a given *exp*ression in the TextBuffer starting at *location.* A **`ScanResult`** is returned which indicates

`SCAN_NOTFOUND`	The scan wrapped without finding a match.
`SCAN_WRAPPED`	A match was found at a location *after* the start location.
`SCAN_FOUND`	A match was found at a location *before* the start location.
`SCAN_INVALID`	Either the location or the expression was invalid.

SEE ALSO

`ForwardScanTextBuffer`(3W)

NAME

Buffer_Macros: **BufferFilled**, **BufferLeft**, **BufferEmpty**

SYNOPSIS

```
# include <buffutil.h>

BufferFilled(buffer)
BufferLeft(buffer)
BufferEmpty(buffer)
```

DESCRIPTION

These macros are provided for use with the Buffer Utilities.

BufferFilled returns a flag indicating whether *buffer* is filled.

BufferLeft returns the number of unused elements in *buffer*.

BufferEmpty returns a flag indicating whether *buffer* is empty.

Text Buffer Utilities

NAME

`CopyBuffer`

SYNOPSIS

```
#include <buffutil.h>
  ...
extern Buffer * CopyBuffer(buffer)
Buffer * buffer;
```

DESCRIPTION

The **`CopyBuffer`** function is used to allocate a new Buffer with the same attributes as the given *buffer* and to copy the data associated with the given *buffer* into the new Buffer. A pointer to the newly allocated and initialized Buffer is returned. It is the responsibility of the caller to free this storage when appropriate.

SEE ALSO

`AllocateBuffer`(3W)
`FreeBuffer`(3W)
`InsertIntoBuffer`(3W)

Text Buffer Utilities

NAME

`CopyTextBufferBlock`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern int CopyTextBufferBlock(text, buffer, start_position,
           end_position)
TextBuffer * text;
char * buffer;
TextPosition start_position;
TextPosition end_position;
```

DESCRIPTION

The `CopyTextBufferBlock` function is used to retrieve a text block from the *text* TextBuffer. The block is defined as the characters between **`start_position`** and **`end_position`** inclusive. It returns the number of bytes copied; if the parameters are invalid the return value is zero (0).

SEE ALSO

`GetTextBufferLocation`(3W)
`GetTextBufferChar`(3W)
`GetTextBufferLine`(3W)

NOTES

The storage for the copy is allocated by the caller. It is the responsibility of the caller to ensure that enough storage is allocated to copy end_position - start_position + 1 bytes.

Text Buffer Utilities

NAME

`EndCurrentTextBufferWord`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextLocation EndCurrentTextBufferWord(textBuffer, current)
TextBuffer * textBuffer;
TextLocation current;
```

DESCRIPTION

The **`EndCurrentTextBufferWord`** function is used to locate the end of a word in the TextBuffer relative to a given *current* location. The function returns the location of the end of the current word. Note: this return value will equal the given current value if the current location is already at the end of a word.

SEE ALSO

`PreviousTextBufferWord`(3W)
`NextTextBufferWord`(3W)

NAME

Error: OlError, OlWarning, OlVaDisplayErrorMsg, OlVaDisplay-WarningMsg, OlSetErrorHandler, OlSetWarningHandler, OlSetVaDisplay-ErrorMsgHandler, OlSetVaDisplayWarningMsgHandler – error and warning message handling

SYNOPSIS

```
#include <Intrinsic.h>
#include <OpenLook.h>

void OlError(msg)
     String     msg;          /* error message string          */

void OlWarning(msg)
     String     msg;          /* warning message string        */

void OlVaDisplayErrorMsg(dpy, name, type, class, default_msg, ...)
     Display *  dpy;          /* Display pointer or NULL      */
     String     name;         /* message name                 */
     String     type;         /* message type                 */
     String     class;        /* message class                */
     String     default_msg;  /* message format string        */
     ...                      /* variable arguments for       */
                              /* the message format string    */

void OlVaDisplayWarningMsg(dpy, name, type, class, default_msg, ...)
     Display *  dpy;          /* Display pointer or NULL      */
     String     name;         /* message name                 */
     String     type;         /* message type                 */
     String     class;        /* message class                */
     String     default_msg;  /* message format string        */
     ...                      /* variable arguments for       */
                              /* the message format string    */

OlErrorHandler
OlSetErrorHandler(handler)
     OlErrorHandler     handler;     /* handler or NULL     */

OlWarningHandler
OlSetWarningHandler(handler)
     OlWarningHandler     handler;  /* handler or NULL      */

OlVaDisplayErrorMsgHandler
OlSetVaDisplayErrorMsgHandler(handler)
     OlVaDisplayErrorMsgHandler     handler;    /* handler or NULL*/

OlVaDisplayWarningMsgHandler
OlSetVaDisplayWarningMsgHandler(handler)
     OlVaDisplayWarningMsgHandler     handler; /* handler or NULL*/
```

```
typeder void     (*OlErrorHandler)(
        String   msg          /* error message string      */
);

typeder void     (*OlWarningHandler)(
        String   msg          /* warning message string    */
);

typedef void (*OlVaDisplayErrorMsgHandler)(
     Display *  dpy,          /* Display pointer or NULL   */
     String     name,         /* message name              */
     String     type,         /* message type              */
     String     class,        /* message class             */
     String     default_msg,  /* message format string     */
     va_list    ap            /* variable arguments for    */
                              /* the message format string */
);

typedef void (*OlVaDisplayWarningMsgHandler)(
     Display *  dpy,         /* Display pointer or NULL    */
     String     name,        /* message name               */
     String     type,        /* message type               */
     String     class,       /* message class              */
     String     default_msg, /* message format string      */
     va_list    ap           /* variable arguments for     */
                             /* the message format string  */
);
```

DESCRIPTION

OlError

OlError writes a simple string to stderr and then exits.

OlWarning

OlWarning writes a simple string to stderr and then returns.

OlVaDisplayErrorMsg

OlVaDisplayErrorMsg writes an error to stderr and exits. The error message is looked up in the error database by calling **XtAppGetErrorDatabaseText** using the *name, type,* and *class* arguments. If no message is found in the error database, the **default_msg** string is used. The application context is determined by calling **XtDisplayToApplicationContext** with the supplied Display pointer. If the display pointer is NULL, the display created at application startup is used to determine the application context.

An application programmer can choose to customize the text in an error message prefix. The following shows what the prefix is in an example message and which is the standard substituted string in the prefix:

"*application class*" OPEN LOOK Toolkit Error: *m e s s a g e*

To customize the prefix, put the following line in the client's *****_msgs** file, where ******* is the name of the client:

`*message.prefix: t e x t %s t e x t %s t e x t`

where the first **%s** will be the application name and the second will be the content of the message.

If the prefix is not customized, the current prefix will be supplied as the default.

To silence any toolkit error, put a corresponding "NULL" message in the client **app-defaults/***_msgs** file:

For example, to silence:

`*invalidResource.setValues: SetValues: widget`

Put the line

`*invalidResource.setValues:`

in the *****_msgs** file.

Note that **OlVaDisplayErrorMsg** will still cause the client application to exit.

OlVaDisplayWarningMsg

OlVaDisplayWarningMsg has the same semantics as **OlVaDisplayErrorMsg** except it returns instead of exiting.

An application programmer can choose to customize the text in a warning message prefix. The following shows what the prefix is in an example message and the standard substituted strings in the prefix:

"*application class*" **OPEN LOOK Toolkit Warning:** *m e s s a g e*

To customize the prefix, put the following line in the client's *****_msgs** file:

`*message.prefix: t e x t %s t e x t %s t e x t`

where the first %s will be the application name and the second will be the type of message.

If the prefix is not customized, the current prefix will be supplied as the default.

To silence any toolkit warning, put a corresponding "NULL" message in the client **app-defaults/***_msgs** file:

For example, to silence:

`*invalidResource.setValues: SetValues: widget`

`Put the line`

`*invalidResource.setValues:`

in the *****_msgs** file.

Others

OlSetErrorHandler, **OlSetWarningHandler**, **OlSetVaDisplayErrorMsgHandler**, and **OlSetVaDisplayWarningMsgHandler** allow an application to override the various warning and error handlers. These routines return a pointer to the previous handler. If NULL is supplied to any of these routines, the default handler will be used.

Since the error routines normally exit the program, application-supplied error handlers should do the same since continuation of an application will result in undefined behavior.

NOTES

Most programs should not use **OlError** and **OlWarning** since they don't allow for customization and internationalization.

Since **OpenLook.h** does not include **stdarg.h** (or **varargs.h**), an application using **OlSetVaDisplayErrorMsgHandler** or **OlSetVaDisplayWarningMsgHandler** should include one of these two headers before including **OpenLook.h** to insure the correct function prototype will be used for the application's error/warning handler.

SEE ALSO

OlGetMessage(3W)

NAME

Flattened Widget Utilities: OlFlatCallAcceptFocus, OlFlatGetFocusItem, OlFlatGetItemIndex, OlFlatGetItemGeometry, OlFlatGetValues, OlFlatSetValues, OlVaFlatGetValues OlVaFlatSetValues – queries and manipulates flattened widget attributes

SYNOPSIS

There are several convenience routines for querying or manipulating flattened widget attributes. All of these routines issue a warning if the widget id is not a subclass of a flattened widget.

```
Boolean OlFlatCallAcceptFocus(widget, index, time)
     Widget        widget;    /* Flattened widget id */
     Cardinal      index;     /* Item's index        */
     Time          time;      /* time of request     */


Cardinal OlFlatGetFocusItem(widget)
     Widget      widget;      /* Flattened widget id */


Cardinal OlFlatGetItemIndex(widget, x, y)
     Widget        widget;    /* Flattened widget id       */
     Position      x;         /* x location within widget  */
     Position      y;         /* y location within widget  */

void OlFlatGetItemGeometry(widget, index, x_ret, y_ret, w_ret, h_ret)
     Widget        widget;    /* Flattened widget id       */
     Cardinal      index;     /* Item's index              */
     Position *    x_ret;     /* returned x coordinate     */
     Position *    y_ret;     /* returned y coordinate     */
     Dimension     w_ret;     /* returned width            */
     Dimension *   h_ret;     /* returned height           */
```

Getting and Setting Flattened Widget Item State

```
void OlFlatGetValues(widget, index, args, num_args)
     Widget        widget;    /* Flattened widget id       */
     Cardinal      index;     /* Item's index              */
     ArgList       args;      /* attributes to query       */
     Cardinal      num_args;  /* number of args            */

void OlFlatSetValues(widget, index, args, num_args)
     Widget        widget;    /* Flattened widget id       */
     Cardinal      index;     /* Item's index              */
     ArgList       args;      /* attributes to set         */
     Cardinal      num_args;  /* number of args            */

void OlVaFlatGetValues(widget, index, ...)
     Widget        widget;    /* Flattened widget id       */
```

```
          Cardinal     index;      /* Item's index            */
          ...                      /* variable name/value pairs */

     void OlVaFlatSetValues(widget, index, ...)
          Widget       widget;     /* Flattened widget id     */
          Cardinal     index;      /* Item's index            */
          ...                      /* variable name/value pairs */
```

DESCRIPTION

OlFlatCallAcceptFocus

If specified item is capable of accepting input focus, focus is assigned to the item and function returns TRUE; otherwise, FALSE is returned.

OlFlatGetFocusItem

Returns the item within the flattened widget which has focus. OL_NO_ITEM is returned if no item within the widget has focus.

OlFlatGetItemIndex

Returns the item that contains the given x and y coordinates. OL_NO_ITEM is returned otherwise if no item contains the coordinate pair.

OlFlatGetItemGeometry

Returns the location and width/height of an item with respect to its flattened widget container. If the supplied item index is invalid, a warning is issued and the return values are set to zero.

OlFlatGetValues

Queries attributes of an item. This routine is very similar to **XtGetValues.** Applications can query any attribute of an item even if the attribute was not specified in the **XtNitemFields** resource of the flat widget container. Also see **OlVaFlatGetValues.**

OlFlatSetValues

Sets attributes of an item. This routine is very similar to **XtSetValues.** Applications can set values of item attributes only even if the attribute name was specified in the **XtNitemFields** resource of the flat widget container or if the item's attribute is always maintained (i.e., implicitly) by the flat widget container regardless of the **XtNitemFields** entries. For example, since the **FlatExclusives** Widget always maintains the value of an item's **XtNset** attribute even if **XtNset** was not in the **XtNitemFields** resource (see **FlatExclusives**(3W)). Therefore, an application can set the value of **XtNset** even though **XtNset** was not specified explicitly in the XtNitemFields resource for the widget. **XtNfont,** on the otherhand, is not implicitly maintained by the FlatExclusives Widget, so an application must specify **XtNfont** in the **XtNitemFields** resource if that application wants to change the font value via **OlFlatSetValues.** Also see **OlVaFlatSetValues.**

OlVaFlatGetValues

Variable argument interface to **OlFlatGetValues.** The variable length list of resource name/value pairs is terminated by a NULL resource name.

OlVaFlatSetValues

Variable argument interface to **OlFlatSetValues.** The variable length list of resource name/value pairs is terminated by a NULL resource name.

Text Buffer Utilities

NAME

ForwardScanTextBuffer

SYNOPSIS

```
#include <textbuff.h>
   ...
extern ScanResult ForwardScanTextBuffer(text, exp, location)
TextBuffer * text;
TextLocation * location;
char * exp;
```

DESCRIPTION

The **ForwardScanTextBuffer** function is used to scan, towards the end of the buffer, for a given **exp**ression in the TextBuffer starting at *location*. A **ScanResult** is returned which indicates

SCAN_NOTFOUND	The scan wrapped without finding a match.
SCAN_WRAPPED	A match was found at a location *before* the start location.
SCAN_FOUND	A match was found at a location *after* the start location.
SCAN_INVALID	Either the location or the expression was invalid.

SEE ALSO

BackwardScanTextBuffer(3W)

Text Buffer Utilities

NAME

`FreeBuffer`

SYNOPSIS

```
#include <buffutil.h>
   ...
extern void FreeBuffer(buffer)
Buffer * buffer;
```

DESCRIPTION

The **`FreeBuffer`** procedure is used to deallocate (free) storage associated with the given *buffer* pointer.

SEE ALSO

`AllocateBuffer`(3W)

Text Buffer Utilities

NAME

`FreeTextBuffer`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern void FreeTextBuffer(text, f, d)
TextBuffer * text;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **`FreeTextBuffer`** procedure is used to deallocate storage associated with a given TextBuffer. Note: the storage is not actually freed if the TextBuffer is still associated with other update function/data pairs.

SEE ALSO

`AllocateTextBuffer`(3W)
`RegisterTextBufferUpdate`(3W)

Cursor/Bitmap Utilities

NAME

`GetOlBusyCursor`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Cursor GetOlBusyCursor(screen)
Screen * screen;
```

DESCRIPTION

The `GetOlBusyCursor` function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Busy* cursor.

SEE ALSO

`GetOlMoveCursor`(3W)
`GetOlDuplicateCursor`(3W)
`GetOlPanCursor`(3W)
`GetOlQuestionCursor`(3W)
`GetOlTargetCursor`(3W)
`GetOlStandardCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Cursor/Bitmap Utilities

NAME

`GetOlDuplicateCursor`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Cursor GetOlDuplicateCursor(screen)
Screen * screen;
```

DESCRIPTION

The **`GetOlDuplicateCursor`** function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Duplicate* cursor.

SEE ALSO

`GetOlMoveCursor`(3W)
`GetOlBusyCursor`(3W)
`GetOlPanCursor`(3W)
`GetOlQuestionCursor`(3W)
`GetOlTargetCursor`(3W)
`GetOlStandardCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Cursor/Bitmap Utilities

NAME

`GetOlMoveCursor`

SYNOPSIS

```
#include <OlCursors.h>
  ...
extern Cursor GetOlMoveCursor(screen)
Screen * screen;
```

DESCRIPTION

The **`GetOlMoveCursor`** function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Move* cursor.

SEE ALSO

`GetOlDuplicateCursor`(3W)
`GetOlBusyCursor`(3W)
`GetOlPanCursor`(3W)
`GetOlQuestionCursor`(3W)
`GetOlTargetCursor`(3W)
`GetOlStandardCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Cursor/Bitmap Utilities

NAME

`GetOlPanCursor`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Cursor GetOlPanCursor(screen)
Screen * screen;
```

DESCRIPTION

The **`GetOlPanCursor`** function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Pan* cursor.

SEE ALSO

`GetOlMoveCursor`(3W)
`GetOlDuplicateCursor`(3W)
`GetOlBusyCursor`(3W)
`GetOlQuestionCursor`(3W)
`GetOlTargetCursor`(3W)
`GetOlStandardCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Cursor/Bitmap Utilities

NAME

`GetOlQuestionCursor`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Cursor GetOlQuestionCursor(screen)
Screen * screen;
```

DESCRIPTION

The **GetOlQuestionCursor** function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Question* cursor.

SEE ALSO

`GetOlMoveCursor`(3W)
`GetOlDuplicateCursor`(3W)
`GetOlBusyCursor`(3W)
`GetOlPanCursor`(3W)
`GetOlTargetCursor`(3W)
`GetOlStandardCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Cursor/Bitmap Utilities

NAME

`GetOlStandardCursor`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Cursor GetOlStandardCursor(screen)
Screen * screen;
```

DESCRIPTION

The **`GetOlStandardCursor`** function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Standard* cursor.

SEE ALSO

`GetOlMoveCursor`(3W)
`GetOlDuplicateCursor`(3W)
`GetOlBusyCursor`(3W)
`GetOlPanCursor`(3W)
`GetOlQuestionCursor`(3W)
`GetOlTargetCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Cursor/Bitmap Utilities

NAME

`GetOlTargetCursor`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Cursor GetOlTargetCursor(screen)
Screen * screen;
```

DESCRIPTION

The **`GetOlTargetCursor`** function is used to retrieve the Cursor id for *screen* that complies with the OPEN LOOK specification of the *Target* cursor.

SEE ALSO

`GetOlMoveCursor`(3W)
`GetOlDuplicateCursor`(3W)
`GetOlBusyCursor`(3W)
`GetOlPanCursor`(3W)
`GetOlQuestionCursor`(3W)
`GetOlStandardCursor`(3W)

RETURN VALUE

The Cursor id is returned.

Text Buffer Utilities

NAME

GetTextBufferBlock

SYNOPSIS

```
#include <textbuff.h>
   ...
extern char * GetTextBufferBlock(text, start_location, end_location)
TextBuffer * text;
TextLocation start_location;
TextLocation end_location;
```

DESCRIPTION

The **GetTextBufferBlock** function is used to retrieve a text block from the *text* TextBuffer. The block is defined as the characters between **start_location** and **end_location** inclusive. It returns a pointer to a string containing the copy. If the parameters are invalid NULL is returned.

SEE ALSO

GetTextBufferLocation(3W)
GetTextBufferChar(3W)
GetTextBufferLine(3W)

NOTES

The storage for the copy is allocated by this routine. It is the responsibility of the caller to free this storage when it becomes dispensable.

Text Buffer Utilities

NAME

`GetTextBufferBuffer`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern Buffer * GetTextBufferBuffer(text, line)
TextBuffer * text;
TextLine     line;
```

DESCRIPTION

The **`GetTextBufferBuffer`** function is used to retrieve a pointer to the Buffer stored in TextBuffer *text* for *line*. This pointer is volatile; subsequent calls to any TextBuffer routine may make it invalid. If a more permanent copy of this Buffer is required the Buffer Utility CopyBuffer can be used to create a private copy of it.

SEE ALSO

`GetTextBufferBlock`(3W)
`GetTextBufferLocation`(3W)

Text Buffer Utilities

NAME

`GetTextBufferChar`

SYNOPSIS

```
#include <textbuff.h>
   ...
int GetTextBufferChar(text, location)
TextBuffer * text;
TextLocation location;
```

DESCRIPTION

The **`GetTextBufferChar`** function is used to retrieve a character stored in the *text* TextBuffer at *location*. It returns either the character itself or EOF if location is outside the range of valid locations within the TextBuffer.

SEE ALSO

`GetTextBufferLocation`(3W)
`GetTextBufferBlock`(3W)
`GetTextBufferLine`(3W)

Text Buffer Utilities

NAME

`GetTextBufferLine`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern char * GetTextBufferLine(text, lineindex)
TextBuffer * text;
TextLine lineindex;
```

DESCRIPTION

The **`GetTextBufferLine`** function is used to retrieve the contents of *line* from the *text* TextBuffer. It returns a pointer to a string containing the copy of the contents of the line or NULL if the *line* is outside the range of valid lines in *text*.

SEE ALSO

`GetTextBufferLocation`(3W)
`GetTextBufferChar`(3W)
`GetTextBufferBlock`(3W)

NOTES

The storage for the copy is allocated by this routine. It is the responsibility of the caller to free this storage when it becomes dispensable.

Text Buffer Utilities

NAME

`GetTextBufferLocation`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern char * GetTextBufferLocation(text, line_number, location)
TextBuffer * text;
TextLine line_number;
TextLocation * location;
```

DESCRIPTION

The **`GetTextBufferLocation`** function is used to retrieve the contents of the given line within the TextBuffer. It returns a pointer to the character string. If the line number is invalid a NULL pointer is returned. If a non-NULL TextLocation pointer is supplied in the argument list the contents of this structure are modified to reflect the values corresponding to the given line.

SEE ALSO

`GetTextBufferBlock`(3W)

Text Buffer Utilities

NAME

`GrowBuffer`

SYNOPSIS

```
#include <buffutil.h>
   ...
extern void GrowBuffer(buffer, increment)
Buffer * buffer;
int increment;
```

DESCRIPTION

The **`GrowBuffer`** procedure is used to expand (or compress) a given *buffer* size by *increment* elements. If the increment is negative the operation results in a reduction in the size of the Buffer.

SEE ALSO

`AllocateBuffer`(3W)

Text Buffer Utilities

NAME

`IncrementTextBufferLocation`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextLocation IncrementTextBufferLocation(text, location, line,
                                                 offset)
TextBuffer * text;
TextLocation location;
TextLine line;
TextPosition offset;
```

DESCRIPTION

The **`IncrementTextBufferLocation`** function is used to increment a *location* by either *line* lines and/or *offset* characters. It returns the new location. Note: if *line* or *offset* are negative the function performs a decrement operation. If the starting location or the resulting location is invalid the starting location is returned without modification; otherwise the new location is returned.

SEE ALSO

`NextLocation`(3W)
`PreviousLocation`(3W)

NAME

Input Focus: OlCallAcceptFocus, OlCanAcceptFocus, OlGetCurrentFocusWidget, OlHasFocus, OlMoveFocus, OlSetInputFocus – manipulates input focus for widgets and gadgets.

SYNOPSIS

Six convenience routines are available for manipulating input focus. Each of these routines work with widgets or gadgets.

```
Boolean OlCallAcceptFocus(w, time)
     Widget     w;
     Time       time;

Boolean OlCanAcceptFocus(w, time)
     Widget     w;
     Time       time;

void OlSetInputFocus(w, revert_to, time)
     Widget     w;
     int        revert_to;
     Time       time;

Widget OlGetCurrentFocusWidget(w)
     Widget     w;

Boolean OlHasFocus(w)
     Widget     w;

Widget OlMoveFocus(w, direction, time)
     Widget            w;
     OlVirtualName     direction;
     Time              time;
```

DESCRIPTION

OlCallAcceptFocus

If widget *w* currently is capable of accepting input focus, focus is assigned to *w* and the function returns TRUE; otherwise, FALSE is returned. Time specifies the X server time of the event that initiated this accept focus request.

OlCanAcceptFocus

If the widget can accept focus, TRUE is returned; otherwise, FALSE is returned. Acceptance of focus is determined by the following:

The widget is not being destroyed.

The widget is managed

The widget is mapped when managed (if it's not a gadget)

The widget is realized, or for a gadget, the gadget's parent must be realized

The widget and its ancestors are sensitive

A query window attributes is successful and the widget's window is viewable (i.e., the window and all its ancestor windows are mapped)

Otherwise, FALSE is returned.

OlSetInputFocus

`OlSetInputFocus` sets focus to a widget. Applications should use this routine instead of **`XSetInputFocus`** since this routine checks the current focus model and before setting focus.

OlGetCurrentFocusWidget

`OlGetCurrentFocusWidget` returns the id of the widget which currently has focus in the window group of the specified widget. If no widget in the window group has focus, NULL is returned.

OlHasFocus

This function is simply a convenience function that calls **`OlGetCurrentFocusWidget`** and compares the result of that call to the supplied widget id.

OlMoveFocus

This function moves the input focus from one widget to another and returns the id of the new focus widget. The routine **`OlCallAcceptFocus`** is used to move the input focus. If the function is unable to move input focus, NULL is returned.

When moving input focus between widgets contained within an exclusives or non-exclusives widget, valid values for direction are:

Note: For the OL_MULTI directions below, the value of **`m`** is the value of the application resource XtNmultiObjectCount.

OL_IMMEDIATE
: Set focus to the next widget that will accept it, starting with *w*.

OL_MOVERIGHT
: Set focus to the widget in the next column (and same row) that will accept it, starting with the first column after *w's* column. If *w* is located in the extreme right column, focus is set to the widget in the extreme left column of the same row.

OL_MOVELEFT
: Set focus to the widget in the previous column (and same row) that will accept it, starting with the first column before *w's* column. If *w* is located on the extreme left column, focus is set to the widget in the extreme right column of the same row. (The widget columns are searched in reverse order.)

OL_MOVEUP
: Set focus to the widget in the next row (and same column) that will accept it, starting with the first row after *w's* row. If *w* is located in the top row, focus is set to the widget in the bottom row of the same column. (The widget rows are searched in reverse order.)

OL_MOVEDOWN
: Set focus to the widget in the previous row (and same column) that will accept it, starting with the first row before *w's* row. If *w* is located in the bottom row, focus is set to the widget in the top row of the same column.

OL_MULTIRIGHT
: Set focus to the widget in the next column (and same row) that will accept it, starting with the first column *m* columns after *w's* column. If *m* is greater than the number of objects between *w* and the extreme right column, focus is set to the widget in the extreme left column of the same row.

OL_MULTILEFT
: Set focus to the widget in the next column (and same row) that will accept it, starting with the first column *m* columns before *w's* column. If *m* is greater than the number of objects between *w* and the extreme left column, focus is set to the widget in the extreme right column of the same row. (The widget columns are searched in reverse order.)

OL_MULTIUP
: Set focus to the widget in the next row (and same column) that will accept it, starting with the first row *m* rows after *w's* row. If *m* is greater than the number of objects between *w* and the extreme bottom row, focus is set to the widget in the extreme top row of the same column. (The widget rows are searched in reverse order.)

OL_MULTIDOWN
: Set focus to the widget in the next row (and same column) that will accept it, starting with the first row *m* rows before *w's* row. If *m* is greater than the number of objects between *w* and the extreme bottom row, focus is set to the widget in the extreme bottom row of the same column. When moving between widgets in a base window or popup window, valid values for direction are:

OL_IMMEDIATE
: Set focus to the next object that will accept it, starting with *w*.

OL_NEXTFIELD
: Set focus to the next object that will accept it, starting with the first object after *w*.

OL_PREVFIELD
: Set focus to the next object that will accept it, starting with the first object before *w*. (The list is searched in reverse order.)

OL_MOVERIGHT
: Behaves like OL_NEXTFIELD direction.

OL_MOVELEFT
: Behaves like OL_PREVFIELD direction.

OL_MOVEUP
: Behaves like OL_PREVFIELD direction.

OL_MOVEDOWN
: Behaves like OL_NEXTFIELD direction.

OL_MULTIRIGHT
: Set focus to the next object that will accept it, starting with the first object *m* objects after *w*.

OL_MULTILEFT
: Set focus to the next object that will accept it, starting with the first object *m* objects before *w*. (The list is searched in reverse order.)

OL_MULTIUP
: Behaves like OL_MULTILEFT direction.

OL_MULTIDOWN
: Behaves like OL_MULTIRIGHT direction.

Text Buffer Utilities

NAME

`InsertIntoBuffer`

SYNOPSIS

```
#include <buffutil.h>
  ...
extern int InsertIntoBuffer(target, source, offset)
Buffer * target;
Buffer * source;
int offset;
```

DESCRIPTION

The `InsertIntoBuffer` function is used to insert the elements stored in the *source* buffer into the *target* buffer *before* the element stored at *offset*. If the **`offset`** is invalid or if the *source* buffer is empty the function returns zero; otherwise it returns one after completing the insertion.

SEE ALSO

`ReadStringIntoBuffer`(3W)
`ReadFileIntoBuffer`(3W)
`BufferMacros`(3W)

Text Buffer Utilities

NAME

`LastTextBufferLocation`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextLocation LastTextBufferLocation(text)
TextBuffer * text;
```

DESCRIPTION

The **`LastTextBufferLocation`** function returns the last valid TextLocation in the TextBuffer associated with *text*.

SEE ALSO

`LastTextBufferPosition`(3W)
`FirstTextBufferLocation`(3W)

Text Buffer Utilities

NAME

`LastTextBufferPosition`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextPosition LastTextBufferPosition(text)
TextBuffer * text;
```

DESCRIPTION

The **`LastTextBufferPosition`** function returns the last valid TextPosition in the TextBuffer associated with *text*.

SEE ALSO

`LastTextBufferLocation`(3W)
`FirstTextBufferLocation`(3W)

Text Buffer Utilities

NAME

`LineOfPosition`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern int LineOfPosition(text, position)
TextBuffer * text;
TextPosition position;
```

DESCRIPTION

The **`LineOfPosition`** function is used to translate a *position* in the *text* TextBuffer to a line index. It returns the translated line index or EOF if the *position* is invalid.

SEE ALSO

`LineOfPosition`(3W)
`PositionOfLocation`(3W)
`LocationOfPosition`(3W)

Text Buffer Utilities

NAME

`LocationOfPosition`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextLocation LocationOfPosition(text, position)
TextBuffer * text;
TextPosition position;
```

DESCRIPTION

The **`LocationOfPosition`** function is used to translate a *position* in the *text* TextBuffer to a TextLocation. It returns the translated TextLocation. If the **`position`** is invalid the Buffer pointer *buffer* is set to NULL and the line and offset members are set the last valid location in the TextBuffer; otherwise *buffer* is set to a non-NULL (though useless) value.

SEE ALSO

`LineOfPosition`(3W)
`PositionOfLocation`(3W)
`LocationOfPosition`(3W)

NAME

`Mnemonic/AccleratorDisplay: OlQueryMnemonicDisplay`
`OlQueryAcceleratorDisplay` – Controls mnemonic and accelerator displays

DESCRIPTION

Query Mnemonic Display for Screen

```
OlDefine OlQueryMnemonicDisplay(w)
Widget w;
```

Range of Values:

```
    OL_UNDERLINE
    OL_HIGHLIGHT
    OL_NONE
    OL_INACTIVE
```

This function queries how the keyboard mnemonics on the controls should be displayed. The default value is OL_UNDERLINE; the mnemonics should be displayed in the Primitive controls by drawing a line under the character in the font color. OL_HIGHLIGHT will display the mnemonic character with the background and foreground colors reversed. When highlighting a character that is displayed on a pixmap background, the mnemonic character will be drawn in a solid color. The mnemonic accelerator will not be displayed and will not activate the control if this function returns OL_INACTIVE.

Query Accelerator Display for Screen

```
OlDefine OlQueryAcceleratorDisplay(w)
Widget w;

Range of Values for return:

    OL_DISPLAY
    OL_NONE
    OL_INACTIVE
```

When this function returns OL_DISPLAY, the keyboard accelerators should be displayed. When this function returns OL_NONE, the keyboard accelerators should not be displayed. the return value OL_INACTIVE means the keyboard accelerators should not be displayed and the controls should ignore the accelerator action.

Text Buffer Utilities

NAME

NextLocation

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextLocation NextLocation(textBuffer, current)
TextBuffer * textBuffer;
TextLocation current;
```

DESCRIPTION

The **NextLocation** function returns the TextLocation which follows the given *current* location in a TextBuffer. If the current location points to the end of the TextBuffer this function wraps.

SEE ALSO

PreviousLocation(3W)

Text Buffer Utilities

NAME

`NextTextBufferWord`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextLocation NextTextBufferWord(textBuffer, current)
TextBuffer * textBuffer;
TextLocation current;
```

DESCRIPTION

The **NextTextBufferWord** function is used to locate the beginning of the next word from a given *current* location in a TextBuffer. If the current location is within the last word in the TextBuffer the function wraps to the beginning of the TextBuffer.

SEE ALSO

`PreviousTextBufferWord`(3W)
`StartCurrentTextBufferWord`(3W)

Dynamic Settings

NAME

`OlCallDynamicCallbacks`

SYNOPSIS

```
#include <OpenLook.h>
 ...
extern void OlCallDynamicCallbacks()
```

DESCRIPTION

The **`OlCallDynamicCallbacks`** procedure is used to trigger the calling of the functions registered on the dynamic callback list. This procedure is called automatically whenever the RESOURCE_MANAGER property of the RootWindow is updated. It may also be called to force a synchronization of the dynamic settings, though applications rarely need to do this explicitly.

SEE ALSO

`OlRegisterDynamicCallback`(3W)
`OlUnregisterDynamicCallback`(3W)

NAME

`OlClassSearchIEDB` – register a given database on a specific widget class

SYNOPSIS

```
#include <Xol/OpenLook.h>
 ...
void
OlClassSearchIEDB(wc, db)
     WidgetClass            wc;
     OlVirtualEventTable    db;
```

DESCRIPTION

The `OlClassSearchIEDB` procedure is used to register a given database on a specific widget class. The *db* value was returned from a call to `OlCreateInputEventDB`(3W).

Once a database is registered with a given widget class, the `OlLookupInputEvent`(3W) procedure (if *db_flag* is `OL_DEFAULT_IE` or *db*) will include this database in the search stack if the given widget id is a subclass of this widget class.

NOTES

The registering order determines the searching order when doing a lookup.

SEE ALSO

`OlClassSearchTextDB`(3W)
`OlCreateInputEventDB`(3W)
`OlLookupInputEvent`(3W)
`OlWidgetSearchIEDB`(3W)
`OlWidgetSearchTextDB`(3W)

EXAMPLE

```
/* To create a client application database */
#include <Xol/OpenLook.h>
#include <Xol/Stub.h>
     /* start with a big value to avoid */
     /* the "virtual_name" collision    */
#define OL_MY_BASE             1000
#define OL_MY_DRAWLINEBTN      OL_MY_BASE+0
#define OL_MY_DRAWARCBTN       OL_MY_BASE+1
#define OL_MY_REDISPLAYKEY     OL_MY_BASE+2
#define OL_MY_SAVEPARTKEY      OL_MY_BASE+3

#define XtNmyDrawLineBtn       "myDrawLineBtn"
#define XtNmyDrawArcBtn        "myDrawArcBtn"
#define XtNmyRedisplayKey      "myRedisplayKey"
#define XtNmySavePartKey       "mySavePartKey"

static OlKeyOrBtnRec     OlMyBtnInfo[] = {
     /*name         default_value    virtual_name         */

     { XtNmyDrawLineBtn,  "c<Button1>",        OL_MY_DRAWLINEBTN  },
     { XtNmyDrawArcBtn,   "s<myDrawLineBtn>", OL_MY_DRAWARCBTN   },
};

static OlKeyOrBtnRec     OlMyKeyInfo[] = {
     /*name               default_value      virtual_name         */

     { XtNmyRedisplayKey, "c<F5>",           OL_MY_REDISPLAYKEY },
     { XtNmySavePartKey,  "c<F5>",           OL_MY_SAVEPARTKEY  },
};

static OlVirtualEventTable     OlMyDB;

OlMyDB = OlCreateInputEventDB(
               w,
               OlMyKeyInfo, XtNumber(OlMyKeyInfo),
               OlMyBtnInfo, XtNumber(OlMyBtnInfo)
     );
     /* assume: all stub widgets are interested in OlMyDB */
OlClassSearchIEDB(stubWidgetClass, OlMyDB);
     /* once this step is done, all stub widget instances */
     /* will receive the OlMyDB commands after a call to  */
     /* OlLookupInputEvent(), or in the XtNconsumeEvent   */
     /* callback's OlVirtualEvent structure supplied with */
     /* the call_data field.                              */
```

NAME

`OlClassSearchTextDB` – register the OPEN LOOK TEXT database on a specific widget class

SYNOPSIS

```
#include <Xol/OpenLook.h>
 ...
void
OlClassSearchTextDB (wc)
     WidgetClass    wc;
```

DESCRIPTION

The **`OlClassSearchTextDB`** procedure is used to register the OPEN LOOK TEXT database on a specific widget class.

Once the OPEN LOOK TEXT database is registered with a given widget class, the **`OlLookupInputEvent`**(3W) procedure (if *db_flag* is **`OL_DEFAULT_IE`** or **`OL_TEXT_IE`**) will include this database in the search stack if the given widget id is a subclass of this widget class.

NOTES

The registering order determines the searching order when doing a lookup.

SEE ALSO

`OlClassSearchIEDB`(3W)
`OlCreateInputEventDB`(3W)
`OlLookupInputEvent`(3W)
`OlWidgetSearchIEDB`(3W)
`OlWidgetSearchTextDB`(3W)

EXAMPLE

```
    ...
#include <Xol/OpenLook.h>
#include <Xol/Stub.h>
    ...

     /* assume: all stub widgets are interested in the    */
     /*         OPEN LOOK TEXT database                   */
OlClassSearchTextDB(stubWidgetClass);
     /* once this step is done, all stub widget instances */
     /* will receive OPEN LOOK TEXT commands after a      */
     /* call to OlLookupInputEvent(), or in the           */
     /* XtNconsumeEvent callback's OlVirtualEvent         */
     /* structure supplied with the call_data field.      */
   ...
```

NAME

`OlCloseDatabase` – responsible for closing a database opened with OlOpenDatabase

SYNOPSIS

```
void  OlCloseDatabase(name, database)
      String name;
      XrmDatabase database;
```

DESCRIPTION

This function is responsible for closing a database opened by OlOpenDatabase. Both functions expect the database to be in XrmDatabase format.

The function will resolve the pathname of the database according to the current locale.

SEE ALSO

`OlOpenDatabase`(3W)
`OlGetMessage`(3W)

NAME

`OlCloseIm` – responsible for closing the Input Method

SYNOPSIS

```
void  OlCloseIm(im)
      OlIm *im;
```

DESCRIPTION

This function is responsible for closing the Input Method (IM). Its functionality is implementation dependent. Some common steps that are performed by all implementations include:

- Destroying all ICs (Input Contexts) associated with the IM and de-allocating storage used by these ICs.
- De-allocating storage used by the `OlIm` structure.

SEE ALSO

`OlOpenIm`(3W)
`OlGetImValues`(3W)
`OlDisplayOfIm`(3W)
`OlLocaleOfIm`(3W)
`OlImOfIc`(3W)

NAME

`OlCreateIc` – Create an Input Context to register a client's text insertion window with an IM

SYNOPSIS

```
typedef struct _OlIcWindowAttr {
     Pixel          background;
     Pixel          foreground;
     Colormap       colormap;
     Colormap       std_colormap;
     Pixmap         back_pixmap;
     OlFontList     fontlist;
     int            spacing;
     Cursor         cursor;
     OlImCallback   callback [NUM_IM_CALLBACKS];
} OlIcWindowAttr;

typedef struct _OlIc {
     Window         cl_win;
     XRectangle     cl_area;
     Window         focus_win;
     XRectangle     s_area;
     Window         s_attr;
     XRectangle     pre_area;
     Window         pre_attr;
     OlImStyle      style;
     XPoint         spot;
     struct_OlIm    *im;
     struct_OlIc    *nextic;
     void           *ictype;
} OlIc;

OlIc * OlCreateIc(im, icvalues)
       OlIm           *im;
       OlIcValues     icvalues;
```

DESCRIPTION

This function creates an Input Context for the client's text insertion window with Input Method (IM). **`im`** is a pointer to the **`OlIm`** structure returned by the function **`OlOpenIm.`** **`icvalues`** points to a variable list of attribute name value pairs to be associated with the IC (Input Context). (See **`OlIcValues`** for the description of valid **`OlIcValues`** attributes.) One attribute, **`XtNclientWindow`** must always be specified at creation time.

The function creates and initializes the **`OlIc`** structure, containing the context information about a particular text area. This includes information about client and focus windows, pre-edit and status areas, pre-edit and status attributes, a pointer to the **`OlIm`** structure associated with the IC, and a pointer to the next IC associated with the same IM. The function returns a pointer to this structure.

If for any reason the function fails to create an Input Context, it should return a null value. The **ictype** field is a hook for attaching implementation dependent data structures.

SEE ALSO

OlDestroyIc(3W)
OlGetIcValues(3W)
OlIcValues(3W)
OlImOfIc(3W)
OlSetIcFocus(3W)
OlSetIcValues(3W)
OlUnSetIcFocus(3W)
OlResetIc(3W)

Database Utilities

NAME

`OlCreateInputEventDB` – create a client specific Key and/or Button database

SYNOPSIS

```
#include <Xol/OpenLook.h>
 ...
OlVirtualEventTable
OlCreateInputEventDB(w, key_info, num_key_info, btn_info, num_btn_info)
     Widget          w;
     OlKeyOrBtnInfo  key_info;
     int             num_key_info;
     OlKeyBtnInfo    btn_info;
     int             num_btn_info;
```

DESCRIPTION

The **OlCreateInputEventDB** function is used to create a client specific Key and/or Button database. This function returns a database pointer if the call to this function is successful otherwise a NULL pointer is returned.

Mapping for a new virtual command can be *composed* from the mappings of a previously defined virtual command.

The returned value from this function is an opaque pointer (**OlVirtualEventTable**). A client application should use this pointer when registering and/or looking up this database.

```
      typedef struct _OlVirtualEventInfo *OlVirtualEventTable;
```

The *key_info* and *btn_info* parameters are a pointer to an **OlKeyOrBtnRec** structure.

```
typedef struct {
     String          name;
     String          default_value; /* "," separate string */
     OlVirtualName   virtual_name;
} OlKeyOrBtnRec, *OlKeyOrBtnInfo;
```

Caveat

A client application can create a Key only database by having the NULL *btn_info*. The same applies to a Button only database.

Each virtual command can have two different bindings because the OPEN LOOK toolkit allows the alternate key or button sequence.

The OPEN LOOK toolkit already has a set of predefined OPEN LOOK virtual names. It is important that the *virtual_name* value of a client application database starts with a big value to avoid the *virtual_name* collision.

SEE ALSO

OlClassSearchIEDB(3W)
OlClassSearchTextDB(3W)
OlLookupInputEvent(3W)
OlWidgetSearchIEDB(3W)
OlWidgetSearchTextDB(3W)

EXAMPLE

```
     /* To create a client application database */
     ...
#include <Xol/OpenLook.h>
     ...
     /* start with a big value to avoid */
     /* the "virtual_name" collision    */
#define OL_MY_BASE            1000
#define OL_MY_DRAWLINEBTN     OL_MY_BASE+0
#define OL_MY_DRAWARCBTN      OL_MY_BASE+1
#define OL_MY_REDISPLAYKEY    OL_MY_BASE+2
#define OL_MY_SAVEPARTKEY     OL_MY_BASE+3

#define XtNmyDrawLineBtn     "myDrawLineBtn"
#define XtNmyDrawArcBtn      "myDrawArcBtn"
#define XtNmyRedisplayKey    "myRedisplayKey"
#define XtNmySavePartKey     "mySavePartKey"

static OlKeyOrBtnRec     OlMyBtnInfo[] = {
     /*name             default_value      virtual_name        */

     { XtNmyDrawLineBtn,  "c<Button1>",       OL_MY_DRAWLINEBTN  },
     { XtNmyDrawArcBtn,   "s<myDrawLineBtn>", OL_MY_DRAWARCBTN   },
};

static OlKeyOrBtnRec     OlMyKeyInfo[] = {
     /*name               default_value      virtual_name        */

     { XtNmyRedisplayKey, "c<F5>",           OL_MY_REDISPLAYKEY },
     { XtNmySavePartKey,  "c<F5>",           OL_MY_SAVEPARTKEY  },
};

static OlVirtualEventTable     OlMyDB;

      ...
OlMyDB = OlCreateInputEventDB(
               w,
               OlMyKeyInfo, XtNumber(OlMyKeyInfo),
               OlMyBtnInfo, XtNumber(OlMyBtnInfo)
     );
    ...
```

NAME

OlCtToEuc – returns a null-terminated string

SYNOPSIS

```
int OlCtToEuc(ctstr, eucstr, euc_len, fontl)
     XctString        ctstr;
     XctString        eucstr;
     int              euc_len;
     OlFontList       *fontl;
```

DESCRIPTION

Given a null-terminated compound text encoded string in the **ctstr** argument, this function returns a semantically equivalent null-terminated string in the **eucstr** argument that conforms to the EUC syntax. Equivalence implies that the characters in both strings are the same and are stored in the same logical order. The code set scheme syntax is the only difference in the two strings. The **fontl** argument provides this function with information about supplemental EUC code set support in the current locale. If during the conversion **OlCtToEuc(3W)** encounters a character from an unsupported code set, it generates an error by returning -1. Optional directional information provided in the compound text encoded string is ignored as EUC does not support directional rendering.

The memory tor storing the EUC encoded string must be pre-allocated prior to the function call. Doing this, rather than making the function allocate the memory every time it is called, results in better performance, because pre-allocated memory could be easily re-used in case of repeated calls to **OlCtToEuc(3W)**. The **euc_len** argument specifies the length of the **eucstr** and is required to prevent buffer overflow. If the number of bytes indicated by **euc_len** is too small to store the converted string, -1 is returned.

This function returns the length, in bytes (not counting the terminating null character), of the EUC encoded string on success, or -1 on failure.

SEE ALSO

OlEucToCt(3W)

NAME

`OlCvtFontGroupToFontStructList` – converts a fontGroup string into a font_list

SYNOPSIS

```
#include <OpenLook.h>
#include <OlStrings.h>
#include <Converters.h>

OlFontList * font_list;

static XtResource resources[] =
     {
       { XtNfontGroup, XtCFontGroup, OlROlFontList, sizeof(OlFontList *),
         &font_list, XtRString, (XtPointer)NULL
       },
                      .
                      .
                      .
     }
static Boolean
CvtFontGroupToFontStrucList  (display, args, num_args, from, to, XtCacheRef)
Display            display;
XrmValuePtr     args = NULL;
Cardinal   num_args = 0;
char *          fontGroup;
Cardinal        num_args=0;
XrmValue   from;
XrmValue   to;
XtCacheRef *cache_ref_return = NULL;

from.addr = (XtPointer) fontGroup;
from.size = strlen(fontGroup);
to.addr = (XtPointer) &font_list;
to.size = sizeof(OlFontList *);
XtCallConverter(dpy,
          OlCvtFontGroupToFontStruct,
          args,
          num_args,
          &from,
          &to,
          cache_ref_return);
```

DESCRIPTION

The `OlCvtFontGroupToFontStruct` OPEN LOOK converter converts a **fontGroup** string into corresponding **OlFontList** for use with internationalized text drawing.

The converter can be invoked in two ways:

1 By specifying the source type of a **fontGroup** as a string and destination type as **OlFontList (OlROlFontList)** in the **XtResource** array. The converter, in this case is automatically invoked and, if successful, a pointer to the **OlFontList** structure is returned in *font_list.*

2 The converter can be directly invoked by the application to obtain a pointer to **OlFontList** by calling the Xt Intrinsics function **XtCallConverter** as shown above.

The *font_list* returned in either case can then be passed to text drawing utilities **OlDrawString, OlDrawImageString, OlTextWidth, OlGetNextStrSegment.**

SEE ALSO

XtCallConverter
OlDrawString(3W)
OlDrawImageString(3W)
OltextWidth(3W)
OlgetNextStrSegment(3W)

NOTES

The storage for the **OlFontList** is allocated by the converter in both cases. Invocation by specifying different *source* and *destination* types in the **XtResource** array will cause Intrinsics to keep track of reference count and manage the cache. Hence the user does not need to free storage explicitly. However, in case of direct invocation via **XtCallConverter(),** it is the caller's responsibility to free the storage for **OlFontList.**

Dynamic Settings

NAME

OlDragAndDrop

SYNOPSIS

```
#include <OpenLook.h>
 ...
extern void OlDragAndDrop(w, window, xPosition, yPosition)
Widget     w;
Window *   window;
Position * xPosition;
Position * yPosition;
```

DESCRIPTION

The `OlDragAndDrop` function is used to monitor a direct manipulation operation; returning, when the operation is completed, the **drop_window** and the *x* and *y* coordinates corresponding to the location of the drop. These return values will reflect the highest (in the stacking order) window located under the pointer at the time of the button release.

SEE ALSO

`OlGrabDragPointer`(3W)
`OlUngrabDragPointer`(3W)

EXAMPLE

The following code provides a sample of the use of the facilities:
`OlLookupInputEvent, OlDetermineMouseAction, OlGrabDragPointer, OlDragAndDrop, OlUngrabDragPointer, and OlReplayBtnEvent`

```
static void ButtonConsumeCB (w, client_data, call_data)
     Widget      w;
     XtPointer   client_data;
     XtPointer   call_data;
{
     Window   drop_window;
     Position x;
     Position y;
     OlVirtualEvent ve;

     ve = (OlVirtualEvent) call_data

     switch (ve->virtual_name) {
     case OL_SELECT:
            OlGrabDragPointer(GetOlMoveCursor(XtScreen(widget)),
              None);
            OlDragAndDrop(&drop_window, &x, &y);
            DropOn(drop_window, x, y, ....);
            OlUngrabDragPointer();
            break;
     }
     . . .
}
```

NAME

`OlDestroyIc` – destroys a specified IC

SYNOPSIS

```
void  OlDestroyIc(ic)
      OlIc *ic;
```

DESCRIPTION

This function will destroy the specified Input Context (IC). It will remove it from the **`ic_list`** maintained by the Input Method (IM), and then de-allocate memory used by the **`OlIc`** structure.

SEE ALSO

`OlCreateIc`(3W)
`OlIcValues`(3W)
`OlImOfIc`(3W)
`OlSetIcFocus`(3W)
`OlSetIcValues`(3W)
`OlUnSetIcFocus`(3W)

NAME

OlDisplayOfIm – queries a display associated with an IM

SYNOPSIS

```
Display * OlDisplayOfIm(im)
      OlIm *im;
```

DESCRIPTION

This function returns a pointer to the **Display** corresponding to the given Input Method.

SEE ALSO

OlOpenIm(3W)
XOpenDisplay(3W)

NAME

`OlDrawImageString` – a Toolkit drawing function that draws EUC encoded text

SYNOPSIS

```
OlDrawImageString(display, drawable, fontlist, gc, x, y, string, len)
     Display *display;
     Drawable drawable;
     OlFontList *fontlist;
     GC gc;
     int x,y;
     unsigned char *string;
     int len;
```

DESCRIPTION

`OlDrawImageString` is a general purpose text drawing utility to draw an internationalized string which may be composed of characters from different code sets. It replaces the Xlib function **`XDrawImageString`**. The argument list is the same as **`XDrawImageString`** with the exception of one additional argument called "*fontlist.*" The *fontlist* specifies a list of **`XFontStructs`**. This utility considers the string to be composed of several segments in which characters belong to the same code set. Each string segment is drawn using the appropriate **`XFontStruct`** from the *fontlist*. Although, the font information in the *gc* is not used by the function, we recommend that the *gc* contain font information for default fonts or ASCII fonts to preserver backward compatibility and to optimize drawing for LATIN-1 characters.

NOTES

The *len* argument specifies the length of *string* in bytes (not characters) as returned by **`w_charstrlenstring*`**.

This function assumes that the string passed to it is a multibyte string.

This function will update the font stored in the GC argument and will not restore the font before returning. If a client relies on a particular font being present in a GC, it must restore the font in the GC after calling of **`OlDrawImageString.`**

SEE ALSO

`XDrawImageString`
`XDrawImageString16`
`OlGetNextStrSegment`(3W)
`OlDrawString`(3W)

NAME

OlDrawString – a Toolkit drawing function that draws EUC encoded text

SYNOPSIS

```
OlDrawString(display, drawable, fontlist, gc, x, y, string, len)
     Display *display;
     Drawable drawable;
     OlFontList *fontlist;
     GC gc;
     int x,y;
     unsigned char *string;
     int len;
```

DESCRIPTION

OlDrawString is a general purpose text drawing utility to draw an internationalized string which may be composed of characters from different code sets. It replaces the Xlib function **XDrawString**. The argument list is the same as **XDrawString** with the exception of one additional argument called "*fontlist.*" The *fontlist* specifies a list of **XFontStructs**. This utility considers the string to be composed of several segments in which characters belong to the same code set. Each string segment is drawn using the appropriate **XFontStruct** from the *fontlist*. Although, the font information in the *gc* is not used by the function, we recommend that the *gc* contain font information for default fonts or ASCII fonts to preserver backward compatibility and to optimize drawing for LATIN-1 characters.

NOTES

The *len* argument specifies the length of *string* in bytes (not characters) as returned by **w_chartstrlenstring***.

This function assumes that the string passed to it is a multibyte string and not a wide character.

This function will update the font stored in the *gc* argument and will not restore the font before returning. If a client relies on a particular font being present in a *gc,* it must restore the font in the *gc* after calling of **OlDrawString.**

SEE ALSO

XDrawString
OlDrawString(3W)
OlGetNextStrSegment(3W)

NAME

OlEucToCt – returns a null-terminated string

SYNOPSIS

```
int OlEucToCt(eucstr, ctstr, ct_len, fontl)
     char        *eucstr;
     char        *ctstr;
     int         ct_len;
     OlFontList  *fontl;
```

DESCRIPTION

Given a null-terminated EUC encoded string in the argument **eucstr,** this function returns a semantically equivalent null-terminated string in the argument **ctstr** that conforms to the compound text syntax. Equivalence implies that the characters in both strings are the same and are stored in the same logical order. The code set scheme syntax is the only difference in the two strings. **OlEucToCt(3W)** will retrieve necessary EUC code set mapping information from the **fontl** structure.

The memory for storing the **ctstr** string must be pre-allocated prior to the function call. Doing this, rather than making the function allocate the memory every time it is called, will result in a better performance, because pre-allocated memory could be easily re-used in case of repeated calls to **OlEucToCt(3W).** The **ct_len** argument specifies the length of the **ctstr** and is required to prevent buffer overflow. If the number of bytes indicated by **ct_len** is too small to store the converted string, -1 is returned.

This function returns the length, in bytes (not counting the terminating null character), of the Compound Text encoded string on success, -1 on failure.

SEE ALSO

OlCtToEuc(3W)

NAME

`OlFindHelpFile` – used to find the locale-specific help file

SYNOPSIS

```
String OlFindHelpFile(widget, filename)
     Widget     widget;     /* for getting display info */
     String     filename;   /* file to retrieve         */
```

DESCRIPTION

The `OlFindHelpFile` procedure is used to retrieve the full name of the passed in base filename in the current locale. It accesses the application's help directory resource to create the full name. The help directory resource is created using the XFILESEARCHPATH environment variable.

Cursor/Bitmap Utilities

NAME

`OlGet50PercentGrey`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Pixmap OlGet50PercentGrey(screen)
Screen * screen;
```

DESCRIPTION

The **`OlGet50PercentGrey`** function is used to retrieve the id of a 50 percent grey Pixmap for *screen*.

RETURN VALUE

The Pixmap id is returned.

Cursor/Bitmap Utilities

NAME

`OlGet75PercentGrey`

SYNOPSIS

```
#include <OlCursors.h>
 ...
extern Pixmap OlGet75PercentGrey(screen)
Screen * screen;
```

DESCRIPTION

The **`OlGet75PercentGrey`** function is used to retrieve the id of a 75 percent grey Pixmap for *screen*.

RETURN VALUE

The Pixmap id is returned.

NAME

OlGetApplicationValues – used to retrieve application resources

SYNOPSIS

```
void OlGetApplicationValues(widget, args, num_args)
     Widget     widget;     /* for getting display info */
     ArgList    args;       /* args to query            */
     Cardinal   num_args;   /* number of args           */
```

DESCRIPTION

The **OlGetApplicationValues** procedure is used to retrieve the application resources that are accessible from the OPEN LOOK toolkit. The semantics is similar to the **XtGetValues** call.

Application resources are resources that all OPEN LOOK applications have in common. Their values are updated dynamically by changing preferences in the WorkSpace Manager's property sheets. Therefore, it's recommended that an application query the values each time it needs them.

SEE ALSO

See the section, Application Resources, in the Appendix "Manual Pages: Introduction" in this Programmer's Guide.

NAME

OlGetIcValues – used for reading Input Context (IC) attributes

SYNOPSIS

```
char*  OlGetIcValues(ic, icvalues)
       OlIc *ic;
       OlIcValues icvalues;
```

DESCRIPTION

This function is used for reading IC attributes. **icvalues** must point to a location where the values will be stored. The function returns NULL if no error occurs; otherwise it returns the name of the first argument that could not be obtained. The end of the **icvalues** list must be indicated by a NULL value for the attribute name. This function will allocate memory to store the values and it is the caller's responsibility to free the storage.

SEE ALSO

OlCreateIc(3W)
OlDestroyIc(3W)
OlIcValues(3W)
OlImOfIc(3W)
OlSetIcFocus(3W)
OlSetIcValues(3W)
OlUnSetIcFocus(3W)

NAME

`OlGetImValues` – returns a list of properties and features supported by the Input Method

SYNOPSIS

```
#define OlImNeedNothing       000
#define OlImPreEditArea       001
#define OlImPreEditCallbacks  002
#define OlImPreEditPosition   004
#define OlImStatusArea        010
#define OlImStatusCallbacks   020
#define OlImFocusTracks       040

typedef unsigned short OlImStyle;

typedef struct _OlImStyles {
     unsigned short styles_count;
     OlImStyle      *supported_styles;
} OlImStyles;

void  OlGetImValues(im, imvalues)
      OlIm          *im;
      OlImValues *imvalues;
```

DESCRIPTION

This function returns a list of properties and features supported by the IM. The end of the list is indicated by a NULL value for the attribute name in the **imvalues** list. Only one attribute, **XtNQueryInputStyle,** is defined at this time It is used to query input styles supported by the IM.

A client should always query the IM to find out what styles are supported, to determine if they match the styles that the clients intend to support. If there are no matches, the client should either chose another IM or terminate the execution.

The **imvalues attr_value** field must be a pointer to the **OlImStyles** structure, which contains a count and an array of supported styles. The **imvalues attr_name** field should contain the string **XtNQueryInputStyle.** Each element in that array is a bitmask in which IM indicates its requirements should a particular style to be selected.

Clients are responsible for freeing **OlImStyles** using **XFree**.

NOTES

Not all style combinations are allowed.

SEE ALSO

`OlOpenIm(3W)`
`OlImValues(3W)`

NAME

`OlGetMessage` – responsible for providing a localized message or a default message.

SYNOPSIS

```
char *OlGetMessage(display,buf,bufsiz,name,type,class,default_msg,database)
     Display    *display;
     char *buf;
     int  bufsiz;
     String     name;
     String     type;
     String     class;
     String     default_msg;
     XrmDatabase     database;
```

DESCRIPTION

`OlGetMessage` will get a unique localized message where the class of the message corresponds to the filename and the name and type of message maps to a unique message in that **`XrmDatabase`** format file.

If a message is found and a buffer is supplied, the message is copied into the buffer and the pointer to this buffer returned.

If a message is found and a buffer is not supplied, the pointer returned is the Xt pointer to that message and should not be freed.

If a message is not found and a buffer is supplied, the pointer to that buffer is returned, with the default message copied into it.

If a message is not found and a buffer is not supplied, the pointer returned is a toolkit pointer to the default message and should not be freed.

SEE ALSO

`OlOpenDatabase`(3W)
`OlCloseDatabase`(3W)
`OlVaDisplayWarningMessage`(3W)
`OlVaDisplayErrorMessage`(3W)

NAME

`OlGetNextStrSegment` – a string parsing utility to obtain string segments in which all characters belong to the same code set

SYNOPSIS

```
typedef struct _OlStrSegment {
     unsigned short   code_set;     /* EUC code set number */
     int              len;          /* length of the string segment */
     unsigned char    *segment;     /* string segment */
} OlStrSegment;

int  OlGetNextStrSegment(fontlist, segment, str, len)
     FontList       *fontlist;
     OlStrSegment   *segment;
     unsigned char  **str;
     int            *len;
```

DESCRIPTION

This function identifies the code set to which the first character (not byte) of the string belongs and copies all subsequent contiguous characters in this string that belong to the same code set into the **segment** field of the **OlStrSegment** structure, until a character belonging to another code set is identified. The auxiliary characters such as single shift two and single shift three (SS2 and SS3) that identifies the code set of a character in the EUC scheme will not be copied. A large enough space to store a string segment into the *segment* field must be allocated by the caller. The **fontlist** contains information about the code sets being used. **str** points to the original string that must be parsed and moves this pointer to the first character belonging to a different code set. **len** points to an integer for length (in bytes) of the **str.** It is also modified to reflect the length of the remaining part of the string.

The function returns -1 if an error occurs, 0 otherwise.

The following example shows how one could obtain string segments from a *string* using this function.

```
char *str;    /*a string is parsed into segment */
int  len;     /*holds limited length of string  */
OlFontList *fontlist;  /*see CvtOlGetFontGroupToFontStringList */
OlStrSegment *parse;   /* Large enough must have been pre-allocated */
while (len > 0)
   {
   OlGetNextStrSegment (fontlist, parse, &str, &len)
     . . .
   do something useful with parse -> str - it points to string
segment
   }
```

Dynamic Settings

NAME

`OlGrabDragPointer`

SYNOPSIS

```
#include <OpenLook.h>
 ...
extern void OlGrabDragPointer(w, cursor, window)
Widget w;
Cursor cursor;
Window window;
```

DESCRIPTION

The `OlGrabDragPointer` procedure is used to effect an active grab of the mouse pointer. This function is normally called after a mouse drag operation is experienced and prior to calling the OlDragAndDrop procedure which is used to monitor a drag operation.

SEE ALSO

`OlDragAndDrop`(3W)
`OlUngrabDragPointer`(3W)

NAME

`OlIcValues` – contains a list of IC attribute names and value pairs

SYNOPSIS

```
typedef struct _OlIcValues {
     char *attr_name;
     void *attr_value;
} OlIcValues;

typedef OlIcValues * OlIcValuesList;

typedef void  (*OlImProc)();
typedef void  * OlImValue;

typedef struct  _OlImCallback {
     OlImValues  client_data;
     OlImProc    callback;
} OlImCallback;
```

DESCRIPTION

`OlIcValuesList` contains a list of Input Context (IC) attribute names and value pairs. It is used for getting and setting various IC attributes. The supported IC attributes are shown in the table below. The end of the list is indicated by a NULL value in the attribute name.

Input Context Attributes	
Attribute Name	**Attribute Value Type**
OlNclientWindow	Window*
OlNClientArea	XRectangle*
OlNinputStyle	OlImStyle*
OlNfocusWindow	Window*
OlNpreeditArea	XRectangle*
OlNstatusArea	XRectangle*
OlNspotLocation	XPoint*
OlNresourceDatabse	XrmDatabase*
OlNpreeditAttributes	OlIcWindowAttr*
OlNstatusAttributes	OlIcWindowAttr*

Attributes for Preedit and Status Windows	
Attribute Name	**Attribute Value Type**
OlNcolormap	Colormap
OlNstdColormap	Colormap
OlNbackground	Pixel
OlNforeground	Pixel
OlNbackgroundPixmap	Pixmap
OlNfontset	OlFontList
OlNlineSpacing	int
OlNcursor	Cursor
Callbacks	OlImCallback

OlNclientWindow

specifies the client window in which the IM may display data or create subwindows. Dynamic changes of client window are not supported; this argument must be set at the IC creation time and cannot be changed later. It is a static attribute that is required by `OlCreateIc`. The value is a pointer to a window.

OlNClientArea

specifies the client area in which IM may display data or create subwindows. IM will establish its own pre-edit and status geometry accordingly. When this attribute is left unspecified, IM will default usable client area to actual client window geometry. It is a dynamic attribute that can be modified via calls to `OlSetIcValues`. The value is a pointer to an `XRectangle`.

OlNinputStyle

specifies the input style to be used. The value of this argument must be one of the supported styles returned by the `OlGetImValues` function, otherwise `OlCreatIc` will fail. If you do not specify this attribute, IM will use an implementation defined default style. OPEN LOOK does not support Dynamic changes of IM style. This argument must be set at the IC creation time and cannot be changed later. The value is a pointer to OlImStyle.

OlNfocusWindow

specifies to IM the window XID of the focus window. The input method may possibly affect that window: select events on it, send events to it, modify its properties, and grab the keyboard within that window.

When this attribute is left unspecified, IM will default from the focus window to the client window. Setting this attribute explicitly to NULL has a specific meaning: when the focus window is set explicitly from a non NULL value to NULL, the Input Method is required to clear any displayed data in the status area corresponding to the focus window. It is a dynamic attribute that can be modified via calls to `OlSetIcValues`. The value is a pointer to a window.

OlNpreeditArea

the area where pre-edit data should be displayed. The value of this argument is a pointer to **XRectangle,** relative to the client window. IM may or not create a preedit window in this area, using the specified geometry, as a child of a client window.

When you leave **OlNpreeditArea** unspecified, IM will default from the preedit area to an implementation defined area. This area shall be contained within the client area.

If you specify this attribute for root or **XimPreEditCallbacks** Input Method, it is ignored.

If you specify this attribute for an **XimPreEditArea** Input Method, the width and height determine the size of the area within the "over-the-spot" window that is now available for pre-edit.

OlNstatusArea

specifies to the IM the usable area to display IC state information. The value of this argument is a pointer to **XRectangle,** relative to the client window.

The IM may or not create a status window in this area, using the specified geometry, as a child of the client window.

When **OlNstatusArea** is left unspecified, The IM defaults to the status area defined by the IM implementation. This area is contained within the client area. This is a dynamic attribute that can be modified via calls to **OlSetIcValues**.

Important Note: if a client leaves all areas unspecified, the IM may not be able to run properly. Some implementations will generate errors if none of the focus window, focus area, client area, preedit area, and status area are defined. At best, it may behave randomly using any area in the client window, possibly clearing the whole window or erasing any region.

OlNspotLocation

specifies to IM the coordinates of the "spot" (the current cursor position in the text insertion window), to be used by the "over-the-spot" or "on-the-spot" IMs. The type is a pointer to **Xpoint**. The *x* coordinate specifies the position where the next character would be inserted. The *y* coordinate is the position of the baseline used by current text line in the focus window.

SEE ALSO

OlCreateIc(3W), **OlDestroyIc**(3W), **OlGetIcValues**(3W), **OlImOfIc**(3W), **OlSetIcFocus**(3W), **OlSetIcValues**(3W), **OlUnSetIcFocus**(3W), **OlReSetIc**(3W)

NAME

`OlImOfIc` – returns a pointer to `OlIm`

SYNOPSIS

```
OlIm * OlImOfIc(ic)
       OlIc *ic;
```

DESCRIPTION

This function returns a pointer to the **`OlIm`** structure associated with the specified Input Context. A Null value is returned if an invalid **`ic`** is specified.

SEE ALSO

`OlCreateIc`(3W)

NAME

OlImValues - contains a list of IM attributes

SYNOPSIS

```
typedef struct {
     unsigned short count_styles;
     OlIMStyle * supported_styles;
     } OlIMStyles
```

DESCRIPTION

OlImValues contains a list of Input Method values or attributes returned by **OlIMStyles** structure. The OlIMStyles structure contains in its field *count_styles* the number of input styles supported. This is also the size of the array in the field *supported_styles*. Each element in the array represents a different input style supported by this Input Method. It is a bitmask in which the Input Method indicates its requirements, should this style be selected. These requirements fall into the following categories:

OlImPreEditArea	If chosen the Input Method requires the client to provide some area values for preediting. Refer to the Input Context Attribute **OlNpreeditArea.**
OlIMPreditPosition	If chosen, the Input Method requires the client to provide positional values. Refer to IC attributes **OlNspotLocation** and **OlNfocusWindow.**
OlImPreEditCallbacks	If chosen, the Input Method requires the client to define the set of preedit callbacks. Refer to IC values **OlNPreEditStartCallback, OlNPreEditDoneCallback, OlNPreEditDrawCallback, OlNPreEditCaretCallback.**
OlImNeedNothing	If chosen, the Input Method can function without any PreEdit values.
OlIMStatusArea	The input method requires the client to provide some area values for it to do its Status feedback. Refer to **OlNArea** and **OlNAreaNeeded.**
OlIMStatusCallbacks	The Input Method requires the client to define the set of status callbacks.
OlImStatusArea	The Input Method requires the client to provide some area values for it to do its Status feedback. Refer to **OlNArea** and **OlNAreaNeeded.**

NAME

`OlInitialize` – a mandatory routine that must be called by every application

SYNOPSIS

```
#include <Xlib.h>
#include <OpenLook.h>

Widget OlInitialize(shell_name, classname, urlist, num_urs, argc, argv)
     char             *shell_name;
     char             *classname;
     XrmOptionDescRec *urlist;
     Cardinal         num_urs;
     Cardinal         *argc;
     char             *argv[];
```

DESCRIPTION

This initialization routine must be called by each application before any OPEN LOOK widgets are created or other OPEN LOOK routines are used.

The arguments to this routine are similar to the arguments to the standard **XtInitialize** routine.

OlInitialize also does the following:

- A call to the **OlLocaleInitialize** routine to set the locale categories in accordance with the Workspace Manager locale announcement;
- **OlInitialize** sets up communication with an input method library if the locale set by **OlLocaleInitialize** requires and input method.

The following resources are set by the Workspace Manager as part of its locale announcement scheme.

- *xnlLanguage
- *inputLang
- *displayLang
- *numeric
- *timeFormat

OlInitialize maps the values of these resources to locale categories, through the **setlocale** function using the following locale category map.

Locale Category Map	
X Toolkit	**Locale Category**
*xnlLanguage	LC_ALL
*displayLang	LC_MESSAGES
*numeric	LC_NUMERIC
*time	LC_TIME
*inputLang	LC_CTYPE

Locale names (the right hand side values of these resources) announced by the Workspace Manager must match the underlying system locale names.

NAME

`OlLocaleOfIm` – queries locale for the input method

SYNOPSIS

```
char * OlLocaleOfIm(im)
       OlIm *im;
```

DESCRIPTION

This function returns a locale name string under which the specified input method runs.

NAME

OlLookupImString – localized version of Xlib **XLookupString** function but maps a keypress event to a language string, a keysym, or **OlComposeStatus**

SYNOPSIS

```
typedef enum _OlImStatus {
                XBufferOverflow,
                XLookupNone,
                XLookupChars,
                XLookupKeysym,
                XLookupBoth
} OlImStatus;

int  OlLookupImString(event, ic, buffer_return, buffer_len,
          keysym_return, status_ret)
     KeyEvent         *event;
     OlIc             *ic;
     char             *buffer_return;
     int              buf_len;
     KeySym           *keysym_return;
     OlImStatus   *status_return;
```

DESCRIPTION

This function is similar to Xlib function **XLookupString** except that it takes an extra *ic* argument and may or may not return any string for a key press event. Instead, it will return a composed character when one is available. If an existing program that uses **XLookupString** is modified to use **OlLookupImString**, the program should check for any string that has been returned by the function. The value returned in the **status_return** value indicates what has been returned in the other arguments. The return value is the length, in bytes, of the string returned in *buffer_return* if a string has been returned.

- **XBufferOverflow** means that the input string to be returned is too large for the supplied **buffer_return**. The required size is returned as the value of the function, and the contents of **buffer_return** and **keysym_return** are not modified. The client should call the function again with the same event and a buffer of adequate size in order to obtain the string.
- **XLookupNone** means that no consistent input has been composed so far. The contents of **buffer_return** and **keysym_return** are not modified, and the function returns zero as a value.
- **XStringReturned** means some input string has been composed. It is placed in **buffer_return** and the string length is returned as the value of the function. The string is encoded in the locale bound to the Input Context. The contents of **keysym_return** is not modified.
- **XLookupKeySym** means a KeySym has been returned instead of a string. The KeySym is returned in **keysym_return.** The contents of **buffer_return** is not modified, and the function returns zero.

- **XLookupBoth** means that both a KeySym and a string are returned, in *buffer_return* and *keysym_return* respectively.

It is not necessary for the Input Context passed as an argument to **OlLookupIm-String** to have focus. Input can be composed within this Input Context before it loses focus and that input is returned by the function even though it no longer has keyboard focus. This result is dependent on the IM implementation and may not be true in all cases.

SEE ALSO

OlDrawImString(3W)
XLookupString(3W)
XLookupKeysym(3W)
XKeysymToString(3W)
XstringToKeySym(3W)

NAME

OlLookupInputEvent – translates an X event to an OPEN LOOK virtual event

SYNOPSIS

```
#include <Xol/OpenLook.h>
    . . .
void
OlLookupInputEvent(w, xevent, virtual_event_ret, db_flag)
        Widget          w;
        XEvent *        xevent;
        OlVirtualEvent  virtual_event_ret;
        XtPointer       db_flag;
```

DESCRIPTION

The **OlLookupInputEvent** procedure is used to translate a X event to an OPEN LOOK virtual event. The X event (*xevent*) could be a **KeyPress**, **ButtonPress**, **ButtonRelease**, **EnterNotify**, **LeaveNotify**, or **MotionNotify** event. The procedure attempts to translate this event based on the setting of the OPEN LOOK defined dynamic databases.

The *virtual_event_ret* parameter is a pointer to an **OlVirtualEventRec** structure:

```
typedef struct {
     Boolean          consumed;
     XEvent *         xevent;
     Modifiers        dont_care;
     OlVirtualName    virtual_name;
     KeySym           keysym;
     String           buffer;
     Cardinal         length;
     Cardinal         item_index;
} OlVirtualEventRec, *OlVirtualEvent;
```

If the X event is a **KeyPress**, the **keysym**, **buffer**, and **length**, information will be included in *virtual_event_ret*. The information was returned from a call to **XLookupString**(3X).

The *db_flag* parameter is an **XtPointer** type. The valid values are **OL_DEFAULT_IE**, **OL_CORE_IE**, **OL_TEXT_IE**, or the return value from a **OlCreateInputEventDB**(3W) call.

The (*w*, *db_flag*) pair determines the searching database(s). If the *db_flag* value is not **OL_DEFAULT_IE** then only the given database (for example, **OL_TEXT_IE** means: search the OPEN LOOK TEXT database) will be searched, otherwise a search stack will be built. This stack is based on the widget information (*w*) and the registering order [see **OlSearchClassIEDB**(3W), **OlSearchClassTextDB**(3W), **OlSearchWidgetIEDB**(3W), and **OlSearchWidgetTextDB**(3W) for details] to determine the searching database(s). Once this stack is built, the procedure uses the LIFO (Last In First Out) fashion to perform the search.

All widgets have an XtNconsumeEvent callback. When this callback is called, the *call_data* field is a pointer to an **OlVirtualEventRec** structure which is filled in with the results of calling **OlLookupInputEvent** with the *db_flag* set to **OL_DEFAULT_IE**.

OPEN LOOK Defined Databases

NOTE: For readability, we have abbreviated the following keys in the Default Bindings column:

Key	Abbreviation
Shift key	s
Alt key	a
Ctrl key	c

Core Database (`OL_CORE_IE`)

Command Name	Virtual Expression	Virtual Event	Default Binding
ADJUST	adjustBtn	OL_ADJUST	<Button2>
ADJUSTKEY	adjustKey	OL_ADJUSTKEY	c s<ampersand>
CANCEL	cancelKey	OL_CANCEL	<Escape>
CONSTRAIN	constrainBtn	OL_CONSTRAIN	c<Button1>
COPY	copyKey	OL_COPY	c<Insert>
CUT	cutKey	OL_CUT	s<Delete>
DEFAULTACTION	defaultActionKey	OL_DEFAULTACTION	<Return>,c<Return>
DRAG	dragKey	OL_DRAG	<F5>
DROP	dropKey	OL_DROP	<F2>
DUPLICATEKEY	duplicateKey	OL_DUPLICATEKEY	s<space>
HELP	helpKey	OL_HELP	<F1>
HSBMENU	horizSBMenuKey	OL_HSBMENU	a c<r>
MENU	menuBtn	OL_MENU	<Button3>
MENUDEFAULT	menuDefaultBtn	OL_MENUDEFAULT	s<Button3>
MENUDEFAULTKEY	menuDefaultKey	OL_MENUDEFAULTKEY	c<M>,s<F4>
MENUKEY	menuKey	OL_MENUKEY	c<m>,<F4>
MOVEDOWN	downKey	OL_MOVEDOWN	<Down>
MOVELEFT	leftKey	OL_MOVELEFT	<Left>
MOVERIGHT	rightKey	OL_MOVERIGHT	<Right>
MOVEUP	upKey	OL_MOVEUP	<Up>
MULTIDOWN	multiDownKey	OL_MULTIDOWN	c<Down>
MULTILEFT	multiLeftKey	OL_MULTILEFT	c<Left>
MULTIRIGHT	multiRightKey	OL_MULTIRIGHT	c<Right>
MULTIUP	multiUpKey	OL_MULTIUP	c<Up>
NEXTAPP	nextAppKey	OL_NEXTAPP	a<Escape>
NEXT_FIELD	nextFieldKey	OL_NEXT_FIELD	<Tab>,c<Tab>
NEXTWINDOW	nextWinKey	OL_NEXTWINDOW	a<F6>
PAGEDOWN	pageDownKey	OL_PAGEDOWN	c<Next>
PAGELEFT	pageLeftKey	OL_PAGELEFT	c<bracketleft>
PAGERIGHT	pageRightKey	OL_PAGERIGHT	c<bracketright>
PAGEUP	pageUpKey	OL_PAGEUP	c<Prior>
PAN	panBtn	OL_PAN	a<Button1>
PASTE	pasteKey	OL_PASTE	s<Insert>

Core Database (OL_CORE_IE)			
Command Name	Virtual Expression	Virtual Event	Default Binding
PREVAPP	prevAppKey	OL_PREVAPP	a s<Escape>
PREV_FIELD	prevFieldKey	OL_PREV_FIELD	s<Tab>,c s<Tab>
PROPERTY	propertiesKey	OL_PROPERTY	c<p>
SCROLLBOTTOM	scrollBottomKey	OL_SCROLLBOTTOM	a<Next>
SCROLLDOWN	scrollDownKey	OL_SCROLLDOWN	<Next>
SCROLLLEFT	scrollLeftKey	OL_SCROLLLEFT	a<bracketleft>
SCROLLLEFTEDGE	scrollLeftEdgeKey	OL_SCROLLLEFTEDGE	a s<braceleft>
SCROLLRIGHT	scrollRightKey	OL_SCROLLRIGHT	a<bracketright>
SCROLLRIGHTEDGE	scrollRightEdgeKey	OL_SCROLLRIGHTEDGE	a s<braceright>
SCROLLTOP	scrollTopKey	OL_SCROLLTOP	a<Prior>
SCROLLUP	scrollUpKey	OL_SCROLLUP	<Prior>
SELCHARBAK	selCharBakKey	OL_SELCHARBAK	s<Left>
SELCHARFWD	selCharFwdKey	OL_SELCHARFWD	s<Right>
SELECT	selectBtn	OL_SELECT	<Button1>
SELECTKEY	selectKey	OL_SELECTKEY	<space>,c<space>
SELFLIPENDS	selFlipEndsKey	OL_SELFLIPENDS	a<Insert>
SELLINE	selLineKey	OL_SELLINE	c a<Left>
SELLINEBAK	selLineBakKey	OL_SELLINEBAK	s<Home>
SELLINEFWD	selLineFwdKey	OL_SELLINEFWD	s<End>
SELWORDBAK	selWordBakKey	OL_SELWORDBAK	c s<Left>
SELWORDFWD	selWordFwdKey	OL_SELWORDFWD	c s<Right>
STOP	stopKey	OL_STOP	c<s>
TOGGLEPUSHPIN	togglePushpinKey	OL_TOGGLEPUSHPIN	c<t>
UNDO	undoKey	OL_UNDO	a<BackSpace>
VSBMENU	vertSBMenuKey	OL_VSBMENU	c<r>
WINDOWMENU	windowMenuKey	OL_WINDOWMENU	s<Escape>
WORKSPACEMENU	workspaceMenuKey	OL_WORKSPACEMENU	c<w>

Text Database (OL_TEXT_IE)			
Command Name	Virtual Expression	Virtual Event	Default Button
CHARBAK	charBakKey	OL_CHARBAK	<Left>
CHARFWD	charFwdKey	OL_CHARFWD	<Right>
DELCHARBAK	delCharBakKey	OL_DELCHARBAK	<BackSpace>
DELCHARFWD	delCharFwdKey	OL_DELCHARFWD	<Delete>
DELLINE	delLineKey	OL_DELLINE	a s<Delete>
DELLINEBAK	delLineBakKey	OL_DELLINEBAK	c<BackSpace>
DELLINEFWD	delLineFwdKey	OL_DELLINEFWD	c<Delete>
DELWORDBAK	delWordBakKey	OL_DELWORDBAK	c s<BackSpace>
DELWORDFWD	delWordFwdKey	OL_DELWORDFWD	c s<Delete>
DOCEND	docEndKey	OL_DOCEND	c<End>
DOCSTART	docStartKey	OL_DOCSTART	c<Home>
LINEEND	lineEndKey	OL_LINEEND	<End>
LINESTART	lineStartKey	OL_LINESTART	<Home>
PANEEND	paneEndKey	OL_PANEEND	c s<End>
PANESTART	paneStartKey	OL_PANESTART	c s<Home>
RETURN	returnKey	OL_RETURN	<Return>
ROWDOWN	rowDownKey	OL_ROWDOWN	<Down>
ROWUP	rowUpKey	OL_ROWUP	<Up>
WORDBAK	wordBakKey	OL_WORDBAK	c<Left>
WORDFWD	wordFwdKey	OL_WORDFWD	c<Right>

SEE ALSO

`OlCreateInputEventDB`(3W)
`OlClassSearchIEDB`(3W)
`OlClassSearchTextDB`(3W)
`OlWidgetSearchIEDB`(3W)
`OlWidgetSearchTextDB`(3W)
`XtNconsumeEvent` discussion in "Primitive Widget Resources" section

EXAMPLE

```
          ...
#include <Xol/OpenLook.h>
          ...
OlVirtualEventRec    ve;

     /* To look up the OPEN LOOK CORE database */
OlLookupInputEvent(w, xevent, &ve, OL_CORE_IE);
switch (ve.virtual_name)
{
     case OL_UNKNOWN_INPUT:
          ...
           break;
     case OL_UNKNOWN_BTN_INPUT:
          ...
           break;
          case OL_UNKNOW_KEY_INPUT:
               ...
               break;
          case OL_ADJUST:
               printf ("pressed the adjustBtn\n");
               ...
               break;
          case OL_ADJUSTKEY:
               printf ("pressed the adjustKey\n");
               ...
               break;
               ...
     }
               ...
               ...
     #include <Xol/OpenLook.h>
               ...
     OlVirtualEventRec     ve;
          /* To look up the OPEN LOOK TEXT database */
     OlLookupInputEvent(w, xevent, &ve, OL_TEXT_IE);
     switch (ve.virtual_name)
     {
               ...
          case OL_DOCEND:
               printf ("pressed the docEndKey\n");
               ...
               break;
          case OL_LINEEND:
               printf ("pressed the lineEndKey\n");
               ...
               break;
               ...
     }
               ...
     #include <Xol/OpenLook.h>
               ...
     OlVirtualEventRec     ve;
          /* To look up all possible databases */
          /* assume: "w" is a textfield widget */
     OlLookupInputEvent(w, xevent, &ve, OL_DEFAULT_IE);
     switch (ve.virtual_name)
     {
               ...
     case OL_ADJUST:
          printf ("pressed the adjustBtn\n");
               ...
               break;
          case OL_ADJUSTKEY:
               printf ("pressed the adjustKey\n");
```

```
                ...
                 break;
                ...
          case OL_DOCEND:
                 printf ("pressed the docEndKey\n");
                ...
                 break;
          case OL_LINEEEND:
                 printf ("pressed the lineEndKey\n");
                ...
                 break;
                ...
     }
```

NAME

OlMaxFontInfo – queries the maximum values of font related attributes from all fonts in **fontlist**

SYNOPSIS

```
typedef struct _OlFontInfo {
     int ascent;
     int descent;
     int height;
     int width;
} OlFontInfo;

OlFontInfo *
OlMaxFontInfo (fontlist)
OlFontList *fontlist;
```

DESCRIPTION

This routine determines the maximum values for the four font related attributes from all fonts in the variable **fontlist**. It then allocates an **OlFontInfo** structure and fills in the structure with those values. This routine is useful to keep track of character positions in a string composed of characters from different code sets.

NOTES

The caller must free memory of the returned structure by calling **XFree**.

SEE ALSO

CvtOlFontGroupToFontStructLists(3W)
OlFreeFontList(3W)
OlGetFontList(3W)
OlMaxFontInfo(3W)

NAME

OlOpenDatabase – responsible for opening a localized **Xrmdatabase** format database.

SYNOPSIS

```
XrmDatabase OlOpenDatabase(display, filename)
                Display *display;
                String filename;
```

DESCRIPTION

This function is responsible for opening a localized version of a database in **XrmDatabase** format. The function will resolve the pathname according to the current locale.

If the function call is successful, the **XrmDatabase** pointer will be returned; if unsuccessful, (**XrmDatabase**) NULL is returned.

If the database has already been opened by **OlOpenDatabase**, the cached **XrmDatabase** pointer is returned.

SEE ALSO

OlCloseDatabase(3W)
OlGetMessage(3W)
OlOpenDatabase(3W)

NAME

`OlOpenIm` – opens a connection to the Input Method

SYNOPSIS

```
typedef struct _OlImValues {
     char  * attr_name;
     void  * attr_value;
} OlImValues;

typedef OlImValues * OlImValuesList;

typedef struct _OlIm {
     OlIc            *iclist;        /*input context list */
     OlImStyles      *im_styles;     /*supported re-edit types */
     OlImValues*     *imvalues;      /*current IM attributes */
     char            *appl_name;     /*application name */
     char            *appl_class;    /*application class */
     long            version         /*OPEN LOOK version */
     void            *imtype;        /*hook for IM specific data*/
} OlIm;

OlIm *OlOpenIm(dpy, rdb, res_name, res_class)
      Display     dpy;
      XrmDatabase rdb;
      String      res_name, res_class;
```

DESCRIPTION

This is an IM dependent routine responsible for opening a connection to the Input Method. Depending on a particular implementation it may have to start an Input Method server, establish a connection with an already running server, set up a STREAMS connection, or simply create an `OlIm` structure.

The routine returns a pointer to the `OlIm` structure, a pointer to a list of `OlIc` structures, information about supported IM styles, and the Toolkit's version number (to be used by some IMs).

The **imtype** field is a hook for attaching implementation dependent data structures.

SEE ALSO

`OlCloseIm`(3W)
`OlDisplayOfIm`(3W)
`OlGetImValues`(3W)
`OlImOfIc`(3W)
`OlLocaleOfIm`(3W)

Dynamic Settings

NAME

`OlRegisterDynamicCallback`

SYNOPSIS

```
#include <OpenLook.h>
 ...
extern void OlRegisterDynamicCallback(CB, data)
OlDynamicCallbackProc  CB;
XtPointer              data;
```

DESCRIPTION

The **`OlRegisterDynamicCallback`** procedure is used to add a function to the list of registered callbacks to be called whenever the procedure **`OlCallDynamicCall-backs`** is invoked. The OlCallDynamicCallback procedure is invoked whenever the RESOURCE_MANAGER property of the Root Window is updated. The OlCallDynamicCallbacks procedure may also be called directly by either the application or other routines in the widget libraries. The callbacks registered are guaranteed to be called in FIFO order of registration and will be called as

```
(*CB)(data);
```

SEE ALSO

`OlUnregisterDynamicCallback`(3W)
`OlCallDynamicCallbacks`(3W)

NAME

`OlRegisterHelp` – associates help information with either a widget instance or class

SYNOPSIS

```
#include <Intrinsic.h>
#include <OpenLook.h>

void OlRegisterHelp(id_type, id, tag, source_type, source);
OlDefine id_type;
XtPointer id;
String tag;
OlDefine source_type;
XtPointer source;
```

DESCRIPTION

These resources define the look of the Help window.

Default Window Decorations		
Resource	**Type**	**Default**
XtNmenuButton	Boolean	FALSE
XtNpushpin	OlDefine	OL_IN
XtNresizeCorners	Boolean	FALSE
XtNwindowHeader	Boolean	TRUE

Associating Help with Widgets or Gadgets

The **`OlRegisterHelp`** routine associates help information with either a widget instance or a widget class. The widget ID or widget class pointer is given in **`id`**, and **`id_type`** identifies whether it is a widget or a widget class using one of the values **`OL_WIDGET_HELP`**, **`OL_CLASS_HELP`**, or **`OL_FLAT_HELP`**, respectively. Use **`OL_WIDGET_HELP`** to register help on gadgets.

The **`tag`** value is shown in the title of the help window, as suggested below:

app-name: **`tag`** Help

where *app-name* is the name of the application. More than one help message can be registered with the same **`tag`**. **`tag`** can be null, in which case only *app-name:* Help is printed.

Help for Flat Widgets

To set the same help message for all items in a flat widget container, use the **`OlRegisterHelp`** routine with **`id_type`** set to **`OL_WIDGET_HELP`**.

To register help for individual items in a flat widget container, use **`OlRegisterHelp`** with **`id_type`** set to **`OL_FLAT_HELP`**. Use the following structure to specify object that gets the help message:

```
typedef struct {
            Widget   widget;
            Cardinal item_index;
}  OlFlatHelpId;
```

Format of the Help

The help message is identified in **source**; **source_type** identifies the form of the help message:

`OL_STRING_SOURCE`
: The **source** is of type **String** and contains simple text with embedded newlines. The **OlRegisterHelp** routine does not copy this source; the application is expected to maintain the original as long as it is registered with a **tag**.

`OL_DISK_SOURCE`
: The **source** is also of type **String**, but contains the name of a file that contains the text. The **OlRegisterHelp** routine does not copy this filename; the application is expected to maintain the original as long as it is registered. The file content is considered to be simple text with embedded newlines.

`OL_INDIRECT_SOURCE`
: The **source** is of type **void(*)** and is a pointer to an application defined routine. The routine is called after HELP has been clicked. The application is expected to define the type of source in the routine. After the routine has returned, the help information is displayed.

The routine is called as follows:

```
(*source)(id_type,id,src_x,src_y,&source_type,&source);
```

id_type
id are the values for the widget class or widget instance that was under the pointer when HELP was pressed. These are the same values registered with the **tag**.

src_x
src_y are the coordinates of the pointer when HELP was pressed. These are relative to the upper-left corner of the window.

source_type
source are pointers to values the application's routine should set for the help source it wants to display. The only **source_type** values accepted are **OL_STRING_SOURCE** and **OL_DISK_SOURCE**.

`OL_TRANSPARENT_SOURCE`
: The **source** is of type **void(*)** and is a pointer to an application defined routine. The routine is called after HELP has been invoked. The application is expected to handle the HELP event completely. This might be used by an application that does not want the standard help window (for example, **xterm** simply generates an escape sequence).

The routine is called as follows:

```
(*source)(id_type, id, src_x, src_y);
```

id_type

`id` are the values for the widget class or widget instance that was under the pointer when HELP was pressed. These are the same values registered with the `tag`.

`src_x`
`src_y` are the coordinates of the pointer when HELP was pressed. These are relative to the upper-left corner of the window.

The help window is automatically popped up for the `OL_STRING_SOURCE`, `OL_DISK_SOURCE`, and `OL_INDIRECT_SOURCE` help sources. (It is popped up after the indirect routine returns for the `OL_INDIRECT_SOURCE` help source.) The application is responsible for popping up a help window (if needed) for the `OL_TRANSPARENT_SOURCE` help source.

Handling the Help Key Event

When the end user clicks HELP, if the event occurs within a widget or window registered with the `OlRegisterHelp` routine, the corresponding help message is automatically displayed (for source types `OL_STRING_SOURCE` and `OL_DISK_SOURCE`) or the application routine is called (for source types `OL_INDIRECT_SOURCE` and `OL_TRANSPARENT_SOURCE`). If the event occurs elsewhere, a default help message is displayed.

If the help key is pressed on a widget, the help routine attempts to look up help on that widget of type `OL_WIDGET_HELP`. If no help is found, the help routine searches up the widget tree (i.e., goes to the widget's parent) looking for the first widget that has help of type `OL_WIDGET_HELP` registered. If it finds help registered on one of the original widget's ancestors, the help message for the ancestor will be used. If help is not found, the help routine looks for help of type `OL_CLASS_HELP` on the original widget. If no help is found, the default message is used.

Separate Help per Application

An application will have, at most, one help message displayed. However, several applications can display their separate help messages simultaneously, in different help windows.

Displaying the Help Message

A help source of type `OL_STRING_SOURCE` and `OL_DISK_SOURCE` is displayed in a help window that is 50 ens wide and 10 lines tall. (An en is *S/2* points, where *S* is the current point size.) Lines longer than 50 ens are wrapped at the space(s) between words, or at the nearest character boundary if there is no space at which to wrap. Lines are also wrapped at embedded newlines regardless of their length.

Only spaces and newlines are recognized for format control; all other non-printable characters are silently ignored.

Up to ten lines of the message are visible at once. Messages longer than ten lines have a scrollbar control that allows scrolling non-visible lines into view.

Static Variables

The `tag` and `source` values should be statically defined (or allocated and not freed). Using automatic variables here will almost always fail.

NAME

`OlResetIc` – resets the state of an input context to the initial state

SYNOPSIS

```
char *OlResetIC(ic)
     OlIc *ic   */specifies the IC to be reset*/
```

DESCRIPTION

OlResetIc resets the input context to its initial state. Any input pending on that context is deleted. Input method is required to clear the pre-edit area, if any, and update the status accordingly. Calling **OlResetIc** does not change the focus.

SEE ALSO

OlCreateIc(3W)
OlDstryIc(3W)
OlGetIcValues(3W)
OlImOfIc(3W)
OlIcValus(3W)
OlSetIcFocus(3W)
OlSetIcValues(3W)
OlUnSetIcFocus(3W)

NAME

`OlSetGaugeValue`

SYNOPSIS

```
extern void OlSetGaugeValue(w, value)
Widget w;
int value;
```

DESRIPTION

This function is an alternate and faster way of setting the slider value of a gauge widget.

SEE ALSO

`Gauge`(3W)

NAME

OlSetApplicationValues – used to set application resources

SYNOPSIS

```
void OlSetApplicationValues(widget, args, num_args)
     Widget     widget;     /* for getting display info */
     ArgList    args;       /* args to query            */
     Cardinal   num_args;   /* number of args           */
```

DESCRIPTION

The **OlSetApplicationValues** procedure is used to set the application resources that are accessible from the OPEN LOOK toolkit. The semantics is similar to the **XtSetValues** call.

Application resources are resources that all OPEN LOOK applications have in common. Their values are updated dynamically by changing preferences in the WorkSpace Manager's property sheets.

SEE ALSO

See the section "Application Resources" for the types and descriptions of available application resources in the Appendix, "Manual Pages: Introduction" in this Programmer's Guide.

NAME

OlSetIcFocus – notifies the Input Method that the focus window attached to the "ic" argument has received keyboard focus

SYNOPSIS

```
void  OlSetIcFocus(ic)
      OlIc *ic;
```

DESCRIPTION

This function informs the IM that the text area associated with a particular IC now has the input focus and should receive all the keyboard events. Its implementation depends on the Input Method. Depending on the implementation, this function may update the status information and provide appropriate feedback. For an input method style that includes the **OlImFocusTracks** mask, the client must call **OlSetIcFocus(ic)** in response to a FocusOut event on the widget associated with the Input Context.

SEE ALSO

OlUnsetFocus(3W)

NAME

`OlSetIcValues` – sets Input Context attributes

SYNOPSIS

```
char *  OlSetIcValues(ic, icvalues)
        OlIc *ic;
        OlIcValues* icvalues;
```

DESCRIPTION

This function sets IC attributes. **`ic`** specifies the input context to be changed. **`icvalues`** is a pointer to a list of attribute names and new value pairs. All values must be appropriate data type, matching the data type imposed by the semantics of the argument. The function returns NULL if all arguments can be set, otherwise it returns the name of the first argument that can not be set. The end of the **`icvalues`** list will be indicated by a NULL value for the attribute name.

SEE ALSO

`OlCreateIc`(3W)
`OlDestroyIc`(3W)
`OlGetIcValues`(3W)
`OlIcValues`(3W)

NAME

OlTextWidth – get the width in pixels of a localized string

SYNOPSIS

```
int OlTextWidth(fontlist, string, len)
     FontList *fontlist;
     unsigned char *string;
     int len;
```

DESCRIPTION

This function returns the width of an EUC string in pixels and as such replaces the Xlib function **XtextWidth**. The *fontlist* is a pointer to a list from **XFontStruct**; *string*, specifies a string whose width in pixels is to be computed, and the *len* argument specifies the length of *string* in bytes (not characters). Upon successful completion, the function returns the width of the *string* in pixels, or otherwise 0.

SEE ALSO

XTextWidth
XTextWidth16

NAME

`OlTextEditClearBuffer`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditClearBuffer(ctx)
TextEditWidget ctx;
```

DESCRIPTION

The **`OlTextEditClearBuffer`** function is used to delete all of the text associated with the TextEdit widget *ctx*.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget or if the clear operation fails; otherwise TRUE is returned.

SEE ALSO

`OlTextEditUpdate`(3W)
`TextEdit`(3W)

NAME

`OlTextEditCopyBuffer`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditCopyBuffer(ctx, buffer)
TextEditWidget ctx;
char ** buffer;
```

DESCRIPTION

The **`OlTextEditCopyBuffer`** function is used to retrieve a copy of the TextBuffer associated with the TextEdit Widget *ctx*. The storage required for the copy is allocated by this routine; it is the responsibility of the caller to free this storage when appropriate.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget or if the buffer cannot be read; otherwise TRUE is returned.

SEE ALSO

`OlTextEditReadSubString`(3W)
`TextEdit`(3W)

NAME

`OlTextEditCopySelection`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditCopySelection(ctx, delete)
TextEditWidget ctx;
int            delete;
```

DESCRIPTION

The **`OlTextEditCopySelection`** function is used to Copy or Cut the current selection in the TextEdit *ctx*. If no selection exists or if the TextEdit cannot acquire the CLIPBOARD, FALSE is returned. Otherwise the selection is copied to the CLIPBOARD then, if the *delete* flag is non-zero, the text is then deleted from the TextBuffer associated with the TextEdit widget (i.e., a CUT operation is performed). Finally, TRUE is returned.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget or if the operation fails; otherwise TRUE is returned.

SEE ALSO

`OlTextEditUpdate`(3W)
`OlTextEditGetCursorPosition`(3W)
`OlTextEditSetCursorPosition`(3W)
`OlTextEditReadSubString`(3W)
`OlTextEditCopyBuffer`(3W)
`TextEdit`(3W)

NAME

`OlTextEditGetCursorPosition`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditGetCursorPosition
   (ctx, start, end, cursorPosition)
TextEditWidget ctx;
TextPosition * start;
TextPosition * end;
TextPosition * cursorPosition;
```

DESCRIPTION

The **OlTextEditGetCursorPosition** function is used to retrieve the current selection *start* and *end* and *cursorPosition*. If there is no current selection *start* and *end* will both be equal to *cursorPosition.*

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget; otherwise TRUE is returned.

SEE ALSO

`OlTextEditSetCursorPosition`(3W)
`TextEdit`

NAME

`OlTextEditGetLastPosition`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditGetLastPosition(ctx, position)
TextEditWidget ctx;
TextPosition * position;
```

DESCRIPTION

The **`OlTextEditGetLastPosition`** function is used to retrieve the *position* of the last character in the TextBuffer associated with the TextEdit widget *ctx*.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget; otherwise TRUE is returned.

SEE ALSO

`OlTextEditGetCursorPosition`(3W)
`TextEdit`(3W)

NAME

`OlTextEditInsert`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditInsert(ctx, buffer, length)
TextEditWidget ctx;
String         buffer;
int            length;
```

DESCRIPTION

The **`OlTextEditInsert`** function is used to insert a NULL-terminated *buffer* containing *length* bytes in the TextBuffer associated with the TextEdit widget *ctx*. The inserted text replaces the current (if any) selection.

Note: The value of *length* is not used internally, but is passed on as the length field in the XtNmodifyVerification callback.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget or if the insert operation fails; otherwise TRUE is returned.

SEE ALSO

`OlTextEditGetCursorPosition`(3W)
`TextEdit`(3W)

NAME

`OlTextEditPaste`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditPaste(ctx)
TextEditWidget ctx;
```

DESCRIPTION

The **OlTextEditPaste** function is used to paste the contents of the CLIPBOARD into the TextEdit widget *ctx*. The current (if any) selection is replaced by the contents of the CLIPBOARD,

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget; otherwise TRUE is returned.

SEE ALSO

OlTextEditCopySelection(3W)
TextEdit(3W)

NAME

OlTextEditReadSubString

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditReadSubString(ctx, buffer, start, end)
TextEditWidget ctx;
char ** buffer;
TextPosition start;
TextPosition end;
```

DESCRIPTION

The **OlTextEditReadSubString** function is used to retrieve a copy of a substring from the TextBuffer associated with the TextEdit Widget *ctx* between positions *start* through *end* inclusive. The storage required for the copy is allocated by this routine; it is the responsibility of the caller to free this storage when appropriate.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget or if the operation fails; otherwise TRUE is returned.

SEE ALSO

OlTextEditCopyBuffer(3W)
TextEdit(3W)

NAME

`OlTextEditRedraw`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditRedraw(ctx)
TextEditWidget ctx;
```

DESCRIPTION

The **`OlTextEditRedraw`** function is used to force a complete refresh of the TextEdit widget display. This routine does nothing if the TextEdit widget is not realized or if the update state is set to FALSE.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget or if the widget is not realized or if the update state is FALSE; otherwise TRUE is returned.

SEE ALSO

`OlTextEditUpdate`(3W)
`TextEdit`(3W)

NAME

`OlTextEditSetCursorPosition`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditSetCursorPosition
   (ctx, start, end, cursorPosition)
TextEditWidget ctx;
TextPosition start;
TextPosition end;
TextPosition cursorPosition;
```

DESCRIPTION

The **`OlTextEditSetCursorPosition`** function is used to change the current selection *start* and *end* and *cursorPosition*. The function does NOT check (for efficiency) the validity of the positions. If invalid values are given results are unpredictable. The function attempts to ensure that the cursorPosition is visible by scrolling the display.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget; otherwise TRUE is returned.

SEE ALSO

`OlTextEditGetCursorPosition`(3W)
`TextEdit`(3W)

NAME

`OlTextEditTextBuffer`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern TextBuffer * OlTextEditTextBuffer(ctx)
TextEditWidget ctx;
```

DESCRIPTION

The **`OlTextEditTextBuffer`** function is used to retrieve the TextBuffer pointer associated with the TextEdit widget *ctx*. This pointer can be used to access the facilities provided by the Text Buffer Utilities module.

SEE ALSO

`TextBufferUtilities`(3W)
`TextEdit`(3W)

NAME

`OlTextEditUpdate`

SYNOPSIS

```
#include <buffutil.h>
#include <textbuff.h>
#include <TextEdit.h>
 ...
extern Boolean OlTextEditUpdate(ctx, state)
TextEditWidget ctx;
Boolean state;
```

DESCRIPTION

The **`OlTextEditUpdate`** function is used to set the *updateState* of a TextEdit Widget. Setting the state to FALSE turns screen update off; setting the state to TRUE turns screen updates on and refreshes the display.

RETURN VALUE

FALSE is returned if the widget supplied is not a TextEdit Widget; otherwise TRUE is returned.

SEE ALSO

`OlTextEditRedraw`(3W)
`TextEdit`(3W)

NAME

`OlTextFieldCopyString`

SYNOPSIS

```
 #include <buffutil.h>
 #include <textbuff.h>
 #include <TextField.h>
 ...
extern int OlTextFieldCopyString(tfw, string)
TextFieldWidget tfw;
char *          string;
```

DESCRIPTION

The **`OlTextFieldCopyString`** function is used to copy the string associated with the TextField widget *tfw* into the user supplied area pointed to by *string*. The function returns the length of this string.

SEE ALSO

`OlTextFieldGetString`(3W)
`TextField Widget`(3W)

NAME

`OlTextFieldGetString`

SYNOPSIS

```
 #include <buffutil.h>
 #include <textbuff.h>
 #include <TextField.h>
 ...
extern char * OlTextFieldGetString(tfw, size)
TextFieldWidget tfw;
int *           size;
```

DESCRIPTION

The **`OlTextFieldGetString`** function is used to retrieve a *new* copy of the string associated with the TextField widget *tfw*. The function returns a pointer to the newly allocated string copy. Optionally, if *size* is not NULL, the function returns in *size* the length of the string.

SEE ALSO

`TextField Widget`(3W)
`OlTextFieldCopyString`(3W)

Dynamic Settings

NAME

`OlUngrabDragPointer`

SYNOPSIS

```
#include <OpenLook.h>
  ...
extern void OlUngrabDragPointer(w)
Widget w;
```

DESCRIPTION

The **OlUngrabDragPointer** procedure is used to relinquish the active pointer grab which was initiated by the OlGrabDragPointer procedure. This function simply ungrabs the pointer.

SEE ALSO

OlDetermineMouseAction(3W)
OlGrabDragPointer(3W)
OlDragAndDrop(3W)

Dynamic Settings

NAME

`OlUnregisterDynamicCallback`

SYNOPSIS

```
#include <OpenLook.h>
 ...
extern int OlUnregisterDynamicCallback(CB, data)
OlDynamicCallbackProc     CB;
XtPointer                 data;
```

DESCRIPTION

The **OlUnregisterDynamicCallback** procedure is used to remove a function from the list of registered callbacks to be called whenever the procedure **OlCallDynamicCallbacks** is invoked.

SEE ALSO

`OlRegisterDynamicCallback`(3W)
`OlCallDynamicCallbacks`(3W)

RETURN VALUE

Zero (`0`) is returned if the dynamic callback cannot be removed; otherwise one (`1`) is returned.

NAME

OlUnSetIcFocus – notifies the Input Method that the focus area attached to the **ic** no longer has input focus

SYNOPSIS

```
void  OlUnsetIcFocus(ic)
      OlIc *ic;
```

DESCRIPTION

This function informs the Input Method that the text insertion window associated with a particular IC no longer has the input focus and should not receive the keyboard events. Its implementation depends on the Input Method. The input method may choose to give some visual feedback to indicate loss of focus (for example, change color of cursor in pre-edit text).

SEE ALSO

OlSetIcFocus(3W)

NAME

`OlWidgetToClassName` – finds the class name for a widget

SYNOPSIS

```
String  OlWidgetToClassName(w)
        Widget w;
```

DESCRIPTION

Given a widget, the function returns the classname of the widget.

SEE ALSO

`OlWidgetClassToClassName`(3W)

NAME

`OlWidgetClassToClassName` – finds the classname for a widget class

SYNOPSIS

```
String OlWidgetClassToClassName(wc)
       WidgetClass wc;
```

DESCRIPTION

Given a widget class, the function returns the classname of the widget.

SEE ALSO

`OlWidgetToClassName`(3W)

NAME

`OlWidgetSearchTextDB` – register the OPEN LOOK TEXT database on a specific widget instance

SYNOPSIS

```
#include <Xol/OpenLook.h>
 ...
void
OlWidgetSearchTextDB(w)
     Widget     w;
```

DESCRIPTION

The `OlWidgetSearchTextDB` procedure is used to register the OPEN LOOK TEXT database on a specific widget instance.

Once the OPEN LOOK TEXT database is registered with a given widget instance, the `OlLookupInputEvent`(3W) procedure (if *db_flag* is `OL_DEFAULT_IE` or `OL_TEXT_IE`) will include this database in the search stack if the given widget id is this widget instance.

NOTES

The registering order determines the searching order when doing a lookup.

SEE ALSO

`OlClassSearchIEDB`(3W),
`OlClassSearchTextDB`(3W),
`OlCreateInputEventDB`(3W),
`OlLookupInputEvent`(3W),
`OlWidgetSearchIEDB`(3W)

EXAMPLE

```
 ...
#include <Xol/OpenLook.h>
 ...

     /* assume: "w" is a stub widget that is interested in */
     /*          the OPEN LOOK TEXT database               */
OlWidgetSearchTextDB(w);
     /* once this step is done, this widget instance will  */
     /* receive OPEN LOOK TEXT commands after a call       */
     /* to OlLookupInputEvent(), or in the XtNconsumeEvent */
     /* callback's OlVirtualEvent structure supplied with  */
     /* the call_data field.                               */
  ...
```

NAME

OlWidgetSearchIEDB – register a given database on a specific widget instance

SYNOPSIS

```
#include <Xol/OpenLook.h>
   ...
void
OlWidgetSearchIEDB(w, db)
     Widget                w;
     OlVirtualEventTable   db;
```

DESCRIPTION

The **OlWidgetSearchIEDB** procedure is used to register a given database on a specific widget instance. The *db* value was returned from a call to **OlCreateInputEventDB**(3W).

Once a database is registered with a given widget instance, the **OlLookupInputEvent**(3W) procedure (if *db_flag* is **OL_DEFAULT_IE** or *db*) will include this database in the search stack if the given widget id is this widget instance.

NOTES

The registering order determines the searching order when doing a lookup.

SEE ALSO

OlClassSearchIEDB(3W)
OlClassSearchTextDB(3W)
OlCreateInputEventDB(3W)
OlLookupInputEvent(3W),
OlWidgetSearchTextDB(3W)

EXAMPLE

```
      /* To create a client application database */
   ...
#include <Xol/OpenLook.h>
     ...
      /* start with a big value to avoid */
      /* the "virtual_name" collision    */
#define OL_MY_BASE              1000
#define OL_MY_DRAWLINEBTN       OL_MY_BASE+0
#define OL_MY_DRAWARCBTN        OL_MY_BASE+1
#define OL_MY_REDISPLAYKEY      OL_MY_BASE+2
#define OL_MY_SAVEPARTKEY       OL_MY_BASE+3

#define XtNmyDrawLineBtn        "myDrawLineBtn"
#define XtNmyDrawArcBtn         "myDrawArcBtn"
#define XtNmyRedisplayKey       "myRedisplayKey"
#define XtNmySavePartKey        "mySavePartKey"

static OlKeyOrBtnRec     OlMyBtnInfo[] = {
     /*name              default_value      virtual_name        */

     { XtNmyDrawLineBtn,  "c<Button1>",      OL_MY_DRAWLINEBTN  },
     { XtNmyDrawArcBtn,   "s<myDrawLineBtn>", OL_MY_DRAWARCBTN   },
};
static OlKeyOrBtnRec      OlMyKeyInfo[] = {
    /*name                default_value       virtual_name        */

     { XtNmyRedisplayKey, "c<F5>",             OL_MY_REDISPLAYKEY },
     { XtNmySavePartKey,  "c<F5>",             OL_MY_SAVEPARTKEY  },
};

static OlVirtualEventTable     OlMyDB;

    ...
OlMyDB = OlCreateInputEventDB(
               w,
               OlMyKeyInfo, XtNumber(OlMyKeyInfo),
               OlMyBtnInfo, XtNumber(OlMyBtnInfo)
     );
     ...
     /* assume: "w" is a stub widget that is interested in */
     /*         OlMyDB                                      */
OlWidgetSearchIEDB(w, OlMyDB);
     /* once this step is done, this widget instance will  */
     /* receive OlMyDB commands after a call to            */
     /* OlLookupInputEvent(), or in the XtNconsumeEvent    */
     /* callback's OlVirtualEvent structure supplied with  */
     /* the call_data field.                               */
     ...
```

NAME

`OlWMProtocolAction` – simulates a response to any window manager's protocol messages

SYNOPSIS

```
void OlWMProtocolAction(w, st, action)
        Widget               w;
        OlWMProtocolVerify * st;
        OlDefine             action;
```

where:

```
        typedef struct {
            int         msgtype;         /* type of WM msg */
            XEvent *    xevent;
        } OlWMProtocolVerify;
```

DESCRIPTION

This routine can be used to simulate a response to any window manager's protocol messages. The **`OlWMProtocolVerify`** field **`msgtype`** is an integer constant indicating the type of protocol message which invoked the callback and has a range of values of:

```
     OL_WM_TAKE_FOCUS
        OL_WM_SAVE_YOURSELF
        OL_WM_DELETE_WINDOW
```

The *w* parameter must be a widget that is a subclass of the VendorShell. Otherwise, no action will be taken.

The action parameter can be:

`OL_QUIT:`	quit the application immediately.
`OL_DEFAULTACTION:`	perform the action that is appropriate for each subclass of VendorShell.
`OL_DESTROY:`	destroy the shell widget.
`OL_DISMISS:`	dismiss or unmap the shell widget.

SEE ALSO

See the section on "Shell Resources" in the Appendix "Manual Pages: Introduction" in this Programmer's Guide.

NAME

`OlUpdateDisplay` – process all pending exposure events immediately

SYNOPSIS

```
#include <Xol/OpenLook.h>
    ...
void
OlUpdateDisplay(w)
     Widget     w;
```

DESCRIPTION

The `OlUpdateDisplay` procedure is used to process all pending exposure events so that the appearance of a given widget can be updated right away.

Normally, an operation is accomplished by a set of callback functions. If one of the callback functions performs a time-consuming action, it is possible that the portion of an application window will not be redrawn right away after a **XtSet-Values** call. This is because the normal exposure processing does not occur until all callback functions have been invoked. This situation can be resolved by calling this function before starting a time-consuming action.

EXAMPLE

```
    ...
#include <Xol/OpenLook.h>
    ...
extern Widget     status_area;     /* a staticText widget */
    ...
void
fooCB(w, client_data, call_data)
     Widget     w;
     XtPointer  client_data;
     XtPointer  call_data;
     {
          ...
          Arg     args[5];

               /* display the status in the footer area     */
               /* before the actual operation               */
     XtSetArg(args[0], XtNstring,
                    "Start the operation, please wait ...");
     XtSetValues(status_area, args, 1);
               /* show the status in the footer area right away*/
     OlUpdateDisplay(status_area);

               /* now we can start the actual operation     */
          ...
          return;
     }
```

NAME

Packed_Widget: OlCreatePackedWidgetList, OlPackedWidget – a convenience routine that allows an application to create a widget tree or subtree in one call

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>

typedef struct {
        Widget widget_returned;
        String name;
        WidgetClass *class_ptr;
        Widget *parent_ptr;
        String descendant;
        ArgList resources;
        Cardinal num_resources;
        Boolean managed;
} OlPackedWidget;

Widget = OlCreatePackedWidgetList(pw_list, num_pw)
OlPackedWidget *pw_list;
Cardinal num_pw;
```

DESCRIPTION

Create Widget (Sub)Trees in One Call

The **OlCreatePackedWidgetList** routine and its associated **OlPackedWidget** structure allow an application to create a widget tree or subtree in one call.

The tree is pointing to **pw_list**. Each element in this array is of the type **OlPackedWidget**. This structure gives all the information needed to create a new widget:

widget_returned
will contain the ID of the newly created widget.

name is the name of the widget that will be created.

class_ptr
is a *pointer* to the **WidgetClass** pointer for the new widget. This gives the class of widget to create. It is a pointer to the pointer because typically the pointer itself is an external value that is not suitable for using in an array initialization; the pointer to the pointer is.

parent_ptr
is a pointer to the widget ID of the intended parent of the new widget *or* the ID of an indirect widget that "knows who the parent is" (see below). This value may point to a **.widget** member in another **PackedWidget** item; if the parent is an indirect widget, it must appear earlier in the list.

descendant
is the name of a resource available in the widget identified by **parent_ptr**. The value of this resource is the ID of the real parent for the new widget.

If the **.descendant** value is not zero, **.parent** is expected to identify an indirect parent that is interrogated for the ID of the real parent. If this value is zero, **.parent** is expected to identify the real parent.

resources
is the resource array to use when creating the new widget.

num_resources
is the number of resources in the array.

managed
is TRUE if the new widget should be managed when created, FALSE otherwise.

The **OlCreatePackedWidgetList** is passed a pointer to an **OlPackedWidget** array and the number of elements in the array. It creates widgets starting from the first element in the array, and returns the ID of the topmost widget.

NAME

Pixel_Conversion – a group of routines which examine the data structures that describe the physical dimensions and the pixel resolution of a screen

SYNOPSIS

```
#include <Xlib.h>
#include <OpenLook.h>

Screen *OlDefaultScreen;
Display *OlDefaultDisplay;

Axis axis;
Screen screen;

OlMMToPixel(axis, millimeters);
Ol_MMToPixel(axis, millimeters);

OlPointToPixel(axis, points);
Ol_PointToPixel(axis, points);

OlScreenMMToPixel(axis, millimeters, screen);
Ol_ScreenMMToPixel(axis, millimeters, screen);

OlScreenPointToPixel(axis, points, screen);
Ol_ScreenPointToPixel(axis, points, screen);

OlPixelToMM(axis, pixels);
Ol_PixelToMM(axis, pixels);

OlPixelToPoint(axis, pixels);
Ol_PixelToPoint(axis, pixels);

OlScreenPixelToPoint(axis, pixels, screen);
Ol_ScreenPixelToPoint(axis, pixels, screen);

OlScreenPixelToMM(axis, pixels, screen);
Ol_ScreenPixelToMM(axis, pixels, screen);
```

DESCRIPTION

All the X-based OPEN LOOK widgets refer to pixels in coordinates and dimensions for compatibility with other X Window System widgets. However, this puts the burden on the application programmer to convert between externally useful measures, such as points or millimeters, and pixels as applied to the screen at hand. These routines examine the data structures that describe the physical dimensions and the pixel resolution of a screen and convert among millimeters, points, and pixels for that screen.

Which Screen?

The shorter forms of these routines (the ones without the word **Screen** in their names) work for the default screen. This is the screen that is active when the X Toolkit Intrinsics are started. The longer forms of these routines take a **Screen *** type argument that refers to a particular screen.

The macros **OlDefaultScreen** and **OlDefaultDisplay** identify the current screen and display being used by the Intrinsics. Although the SYNOPSIS above implies these are variables of type **Screen *** and **Display ***, respectively, they are really macros that produce values of these types.

Note: Use After Toolkit Initialization
These routines make use of data structures that are initialized when the Toolkit is initialized (see **`OlInitialize`** later in this document). Therefore, using them before Toolkit initialization (for example, as an initial value to a statically defined variable) will result in a *run time* error.

Axis Argument

The first argument of all the routines is the direction in which the measurement is made. This is necessary because not all screens have equivalent resolution in the horizontal and vertical axes. The **`axis`** argument can take one of the two values: **`OL_HORIZONTAL`** or **`OL_VERTICAL`**. These routines are not directly usable in computing a diagonal measure. (Find the diagonal with the Pythagorean Theorem: $a^2 + b^2 = c^2$)

Implemented as Macros

All these routines are implemented as macros, so they can take any reasonable type value for the **`millimeters`**, **`points`**, and **`pixels`**. The macros cast the values into the proper type needed for the conversion. However, only a single type value can be "returned". The routines without an underscore in their names produce values of type **`int`** (the values are rounded to the nearest integer). The routines with an underscore in their names produce values of type **`double`** (these values have not been rounded, leaving it up to the application to round up, round down, or truncate as needed). Given the small size of the units involved, the integer returning routines should be sufficient for many applications.

Because these routines are implemented as macros, there are no function addresses available.

Text Buffer Utilities

NAME

`PositionOfLine`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextPosition PositionOfLine(text, lineindex)
TextBuffer * text;
TextLine lineindex;
```

DESCRIPTION

The **`PositionOfLine`** function is used to translate a **`lineindex`** in the *text* TextBuffer to a TextPosition. It returns the translated TextPosition or EOF if the **`lineindex`** is invalid.

SEE ALSO

`LineOfPosition`(3W)
`PositionOfLocation`(3W)
`LocationOfPosition`(3W)

Text Buffer Utilities

NAME

`PositionOfLocation`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextPosition PositionOfLocation(text, location)
TextBuffer * text;
TextLocation location;
```

DESCRIPTION

The **`PositionOfLocation`** function is used to translate a *location* in the *text* TextBuffer to a TextPosition. The function returns the translated TextPosition or EOF if the *location* is invalid.

SEE ALSO

`PositionOfLine`(3W)
`LocationOfPosition`(3W)

Text Buffer Utilities

NAME

`PreviousLocation`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextLocation PreviousLocation(textBuffer, current)
TextBuffer * textBuffer;
TextLocation current;
```

DESCRIPTION

The **`PreviousLocation`** function returns the Location which precedes the given *current* location in a TextBuffer. If the current location points to the beginning of the TextBuffer this function wraps.

SEE ALSO

`NextLocation`(3W)

Text Buffer Utilities

NAME

`PreviousTextBufferWord`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextLocation PreviousTextBufferWord(textBuffer, current)
TextBuffer * textBuffer;
TextLocation current;
```

DESCRIPTION

The **`PreviousTextBufferWord`** function is used to locate the beginning of a word in a TextBuffer relative to a given *current* location. It returns the location of the beginning of the word which precedes the given current location. If the current location is within a word this function will skip over the current word. If the current word is the first word in the TextBuffer the function wraps to the end of the buffer.

SEE ALSO

`PreviousTextBufferWord`(3W)

Text Buffer Utilities

NAME

`ReadFileIntoBuffer`

SYNOPSIS

```
#include <buffutil.h>
   ...
extern int ReadFileIntoBuffer(fp, buffer)
FILE * fp;
Buffer * buffer;
```

DESCRIPTION

The **`ReadFileIntoBuffer`** function reads the file associated with *fp* and inserts the characters read into the *buffer*. The read operation terminates when either EOF is returned when reading the file or when a NEWLINE is encountered. The function returns the last character read to the caller (either EOF or NEWLINE).

SEE ALSO

`ReadStringIntoBuffer`(3W)

Text Buffer Utilities

NAME

ReadFileIntoTextBuffer

SYNOPSIS

```
#include <textbuff.h>
  ...
extern TextBuffer * ReadFileIntoTextBuffer(filename, f, d)
char * filename;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **ReadFileIntoTextBuffer** function is used to read the given *file* into a newly allocated TextBuffer. The supplied TextUpdateFunction and data pointer are associated with this TextBuffer.

SEE ALSO

ReadStringIntoTextBuffer(3W)

Text Buffer Utilities

NAME

`ReadStringIntoBuffer`

SYNOPSIS

```
#include <buffutil.h>
   ...
extern int ReadStringIntoBuffer(sp, buffer)
Buffer * sp;
Buffer * buffer;
```

DESCRIPTION

The **`ReadStringIntoBuffer`** function reads the buffer associated with *sp* and inserts the characters read into *buffer*. The read operation terminates when either EOF is returned when reading the buffer or when a NEWLINE is encountered. The function returns the last character read to the caller (either EOF or NEWLINE).

SEE ALSO

`ReadFileIntoBuffer`(3W)

Text Buffer Utilities

NAME

`ReadStringIntoTextBuffer`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextBuffer * ReadStringIntoTextBuffer(string, f, d)
char * string;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **`ReadStringIntoTextBuffer`** function is used to copy the given *string* into a newly allocated TextBuffer. The supplied TextUpdateFunction and data pointer are associated with this TextBuffer.

SEE ALSO

`ReadFileIntoTextBuffer`(3W)

Text Buffer Utilities

NAME

`RegisterTextBufferScanFunctions`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern void RegisterTextBufferScanFunctions(forward, backward)
char * (*forward)();
char * (*backward)();
```

DESCRIPTION

The **RegisterTextBufferScanFunctions** procedure provides the capability to replace the scan functions used by the ForwardScanTextBuffer and BackwardScan-TextBuffer functions. These functions are called as:

```
(*forward)(string, curp, expression);
(*backward)(string, curp, expression);
```

and are responsible for returning either a pointer to the beginning of a match for the expression or NULL.

Calling this procedure with NULL function pointers reinstates the default regular expression facility.

Text Buffer Utilities

NAME

`RegisterTextBufferUpdate`

SYNOPSIS

```
#include<textbuff.h>
   ...
extern void RegisterTextBufferUpdate(text, f, d)
TextBuffer * text;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **`RegisterTextBufferUpdate`** procedure associates the TextUpdateFunction *f* and data pointer *d* with the given TextBuffer *text*. This update function will be called whenever an update operation is performed on the TextBuffer. See ReplaceBlockInTextBuffer for more details.

SEE ALSO

`UnregisterTextBufferUpdate`(3W)
`ReadStringIntoTextBuffer`(3W)
`ReadFileIntoTextBuffer`(3W)

NOTES

Calling this function increments a reference count mechanism used to determine when to actually free the TextBuffer. Calling the function with a NULL value for the function circumvents this mechanism.

Text Buffer Utilities

NAME

`RegisterTextBufferWordDefinition`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern void RegisterTextBufferWordDefinition(word_definition)
int (*word_definition)();
```

DESCRIPTION

The **RegisterTextBufferWordDefinition** procedure provides the capability to replace the word definition function used by the TextBuffer Utilities. This function is called as:

```
        (*word_definition)(c);
```

The function is responsible for returning non-zero if the character c is considered a character that can occur in a word and zero otherwise.

Calling this function with NULL reinstates the default word definition which allows the following set of characters: a-zA-Z0-9_

Text Buffer Utilities

NAME

`ReplaceBlockInTextBuffer`

SYNOPSIS

```
#include <textbuff.h>
  ...
extern EditResult ReplaceBlockInTextBuffer(text, startloc, endloc,
       string, f, d)
TextBuffer * text;
TextLocation * startloc;
TextLocation * endloc;
char * string;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **ReplaceBlockInTextBuffer** function is used to update the contents of the TextBuffer associated with *text*. The characters stored between **startloc** and **endloc** are deleted and the *string* is inserted after **startloc**. If the edit succeeds the TextUpdateFunction *f* is called with the parameters: *d, text,* and 1; then any other **different** update functions associated with the TextBuffer are called with their associated data pointer, *text,* and 0.

This function records the operation performed in TextUndoItem structures. The contents of these structures can be used to implement an undo function. The contents can also be used to determine the type of operation performed. A structure is allocated for both the delete and insert information.

The hints provided in these structures is the inclusive or of:

TEXT_BUFFER_NOP
TEXT_BUFFER_INSERT_LINE
TEXT_BUFFER_INSERT_SPLIT_LINE
TEXT_BUFFER_INSERT_CHARS
TEXT_BUFFER_DELETE_START_LINE
TEXT_BUFFER_DELETE_END_LINE
TEXT_BUFFER_DELETE_START_CHARS
TEXT_BUFFER_DELETE_END_CHARS
TEXT_BUFFER_DELETE_JOIN_LINE
TEXT_BUFFER_DELETE_SIMPLE

SEE ALSO

ReplaceCharInTextBuffer(3W)

Text Buffer Utilities

NAME

ReplaceCharInTextBuffer

SYNOPSIS

```
#include <textbuff.h>
   ...
extern EditResult ReplaceCharInTextBuffer(text, location, c, f, d)
TextBuffer *       text;
TextLocation *     location;
int                c;
TextUpdateFunction f;
caddr_t            d;
```

DESCRIPTION

The **ReplaceCharInTextBuffer** function is used to replace the character in the TextBuffer *text* at *location* with the character *c*.

SEE ALSO

ReplaceBlockInTextBuffer(3W)

Text Buffer Utilities

NAME

`SaveTextBuffer`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern SaveResult SaveTextBuffer(text, filename)
TextBuffer * text;
char * filename;
```

DESCRIPTION

The **`SaveTextBuffer`** function is used to write the contents of the *text* TextBuffer to the file *filename*. It returns a SaveResult which can be:

```
SAVE_FAILURE
SAVE_SUCCESS
```

Text Buffer Utilities

NAME

`StartCurrentTextBufferWord`

SYNOPSIS

```
#include <textbuff.h>
   ...
extern TextLocation StartCurrentTextBufferWord(textBuffer, current)
TextBuffer * textBuffer;
TextLocation current;
```

DESCRIPTION

The `StartCurrentTextBufferWord` function is used to locate the beginning of a word in the TextBuffer relative to a given *current* location. The function returns the location of the beginning of the current word.

NOTES

The return value will equal the given current value if the current location is the beginning of a word.

SEE ALSO

`PreviousTextBufferWord`(3W)
`NextTextBufferWord`(3W)

NAME

TextBuffer Macros: **TextBufferUserData**, **TextBufferName**, **TextBuffer-Modified**, **TextBufferEmpty**, **TextBufferNamed**, **LinesInTextBuffer**, **Last-TextBufferLine**, **LastCharacterInTextBufferLine**, **LengthOfTextBuffer-Line**, **SameTextLocation**

SYNOPSIS

```
# include <textbuff.h>

TextBufferUserData(text,line)
TextBufferName(text)
TextBufferModified(text)
TextBufferEmpty(text)
TextBufferNamed(text)
LinesInTextBuffer(text)
LastTextBufferLine(text)
LastCharacterInTextBufferLine(text, line)
LengthOfTextBufferLine(text, line)
SameTextLocation(x,y)
```

DESCRIPTION

These macros are provided for use with the Text Buffer Utilities.

TextBufferUserData	used to access the per-line user data.
TextBufferName	returns the filename associated with *text*.
TextBufferModified	returns a flag indicating whether *text* has been modified since last saved.
TextBufferEmpty	returns a flag indicating whether *text* is empty.
TextBufferNamed	returns a flag indicating whether *text* is associated with a filename.
LinesInTextBuffer	returns the number of lines in *text*.
LastTextBufferLine	returns the line number of the last line in *text*.
LastCharacterInTextBufferLine	returns the offset of the last character in *text* on *line*.
LengthOfTextBufferLine	returns the length of *line* in *text*.
SameTextLocation	returns a flag indicating whether location *x* and *y* are the same.

Text Buffer Utilities

NAME

`UnregisterTextBufferUpdate`

SYNOPSIS

```
#include<textbuff.h>
   ...
extern int UnregisterTextBufferUpdate(text, f, d)
TextBuffer * text;
TextUpdateFunction f;
caddr_t d;
```

DESCRIPTION

The **`UnregisterTextBufferUpdate`** function disassociates the TextUpdateFunction *f* and data pointer *d* with the given TextBuffer *text*. If the function/data pointer pair is not associated with the given TextBuffer zero is returned otherwise the association is dissolved and one is returned.

SEE ALSO

`RegisterTextBufferUpdate`(3W)
`FreeTextBuffer`(3W)

Text Buffer Utilities

NAME

strclose

SYNOPSIS

```
#include <buffutil.h>
   ...
extern void strclose(sp)
Buffer * sp;
```

DESCRIPTION

The **strclose** procedure is used to close a string Buffer which was opened using the **stropen** function.

SEE ALSO

stropen(3W)
strgetc(3W)

Regular Expression Utilities

NAME

`streexp`

SYNOPSIS

```
#include <regexp.h>
 ...
extern char * streexp()
```

DESCRIPTION

The **streexp** function is used to retrieve the pointer of the last character in a match found following a strexp/strrexp function call.

SEE ALSO

strexp(3W)
strrexp(3W)

Regular Expression Utilities

NAME

strexp

SYNOPSIS

```
#include <expcmp.h>
 ...
extern char * strexp(string, curp, expression)
char * string;
char * curp;
char * expression;
```

DESCRIPTION

The **strexp** function is used to perform a regular expression forward scan of *string* for *expression* starting at *curp.*

THE REGULAR EXPRESSION LANGUAGE USED IS

```
         c - match c
   [<set>] - match any character in <set>
  [!<set>] - match any character not in <set>
         * - match any character(s)
         ^ - match must start at curp
```

RETURN VALUE

NULL is returned if expression cannot be found in string; otherwise a pointer to the first character in the substring which matches expression is returned. The function **streexp**(3W) can be used to get the pointer to the last character in the match.

SEE ALSO

strrexp(3W)
streexp(3W)

Text Buffer Utilities

NAME

`strgetc`

SYNOPSIS

```
#include <buffutil.h>
   ...
extern int strgetc(sp)
Buffer * sp;
```

DESCRIPTION

The **strgetc** function is used to read the next character stored in the string *buffer*. The function returns the next character in the Buffer. When no characters remain the routine returns EOF.

SEE ALSO

stropen(3W)
strclose(3W)

Text Buffer Utilities

NAME

stropen

SYNOPSIS

```
#include <buffutil.h>
   ...
extern Buffer * stropen(string)
char * string;
```

DESCRIPTION

The **stropen** function copies the *string* into a newly allocated Buffer. This string buffer can be *read* using the **strgetc** function and *closed* using the **strclose** procedure. The **strclose** function frees the buffer allocated by **stropen**.

SEE ALSO

strclose(3W)
strgetc(3W)

Regular Expression Utilities

NAME

strrexp

SYNOPSIS

```
#include <expcmp.h>
 ...
extern char * strrexp(string, curp, expression)
char * string;
char * curp;
char * expression;
```

DESCRIPTION

The **strrexp** function is used to perform a regular expression backward scan of *string* for *expression* starting at *curp*.

THE REGULAR EXPRESSION LANGUAGE USED IS

```
       c - match c
  [<set>] - match any character in <set>
 [!<set>] - match any character not in <set>
       * - match any character(s)
       ^ - match must start at curp
```

RETURN VALUE

NULL is returned if expression cannot be found in string; otherwise a pointer to the first character in the substring which matches expression is returned. The function **streexp** can be used to get the pointer to the last character in the match.

SEE ALSO

strexp(3W)
streexp(3W)

NAME

OlActivateWidget, **OlAssociateWidget**, **OlUnassociateWidget** – three routines for activating widget based on widget type

SYNOPSIS

```
#include <OpenLook.h>

Boolean OlActivateWidget(widget, activation_type, data)
     Widget          widget;
     OlVirtualName   activation_type;
     XtPointer       data;

Boolean OlAssociateWidget(leader, follower, disable_traversal)
     Widget          leader;
     Widget          follower;
     Boolean         disable_traversal;

void OlUnassociateWidget(follower)
    Widget        follower;
```

DESCRIPTION

OlActivateWidget programmatically activates a widget using the specified type. (See the widget manual pages for valid activation types.) The function returns TRUE if the activation type was accepted by the supplied widget or one of its associated followers; otherwise, FALSE is returned. When activating a widget, if the initially-supplied widget does not accept the activation request, **OlActivateWidget** recursively attempts to activate all **associated** follower widgets until one of them accepts the activation type.

OlAssociateWidget associates a widget (the *follower*) with another widget (the *leader*). Associating a widget with a lead widget effectively expands the number of ways the lead widget can be activated since **OlActivateWidget** automatically activates any *follower* widgets if the lead widget does not accept the supplied activation type. This routine returns TRUE if the association was successful; otherwise FALSE is returned. Attempts to create an association-cycle is illegal and produces a warning. It's typically desirable to prevent keyboard traversal into widgets which are associated with other widgets. The *disable_traversal* parameter is a convenient interface to setting the *follower* widget's **XtNtraversalOn** resource to FALSE.

OlUnassociateWidget removes a *follower* widget from a previous association with another lead widget. No warning is generated if the supplied widget was not previously associated with another widget.

NOTES

The above routines accept gadget arguments also.

C Manual Pages: Widgets

Introduction to the Widgets

The List of Widget Manual Pages

The following is a list of all widgets available to the application programmer.

Action Widgets	`OblongButton`
	`RectButton`
	`CheckBox`
	`MenuButton (was: ButtonStack)`
	`AbbrevMenuButton (was: AbbrevStack)`
	`Slider`
	`Gauge`
	`Scrollbar`
	`Stub`

Text Control Widgets	`StaticText`
	`TextEdit`
	`TextField`

Manager Widgets	`BulletinBoard`
	`ControlArea`
	`Form`
	`FooterPanel`

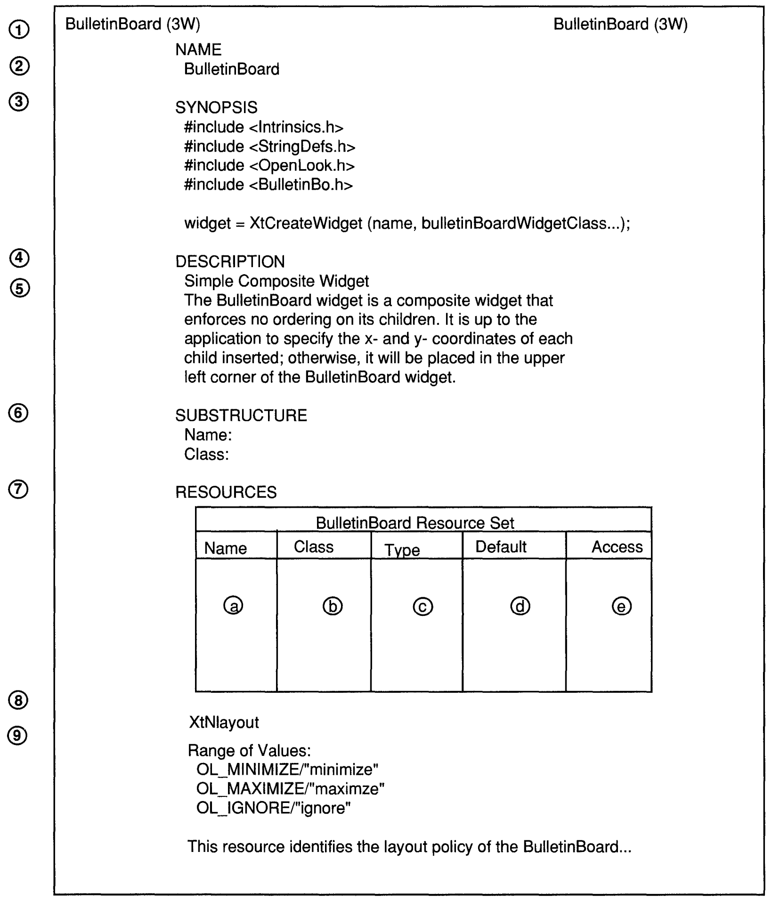
Container Widgets	`Caption`
	`Exclusives`
	`Nonexclusives`
	`FlatCheckbox`
	`FlatExclusives`
	`FlatNonExlusives`
	`ScrolledWindow`
	`ScrollingList`

Popup Choices	`Notice`
	`PopupWindow`
	`Menu`

Sample Widget Manual Page

This section contains the widget manual pages in alphabetical order. The format of the page is described below.

Figure C-1: Sample Manual Page Format



① BulletinBoard (3W) BulletinBoard (3W)

NAME

② BulletinBoard

③ SYNOPSIS

```
#include <Intrinsics.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <BulletinBo.h>

widget = XtCreateWidget (name, bulletinBoardWidgetClass...);
```

④ DESCRIPTION

⑤ Simple Composite Widget

The BulletinBoard widget is a composite widget that enforces no ordering on its children. It is up to the application to specify the x- and y- coordinates of each child inserted; otherwise, it will be placed in the upper left corner of the BulletinBoard widget.

⑥ SUBSTRUCTURE

Name:

Class:

⑦ RESOURCES

BulletinBoard Resource Set				
Name	Class	Type	Default	Access
ⓐ	ⓑ	ⓒ	ⓓ	ⓔ

⑧ XtNlayout

⑨ Range of Values:

OL_MINIMIZE/"minimize"

OL_MAXIMIZE/"maximze"

OL_IGNORE/"ignore"

This resource identifies the layout policy of the BulletinBoard...

The numbers in circles refer to the following notes:

1. The top of the first page for each widget page gives the widget name on both the top left and top right of the page, followed by a "3W" in parentheses. (3W is the numbering convention assigned to all OPEN LOOK programming manual pages.)
2. The NAME for the widget is given here. The various ways of referring to the widget, including the name of the C header file, are based on this root name.
3. A synopsis is given that shows, briefly, how to create an instance of the widget.
4. All widgets have a description.
5. The description is typically broken up into minor features, each starting with a separate heading.
6. If the widget is automatically built up of additional widgets, a description of the application and end-user interface to this substructure is given.
7. A complete list of resources available for the widget is given in alphabetical order. The resources are not broken up into their class groupings, to avoid suggesting a particular implementation of the class hierarchy. (Of course, some of the hierarchy is built into the "X Toolkit Intrinsics.") Many of the resources listed in these tables are part of the superclasses of which all widgets are subclasses; the general resources are described in Section 2 General Resources.

NOTE Do not use a General resource for a widget if the resource is not listed for that particular widget.

The table lists five attributes for each resource:

1. the resource name;
2. the class to which the resource belongs;
3. the type of values handled by the resource;

4. the default value given to the resource by the widget if the application does not set a value or sets an illegal value;
5. the access to the base window allowed:

I	the value can be set at initialization time;
S	the value can be set with a call to **XtSetValues**;
G	the value can be read with a call to **XtGetValues**;
*	the value is set in other ways - see the description of the resource for information;
†	the access is conditional - see the description of the resource for information.

As defined in the "X Toolkit Intrinsics," each resource is referred to in resource files by stripping off the **XtN** prefix from the name for direct reference or the **XtC** prefix from the class name for reference by class.

8. The resources that are unique to a widget are described after the list of resources.
9. The range of values that each resource can take are listed immediately after the resource name, if the resource can be set or initialized by an application. Exceptions are resources that take pointer values: the pointer cannot be validated, so no range is given.

   The values are listed using C language bindings (for example, a variable or macro name like **OL_LEFT**). If the resource file bindings differ, they follow the C bindings, separated with a slash and enclosed in double quotes (for example, **OL_LEFT/"left"**).

Widgets

Widget Naming Conventions

The following guidelines provide a vehicle by which programmers can create new widgets and organize a collection of widgets into an application. To ensure that applications need not deal with as many styles of capitalization and spelling as the number of widget classes it uses, the following guidelines should be followed when writing new widgets:

- Use the X naming conventions that are applicable. For example, a record component name is all lowercase and uses underscores (_) for compound words (for example, background_pixmap). Type and procedure names start with uppercase and use capitalization for compound words (for example, **ArgList** or **XtSetValues**).
- A resource name string is spelled identically to the field name except that compound names use capitalization rather than underscore. To let the compiler catch spelling errors, each resource name should have a macro definition prefixed with **XtN**. For example, the background_pixmap field has the corresponding resource name identifier **XtNbackgroundPixmap,** which is defined as the string "**backgroundPixmap**". Many predefined names are listed in **X11/StringDefs.h**. Before you invent a new name, you should make sure that your proposed name is not already defined or that there is not already a name that you can use.
- A resource class string starts with a capital letter and uses capitalization for compound names (for example,"**BorderWidth**"). Each resource class string should have a macro definition prefixed with **XtC** (for example, **XtCBorderWidth**).
- A resource representation string is spelled identically to the type name (for example, "**TranslationTable**"). Each representation string should have a macro definition prefixed with **XtR** (for example, **XtRTranslationTable**).
- New widget classes start with a capital and use uppercase for compound words. Given a new class name *AbcXyz* you should derive several names:
  - Partial widget instance structure name *AbcXyzPart*
  - Complete widget instance structure names *AbcXyzRec* and *_AbcXyzRec*

- Widget instance pointer type name *AbcXyzWidget*
- Partial class structure name *AbcXyzClassPart*
- Complete class structure names *AbcXyzClassRec* and *_AbcXyzClassRec*
- Class structure variable *abcXyzClassRec*
- Class pointer variable *abcXyzWidgetClass*

■ Action procedures available to translation specifications should follow the same naming conventions as procedures. That is, they start with a capital letter and compound names use uppercase (for example, "Highlight" and "NotifyClient").

NAME

AbbrevMenuButton – a widget that creates a button with a menu mark and menu allowing the user to select items from the menu

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <AbbrevMenu.h>

static Widget stack, menupane, w;

Arg args[1];

stack = XtCreateWidget(name, abbrevMenuButtonWidgetClass, ...);
XtSetArg(args[0], XtNmenuPane, &menupane);
XtGetValues(stack, args, 1);

w = XtCreateWidget(name, widget-class, menupane, ...);
```

DESCRIPTION

The **AbbrevMenuButton** widget provides the end user the same features as the **MenuButton** widget (menu default selection, menu previewing, menu selection), plus current selection viewing, and the ability to add a new selection by typing in its name.

AbbreviatedMenubutton Components

Each abbreviated menu button has a menu. An application typically identifies an additional component, the Current Selection Widget, where previewing of the default menu choice can be done.

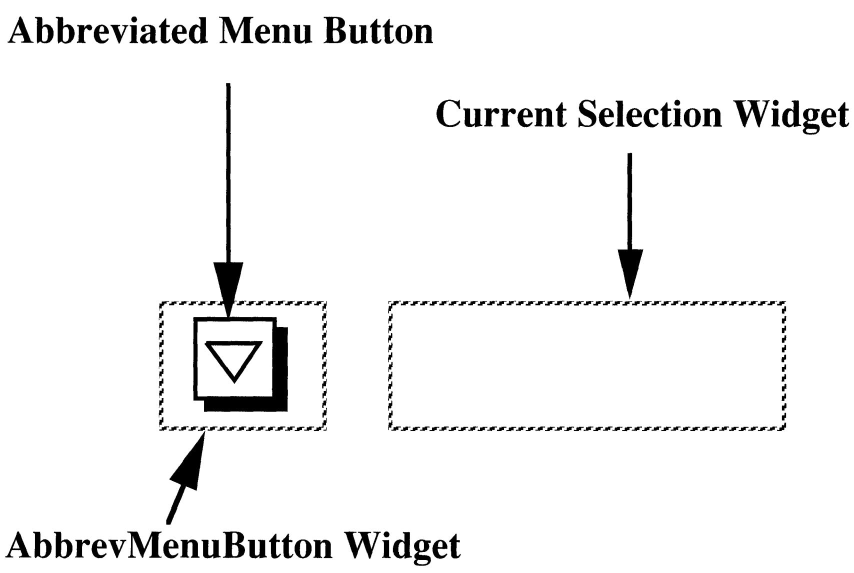


Figure 1. Abbreviated Menu Button

Each abbreviated menu button also has the components of a `Menu` widget. These are not shown in Figure 1.

AbbreviatedMenuButton Sensitive Area

While on the Abbreviated Menu Button and the power-user option is on:

- Pressing SELECT previews the default menu item (if a preview widget exists), and releasing it will activate the default menu item.
- Clicking SELECT briefly previews the default menu item (if a preview widget exists) and then activates the default menu item.
- Pressing MENU brings up a pop-up menu.
- Clicking MENU produces a stayup menu.

If the power-user option is off:

- Pressing SELECT or MENU brings up a pop-up menu.
- Clicking SELECT or MENU produces a stayup menu.

(The power-user option is set in the Miscellaneous property sheet of the Workspace Manager. See the *OPEN LOOK™ GUI User's Guide* for more information on setting this option.)

All Features of Menu Button Widget

The **AbbrevMenuButton** widget includes all the features of the **MenuButton** widget, except for the previewing (done instead in the Current Selection Widget) and the behavior in a menu (the **AbbrevMenuButton** widget cannot be used in a menu). The features of the **MenuButton** widget apply here.

Current Selection Widget

The Current Selection Widget is created by the application. Typically, the Current Selection Widget and the **AbbrevMenuButton** widget are placed together in a composite widget that manages their side-by-side placement. The **Abbrev-MenuButton** widget uses the Current Selection Widget only for previewing the default item in the menu. The application is responsible for using it to implement the OPEN LOOK user interface needs of showing the current menu selection and acquiring a new item to add to the menu, as appropriate.

AbbreviatedMenuButton Coloration

On a monochrome display, the **AbbrevMenuButton** widget indicates that it has input focus by inverting the foreground and background colors of the control.

On color displays, when the **AbbrevMenuButton** widget receives the input focus, the background color is changed to the input focus color set in the **XtNinput-FocusColor** resource.

EXCEPTIONS:

— If the input focus color is the same as the Input Window Header Color and the active control is in the window header, then invert the colors.

— If the input focus color is the same as the window background color, then the **AbbrevMenuButton** widget inverts the foreground and background colors when it has input focus.

Figure 2 illustrates the resources that affect the coloration of the **AbbrevMenuBut-ton** widget.

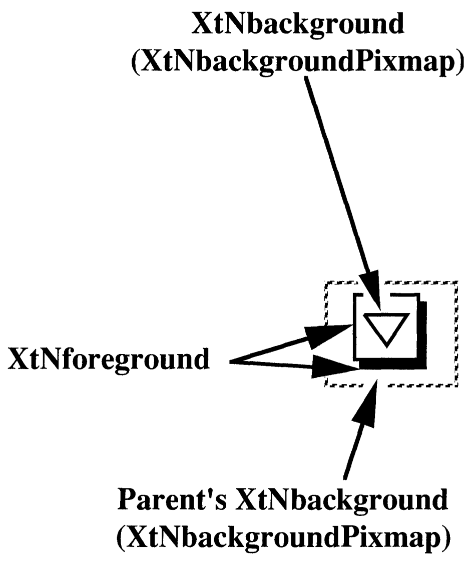


Figure 2. Abbreviated Menu Button Coloration

Keyboard Traversal

The default value of the **XtNtraversalOn** resource is True.

The action of the SELECTKEY depends on whether the user has selected the power-user option. (The power-user option is set in the property sheet of the Workspace Manager. See the **GUI User's Guide** for more information on setting this option.) While on the **AbbrevMenuButton** and the power-user option is on, clicking the SELECTKEY activates the default menu item. If the power-user option is off, pressing the SELECTKEY posts the stayup menu.

The **AbbrevMenuButton** does not control the keyboard traversal between the **AbbrevMenuButton** widget and the Current Selection widget. The Current Selection widget's traversal resources can be set up to allow for traversal between it and the **AbbrevMenuButton**, but it is recommended that the **XtNtraversalOn** resource on the Current Selection widget be False. Normal menu traversal can always be used to access the Current Selection widget.

Keyboard traversal within a Menu is done using the PREV_FIELD, NEXT_FIELD, MOVEUP, MOVEDOWN, MOVELEFT and MOVERIGHT keys. The PREV_FIELD, MOVEUP, and MOVELEFT keys move the input focus to the previous Menu item with keyboard traversal enabled. If the menu is not pinned, the MOVELEFT key will dismiss the menu. If the input focus is on the first item of the Menu, then pressing one of these keys will wrap to the last item of the Menu with keyboard traversal enabled. The NEXT_FIELD, MOVEDOWN, and MOVERIGHT keys move the input focus to the next Menu item with keyboard traversal enabled. If the input focus is on the last item of the Menu, then pressing one of these keys will wrap to the first item of the Menu with keyboard traversal enabled. If input focus is on a MenuButton within a Menu, pressing the MENUKEY will post the cascading Menu associated with the MenuButton, and input focus will be on the first Menu item with traversal enabled.

To traverse out of the menu, the following keys can be used:

— CANCEL dismisses the menu and returns focus to the AbbrevMenuButton

— NEXTWINDOW moves to the next window in the application

— PREVWINDOW moves to the previous window in the application

— NEXTAPP moves to the first window in the next application

— PREVAPP moves to the first window in the previous application

The DEFAULTACTION key will activate the default control in the **AbbrevMenuButton** widget as if the user clicked the SELECT button on the control.

The MENUDEFAULTKEY can be used by the user to change the default control in the **AbbrevMenuButton** widget. When the user presses the MENUDEFAULTKEY, the control which has input focus will become the default control.

Abbreviated MenuButton Activation Types	
Activation Type	Expected Results
OL_SELECTKEY	See discussion below
OL_MENUKEY	Popup the **AbbrevMenuButton**'s submenu

Display of Keyboard Mnemonic

The **AbbrevMenuButton** does not display the mnemonic accelerator. If the **AbbrevMenuButton** is the child of a **Caption** widget, the **Caption** widget can be used to display the mnemonic.

SUBSTRUCTURE

Application Resources				
Name	Class	Type	Default	Access
*XtNcenter	XtCCenter	Boolean	TRUE	I
*XtNhPad	XtCHPad	Dimension	4	I
*XtNhSpace	XtCHSpace	Dimension	4	I
*XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	I
*XtNmeasure	XtCMeasure	int	1	I
XtNpushpin	XtCPushpin	OlDefine	OL_NONE	I
XtNpushpinDefault	XtCPushpinDefault	Boolean	FALSE	I
*XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	I
XtNtitle	XtCTitle	String	(widget's name)	I
*XtNvPad	XtCVPad	Dimension	4	I
*XtNvSpace	XtCVSpace	Dimension	4	I

* See the **Menu** and **ControlArea** widgets for more information on these resources.

RESOURCES

AbbrevMenuButton Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmenuPane	XtCMenuPane	Widget	(none)	G
XtNpreviewWidget	XtCPreviewWidget	Widget	NULL	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNforeground

This resource defines the foreground color for the widget.

See the note about the interaction of this resource with other color resources under the description of the **XtNbackground** resource in Core Resources, "Manual Pages: Introduction", Appendix A.

XtNmenuPane

This is the widget where menu items can be attached; its value is available once the **AbbrevMenuButton** widget has been created.

XtNpreviewWidget

Range of Values:
(ID of existing widget)

This resource identifies the Current Selection Widget that the **AbbrevMenuButton** can use for previewing the Default Item.

When the end user presses SELECT over the **AbbrevMenuButton** widget, the **AbbrevMenuButton** widget uses the location and size of the Current Selection Widget to display the label of the Default Item. The preview is constrained to be within the height and width of the Current Selection Widget.

If the Current Selection Widget is not defined or is not mapped, previewing does not take place.

NOTE:

The previewing feature is not accessible with keyboard only operation.

SEE ALSO

MenuShell ''Programmatic Menu Popup and Popdown''

NAME

BulletinBoard – a simple manager widget

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <BulletinBo.h>
#include <.h>

widget = XtCreateWidget(name, bulletinBoardWidgetClass, ...);
```

DESCRIPTION

Simple Composite Widget

The **BulletinBoard** widget is a composite widget that enforces no ordering on its children. It is up to the application to specify the x- and y-coordinates of each child inserted; otherwise, it will be placed in the upper left corner of the **BulletinBoard** widget.

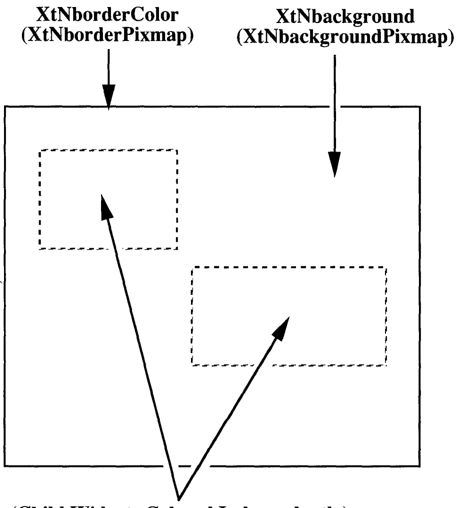
No Children

The **BulletinBoard** can be mapped with no children. It displays an empty space, possibly surrounded by a border.

BulletinBoard Coloration

Figure 1 illustrates the resources that affect the coloration of the **BulletinBoard** widget.

Figure 1. Bulletin Board Coloration



(Child Widgets Colored Independently)

Keyboard Traversal

The **BulletinBoard** widget is a composite widget and cannot be accessed via keyboard traversal. Input focus moves between the Primitive children of this widget.

RESOURCES

BulletinBoard Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNlayout	XtCLayout	OlDefine	OL_MINIMIZE	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*

BulletinBoard Resource Set (cont'd)				
Name	**Class**	**Type**	**Default**	**Access**
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNlayout

Range of Values:

OL_MINIMIZE/"minimize"
OL_MAXIMIZE/"maximize"
OL_IGNORE/"ignore"

This resource identifies the layout policy the **BulletinBoard** widget is to follow:

OL_MINIMIZE
The **BulletinBoard** widget will always be just large enough to contain all its children, regardless of any provided width and height values. Thus the **BulletinBoard** widget will grow and shrink depending on the size needs of its children.

OL_IGNORE
The **BulletinBoard** widget will honor its own width and height; it will not grow or shrink in response to the addition, deletion, or altering of its children.

OL_MAXIMIZE
The **BulletinBoard** widget will ask for additional space when it needs it for new or altered children, but will not give up extra space.

NAME

`Caption` – creates a caption or label for any widget

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Caption.h>

widget = XtCreateWidget(name, captionWidgetClass, ...);
```

DESCRIPTION

Caption Components

The `Caption` composite widget provides a convenient way to label an arbitrary widget. It has only two parts: the Label and the Child Widget.

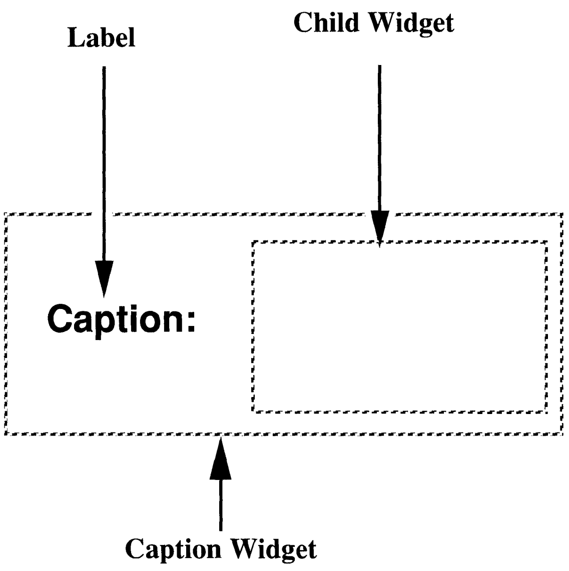


Figure 1. Caption Widget

Layout Control

The application can determine how the Label is placed next to the Child Widget (by specifying that it goes above, below, to the left, or to the right), and by specifying how far away the Label is to be placed.

Child Constraints

The `Caption` composite allows at most one child; attempts to add more than one are refused with a warning. If the `Caption` widget is mapped without a Child Widget, or if the Child Widget is not managed, only the Label is shown.

Caption Coloration

Figure 2 illustrates the resources that affect the coloration of the **Caption** widget.

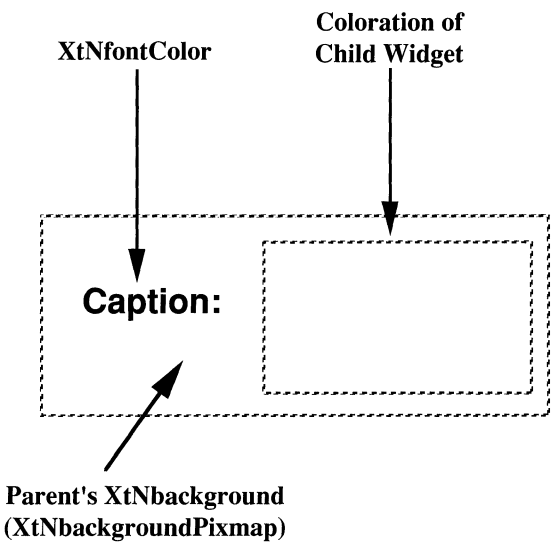

XtNfontColor
Coloration of Child Widget
Caption:
Parent's XtNbackground (XtNbackgroundPixmap)

Figure 2. Caption Coloration

Keyboard Traversal

The **Caption** is a special Manager widget that can be used to display the mnemonic for its single child. However, the label used as a caption to the child is not accessible via keyboard traversal. The Caption has the **XtNmnemonic** resources which should be set to the child widget's corresponding values. The return of the **OlQueryMnemonicDisplay()** on the Caption is used to determine if the Caption should display the mnemonic for the child.

The action of a mnemonic on a Caption widget is used for traversal only since clicking the SELECT button on a caption does not have an affect.

Display of Keyboard Mnemonic

The **Caption** widget displays the mnemonic for its child as part of its label. If the mnemonic character is in the label, then that character is highlighted according to the value of the application resource **XtNshowMneumonics()**. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource **XtNshowMneumonics()**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **Caption** widget displays the keyboard accelerator for its child as part of its label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

RESOURCES

Caption Resource Set

Name	Class	Type	Default	Access
XtNalignment	XtCAlignment	OlDefine	OL_CENTER	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNfontGroup	XtCFontGroup	OlFontList	NULL	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNlabel	XtCLabel	String	NULL	SGI
XtNmnemonic	XtCMnemonic	unsigned char	\0	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNposition	XtCPosition	OlDefine	OL_LEFT	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNspace	XtCSpace	Dimension	4	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNalignment

Range of Values:

If **XtNposition** is **OL_LEFT** or **OL_RIGHT**:

OL_TOP/"top"
OL_CENTER/"center"
OL_BOTTOM/"bottom"

If **XtNposition** is **OL_TOP** or **OL_BOTTOM**:

OL_LEFT/"left"
OL_CENTER/"center"
OL_RIGHT/"right"

This specifies how the Label is to be aligned relative to the Child Widget, as described below:

`OL_LEFT`	The left edge of the Label is aligned with the left edge of the Child Widget.
`OL_TOP`	The top edge of the Label is aligned with the top edge of the Child Widget.
`OL_CENTER`	The center of the Label is aligned with the center of the Child Widget.
`OL_RIGHT`	The right edge of the Label is aligned with the right edge of the Child Widget.
`OL_BOTTOM`	The bottom edge of the Label is aligned with the bottom edge of the Child Widget.

XtNlabel

This resource gives the string to use for the Label. If NULL, the size of the **Caption** widget will be identical to the size of the child widget.

Note that the Label is displayed as given; no punctuation (such as a colon) is added.

Control characters (other than spaces) are ignored without warning. For example, embedded newlines do not cause line breaks.

XtNposition

Range of Values:

```
OL_LEFT/"left"
OL_RIGHT/"right"
OL_TOP/"top"
OL_BOTTOM/"bottom"
```

This resource determines on which side of the Child Widget the Label is to be placed. The value may be one of **OL_LEFT**, **OL_RIGHT**, **OL_TOP**, or **OL_BOTTOM** to indicate that the Label is to be placed to the left, to the right, above, or below the Child Widget, respectively.

XtNspace

Range of Values:

$0 \le$ **XtNspace**

This resource gives the separation of the Label from the child widget, in pixels, as suggested by Figure 3.

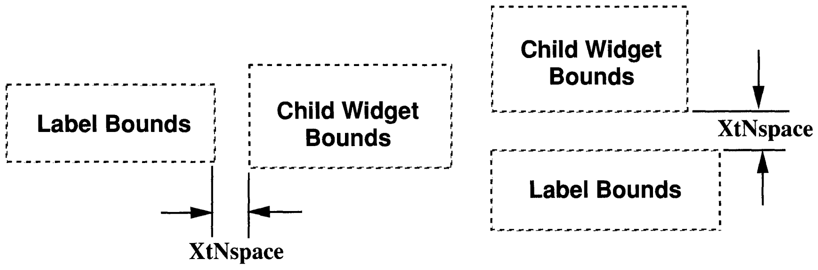


Figure 3. Label and Child Widget Spacing

NAME

CheckBox – creates a label button with a check box to act as a toggle switch

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <CheckBox.h>

widget = XtCreateWidget(name, checkBoxWidgetClass, ...);
```

DESCRIPTION

CheckBox Components

The **CheckBox** widget implements one of the OPEN LOOK button widgets. It consists of a Label next to a Check Box; the Check Box will have a Check Mark, if selected.

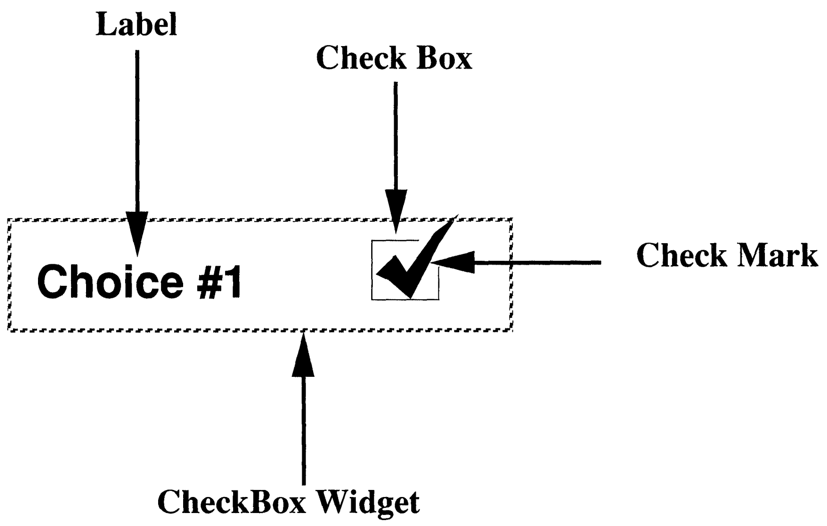


Figure 1. CheckBox Widget

Figure 2 shows several buttons, in unselected and selected, as well as normal and dim states.

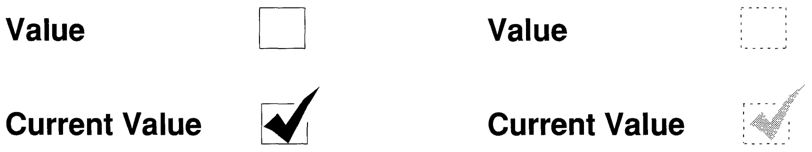


Figure 2. CheckBoxes

Typical Use of Check Boxes

Check Boxes may be used alone, but are usually used in the **Nonexclusives** composite widget, where they are used to implement a several-of-many selection. Making the **CheckBox** widget a child of a different composite widget will not produce an error, but proper layout is not guaranteed.

Operating on Check Boxes

A **CheckBox** widget has two states: "set" and "not set". When set, the Check Mark is visible. Toggling this state alternates a resource (**XtNset**) between "true" and "false" and starts an action associated with the check box. Clicking SELECT on a check box *toggles* the state associated with it. Pressing SELECT, or moving the pointer into the check box while SELECT is pressed, adds or removes the Check Mark to reflect the state the check box would be in if SELECT was released. Releasing SELECT toggles the state. Moving the pointer off the check box before releasing SELECT restores the original CheckBox, but does not toggle the state. Clicking or pressing MENU does not do anything in the **CheckBox** widget; the event is passed up to an ancestor widget.

Bounds on SELECT

Only the CheckBox box and Check Mark respond to SELECT, as shown in Figure 3.

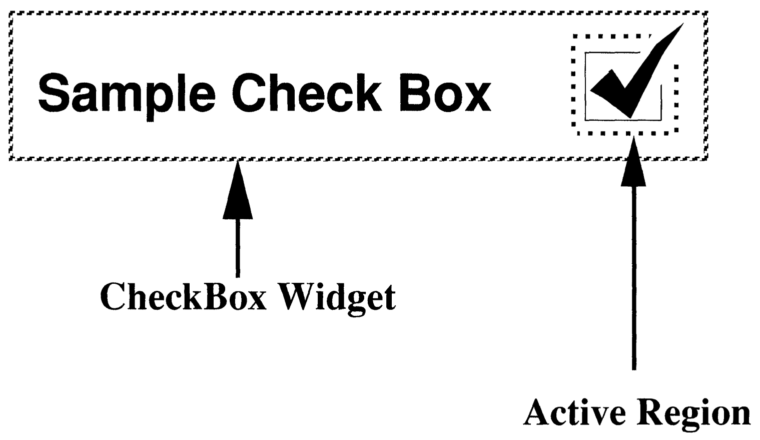


Figure 3. Active Region for a CheckBox

CheckBox Coloration

On a monochrome display, the CheckBox widget indicates that it has input focus by inverting the foreground color and parent's background colors within the bounding box of the widget.

On color displays, when the CheckBox widget receives the input focus, the background color within the bounding box of the widget is changed to the input focus color set in the **XtNinputFocusColor** resource. When the CheckBox widget loses the input focus, the background color reverts to its parent's **XtNbackground** color or **XtNbackgroundPixmap**.

EXCEPTIONS:

— If the input focus color is the same as the parent's background color, then the CheckBox widget inverts the foreground and background colors when it has input focus.

— If the input focus color is the same as the font color or foreground color, then the CheckBox widget inverts the foreground and background colors when it has input focus.

Figure 4 illustrates the resources that affect the coloration of the **CheckBox** widget.

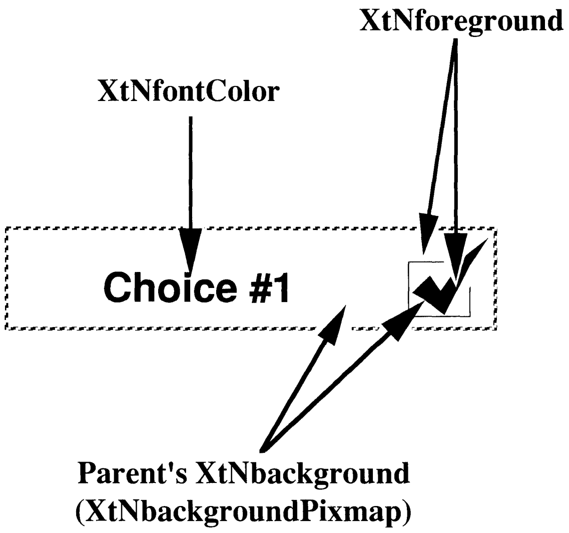


Figure 4. CheckBox Coloration

Keyboard Traversal

The default value of the **XtNtraversalOn** resource is TRUE.

The CheckBox widget responds to the following keyboard navigation keys:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
MOVEUP	moves to the CheckBox above the current widget in the Nonexclusives composite
MOVEDOWN	moves to the CheckBox below the current widget in the Nonexclusives composite
MOVELEFT	moves to the CheckBox to the left of the current widget in the Nonexclusives composite
MOVERIGHT	moves to the CheckBox to the right of the current widget in the Nonexclusives composite
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application

NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application

CheckBox Widget Activation Types

Activation Type	Expected Results
OL_SELECTKEY	Update its visual to reflect the new state and call the appropriate callback list

Display of Keyboard Mnemonic

The **CheckBox** widget displays the mnemonic accelerator as part of its label. If the mnemonic character is in the label, then that character is highlighted according to the value returned by OlQueryMnemonicDisplay(). If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value returned by OlQueryMnemonicDisplay().

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **CheckBox** widget displays the keyboard accelerator as part of its label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

RESOURCES

CheckBox Resource Set

Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNdim	XtCDim	Boolean	FALSE	SGI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNfontGroup	XtCFontGroup	OlFontList	NULL	SGI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNlabel	XtCLabel	String	(class name)	SGI
XtNlabelImage	XtCLabelImage	XImage *	(class name)	SGI
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI
XtNlabelTile	XtCLabelTile	Boolean	FALSE	SGI

CheckBox Resource Set				
Name	Class	Type	Default	Access
XtNlabelType	XtCLabelType	int	OL_STRING	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI
XtNposition	XtCPosition	OlDefine	OL_LEFT	SGI
XtNrecomputeSize	XtCRecomputeSize	Boolean	TRUE	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNselect	XtCCallback	XtCallbackList	NULL	SI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNset	XtCSet	Boolean	TRUE	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNunselect	XtCCallback	XtCallbackList	NULL	SI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNdim

Range of Values:

TRUE
FALSE

If this resource is TRUE, the check box border is dimmed to show that the check box represents the state of one or more of several objects that, as a group, are in different states.

XtNlabel

This resource is a pointer to the text for the Label. This resource is ignored if the **XtNlabelType** resource has the value **OL_IMAGE**.

XtNlabelImage

This resource is a pointer to the image for the Label of the **CheckBox** widget. This resource is ignored unless the **XtNlabelType** resource has the value **OL_IMAGE**.

If the image is smaller than the space available for it next to the Check Box, it is centered vertically and either centered or left-justified horizontally depending on the value of the **XtNlabelJustify** resource. If the image is larger than the space available for it, it is clipped so that it does not stray outside the space.

XtNlabelJustify

Range of Values:

OL_LEFT/"left"
OL_RIGHT/"right"

This resource dictates whether the Label should be left- or right-justified within the space left before or after the Check Box, if the **XtNwidth** resource gives more space than needed.

XtNlabelTile

Range of Values:

> **TRUE**
> **FALSE**

This resource augments the **XtNlabelImage/XtNlabelPixmap** resource to allow tiling of the sub-object's background. For an image/pixmap that is smaller than the sub-object's background, the label area is tiled with the image/pixmap to fill the sub-object's background if this resource is TRUE; otherwise, the label is placed as described by the **XtNlabelImage** resource.

The **XtNlabelTile** resource is ignored for text labels.

XtNlabelType

Range of Values:

> **OL_STRING/"string"**
> **OL_IMAGE/"image"**

This resource identifies the form that the Label takes. It can have the value **OL_STRING** or **OL_IMAGE** for text or image, respectively.

XtNposition

Range of Values:

> **OL_LEFT/"left"**
> **OL_RIGHT/"right"**

This resource determines on which side of the Check Box the Label is to be placed. The value may be one of **OL_LEFT** or **OL_RIGHT** to indicate that the Label is to be placed to the left or to the right of the Check Box, respectively.

XtNrecomputeSize

Range of Values:

> **TRUE**
> **FALSE**

This resource indicates whether the **CheckBox** widget should calculate its size and automatically set the **XtNheight** and **XtNwidth** resources. If set to TRUE, the **CheckBox** widget will do normal size calculations that may cause its geometry to change. If set to FALSE, the **CheckBox** widget will leave its size alone; this may cause truncation of the visible image being shown by the **CheckBox** widget if the fixed size is too small, or may cause padding if the fixed size is too large. The location of the padding is determined by the **XtNlabelJustify** resource.

XtNselect

This is the list of callbacks invoked when the widget is selected.

XtNset

Range of Values:

> **TRUE**
> **FALSE**

This resource reflects the current state of the check box. The Check Mark is present if **XtNset** is TRUE and is absent otherwise.

XtNunselect

This is the list of callbacks invoked when a **CheckBox** widget is toggled into the "unset" mode by the end user to make **XtNset** be FALSE. Note that simply setting **XtNset** to FALSE with a call to **XtSetValues()** does not issue the **XtNunselect** callbacks.

XtNdim and XtNset Interaction

The **XtNdim** and **XtNset** resources can be set independently, as the state table in Figure 5 shows.

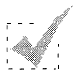
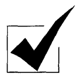
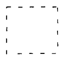
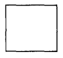
XtNset	XtNdim	Check Box Appearance
TRUE	TRUE	
TRUE	FALSE	
FALSE	TRUE	
FALSE	FALSE	

Figure 5. Check Box Appearance with Set/Default/Dim

Label and Check Box Appearance

The **XtNwidth**, **XtNheight**, **XtNrecomputeSize**, and **XtNlabelJustify** resources interact to produce a truncated, clipped, centered, left-justified, or right-justified

Label and Check Box as shown in Figure 6.

XtNwidth	XtNrecomputeSize	XtNlabelJustify	Result
any value	TRUE	any	Just Fits ✓
> needed for label	FALSE	OL-LEFT	Left Justified ✓
> needed for label	FALSE	OL-RIGHT	Right Justified ✓
< needed for label	FALSE	any	Truncated ◀
XtNheight	**XtNrecomputeSize**	**XtNlabelJustify**	**Result**
any value	TRUE	any	Just Fits ✓
> needed for label	FALSE	any	Centered ✓
< needed for label	FALSE	any	Clipped ✓

Figure 6. Label and Check Box Appearance

When the label is left-justified, right-justified, or centered the extra space is filled with the background color of the `CheckBox` widget's parent, as determined by the `XtNbackground` and `XtNbackgroundPixmap` resources of the parent.

See also the `XtNlabelTile` resource for how it affects the appearance of a label.

NAME

`ControlArea` – manages a number of child widgets in rows or columns

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <ControlAre.h>

widget = XtCreateWidget(name, controlAreaWidgetClass, ...);
```

DESCRIPTION

ControlArea Components

The **ControlArea** widget has zero or more Child Widgets and an optional Border.

Layout Control

The **ControlArea** composite widget arranges its child widgets, presenting them to the end-user as a group of "controls". The application can choose one of four simple layout schemes: Fixed number of columns in the control pane, fixed number of rows, fixed overall width of the control area, and fixed overall height. The application can also specify the inter-control spacing and the size of the margin around the children.

Equal Height Rows

The children in each row align at the top of the row. The distance between the top of one row and the next is the height of the tallest control in the row plus the application specified inter-row spacing.

ControlArea Coloration

Figure 1 illustrates the resources that affect the coloration of the **ControlArea** widget.

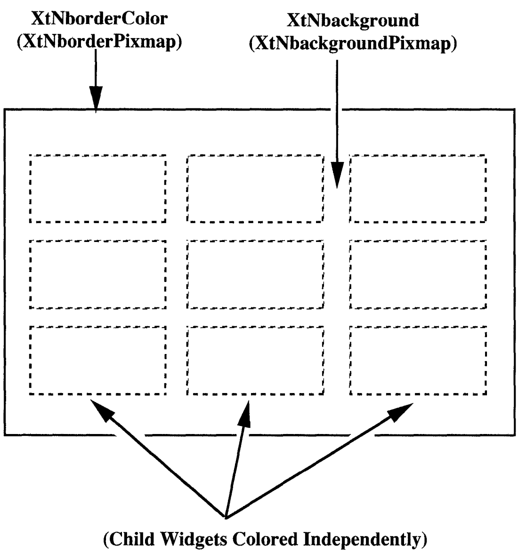


Figure 1. Control Area Coloration

RESOURCES

`ControlArea` Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNalignCaptions	XtCAlignCaptions	Boolean	FALSE	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNcenter	XtCCenter	Boolean	FALSE	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNhPad	XtCHPad	Dimension	4	SGI
XtNhSpace	XtCHSpace	Dimension	4	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmeasure	XtCMeasure	int	1	SGI

ControlArea Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNvPad	XtCVPad	Dimension	4	SGI
XtNvSpace	XtCVSpace	Dimension	4	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNalignCaptions

Range of Values:

TRUE
FALSE

This resource controls how the **ControlArea** widget aligns widgets of the **Caption** class. If set to TRUE, the **ControlArea** will align all **Caption** widgets in each column so that their captions are right justified. This may affect the width calculation for a column: The effective width for the **Caption** widgets in a column becomes the sum of the width of the widest caption, plus the largest caption/child widget separation and child widget width.

This alignment is only for groups of **Caption** widgets with all their captions on the left or the right. Mixed orientation, or captions above or below, cannot be aligned well.

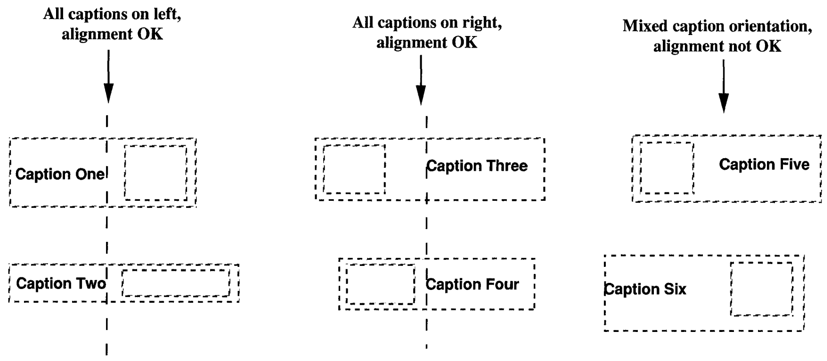

All captions on left, alignment OK
All captions on right, alignment OK
Mixed caption orientation, alignment not OK
Caption One
Caption Two
Caption Three
Caption Four
Caption Five
Caption Six

Figure 2. Aligning Captions

If the **XtNalignCaption** resource is set to FALSE, the **ControlArea** will align all **Caption** widgets the same as other widgets—by their overall width.

This resource takes precedence over the **XtNcenter** resource, but only for **Caption** widgets.

XtNcenter

Range of Values:

TRUE
FALSE

This resource controls how the **ControlArea** widget orients each widget within a column (although see also **XtNalignCaptions**). If set to TRUE, the **ControlArea** will center each widget with each column; if set to FALSE, the **ControlArea** will left justify each widget within each column, unless the **XtNalignCaptions** resource is TRUE. **XtNhPad**
XtNvPad

Range of Values:

0 ≤ **XtNhPad**
0 ≤ **XtNvPad**

These resources give the amount of padding, in pixels, to leave around the edges of the control area, left and right, and top and bottom, respectively, as suggested by Figure 3.

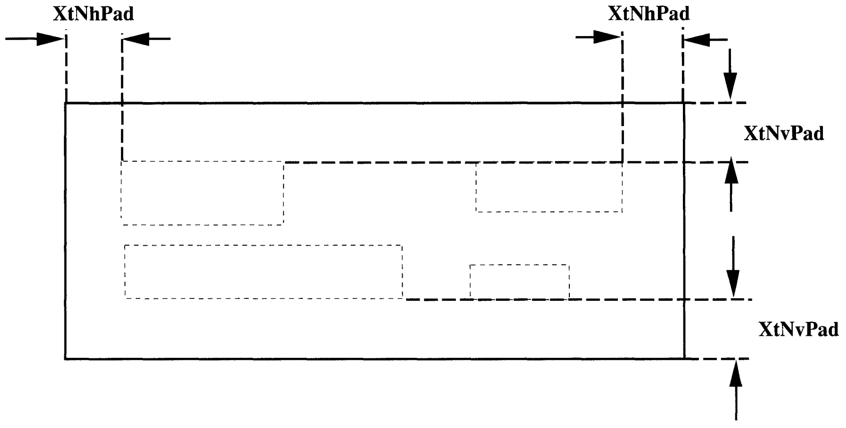


Figure 3. Padding Around Controls

XtNhSpace
XtNvSpace

Range of Values:

`0 ≤ XtNhSpace`
`0 ≤ XtNvSpace`

These resources give the amount of space, in pixels, to leave between controls horizontally and vertically, respectively. If the controls are of different sizes in a row or column, the spacing applies to the widest or tallest dimension of all the controls.

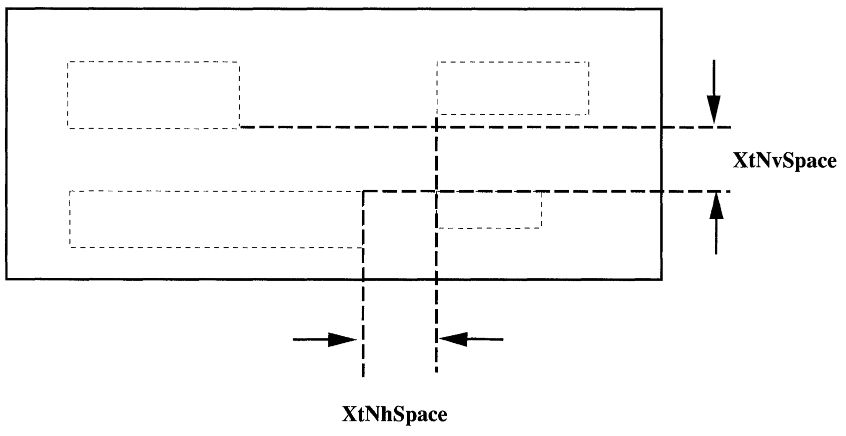


Figure 4. Spacing Between Controls

XtNlayoutType

Range of Values:

```
OL_FIXEDROWS/"fixedrows"
OL_FIXEDCOLS/"fixedcols"
OL_FIXEDWIDTH/"fixedwidth"
OL_FIXEDHEIGHT/"fixedheight"
```

This resource controls the layout of the child widgets by the `ControlArea` composite. The choices are to specify the number of rows or columns, or to specify the overall height or width of the layout area. Only one of these dimensions can be specified directly; the other is determined by the number of controls added. For instance, if the application specifies that the control area should have four columns, the number of rows will be the number of controls divided by four.

The values of the `XtNlayoutType` resource can be:

`OL_FIXEDROWS`	if the layout should have a fixed number of rows and enough columns to hold all the controls;
`OL_FIXEDCOLS`	if the layout should have a fixed number of columns and enough rows to hold all the controls;
`OL_FIXEDWIDTH`	if the layout should be of a fixed width but tall enough to hold all the controls;

`OL_FIXEDHEIGHT`	if the layout should be of a fixed height but wide enough to hold all the controls.

The **XtNmeasure** resource gives the number of rows or columns or the fixed height or width.

XtNmeasure

Range of Values:

`0 < XtNmeasure`

Default:

If **XtNlayoutType** is **OL_FIXEDROWS** or **OL_FIXEDCOLS**: **1**
If **XtNlayoutType** is **OL_FIXEDWIDTH** or **OL_FIXEDHEIGHT**:
width or height of widest or tallest widget, depending on **XtNlayoutType**.

This resource gives the number of rows or columns in the layout of the child widgets, or the fixed width or height of the control area. When **XtNlayoutType** is **OL_FIXEDWIDTH** or **OL_FIXEDHEIGHT**, the measure includes the padding on both edges and the inter-control spacing, as suggested by Figure 5.

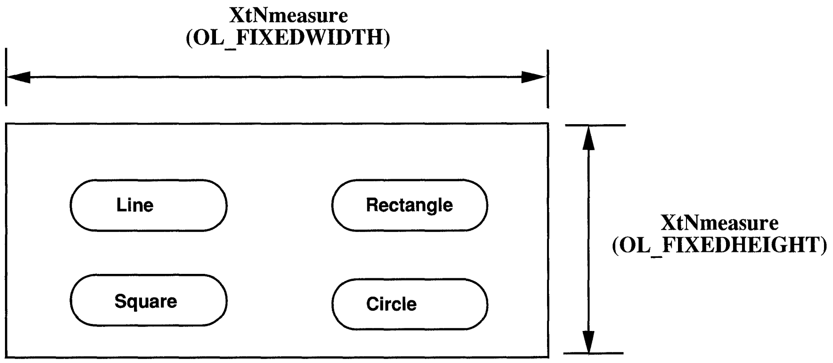


Figure 5. XtNmeasure

XtNsameSize

Range of Values:

OL_NONE/"none"
OL_COLUMNS/"columns"
OL_ALL/"all"

This resource controls which controls, if any, are forced to be the same width within the **ControlArea** widget:

OL_NONE	The controls are placed in fixed-width columns, but the size of each control is left alone. The width of each column is the width of the widest control in the column.
OL_COLUMNS	Controls of the same class in each column are made the same width as the widest of them. The width of each column is thus the width of the widest control in the column.
OL_ALL	All controls are made the same width, the width of the widest control in the **ControlArea** widget.

NAME

`Exclusives` – allows the end-user to select one of a set of choices

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Exclusives.h>

widget = XtCreateWidget(name, exclusivesWidgetClass, ...);
```

DESCRIPTION

The **`Exclusives`** widget provides a simple way to build a one-of-many button selection object. It manages a set of rectangular buttons, providing layout management.

Grid Layout and Button Labels

The **`Exclusives`** widget lays out the rectangular buttons in a grid in the order they are added as child widgets by the application. The number of rows or columns in this grid can be controlled by the application. If the grid has more than one row, the **`Exclusives`** widget forces the buttons in each column to be the same size as the widest in the column, and forces their labels to be left-justified. (Note: If the grid has a single row, each button will be only as wide as necessary to display the label.)

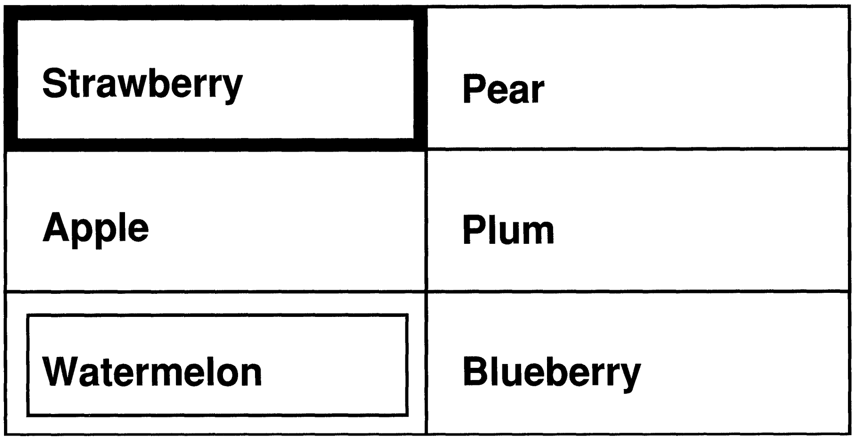


Figure 1. Example of Exclusive Buttons

`Selection Control—One Set`

In one mode of operation (for example, **XtNnoneSet** is FALSE), exactly one button in an **Exclusives** widget must be "set" (for example, the **XtNset** resource set to TRUE). An error is generated if an **Exclusives** is configured with two or more rectangular buttons set or with no button set. The **Exclusives** widget maintains this condition by ensuring that when a button is set by the user clicking SELECT over it, the button that was set is cleared and its **XtNunselect** callbacks are invoked. However, clicking SELECT over a button that was already set does nothing.

Selection Control—None Set

In the other mode of operation (for example, **XtNnoneSet** is TRUE), at most one button in an **Exclusives** widget can be set. An error is generated if an **Exclusives** is configured with two or more rectangular buttons set, but not if configured with no button set. The **Exclusives** widget maintains this condition by ensuring that when a button is set by the user clicking SELECT over it, or by the application programmer with the **XtNset** resource, any button that was previously set is cleared. Also, clicking SELECT over a button that was already set will unset it. Clearing a button in either case invokes its **XtNunselect** callbacks.

Use in a Menu

The **Exclusives** widget can be added as a single child to a menu pane to implement a one-of-many menu choice.

Child Constraint

The **Exclusives** widget constrains its child widgets to be of the class **rectButtonWidgetClass**.

Exclusives Coloration

There is no explicit foreground or background in the **Exclusives** composite widget; each rectangular button has its own coloration.

Keyboard Traversal

The Exclusives widget manages the traversal between a set of RectButtons. When the user traverses to a Exclusives widget, the first RectButton in the set will receive input focus. The MOVEUP, MOVEDOWN, MOVERIGHT, and MOVELEFT keys move the input focus between the RectButtons. To traverse out of the Exclusives widget, the following keys can be used:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application.
PREVWINDOW	moves to the previous window in the application.
NEXTAPP	moves to the first window in the next application.
PREVAPP	moves to the first window in the previous application.

The SELECTKEY acts as if the SELECT button had been clicked on the **RectButton** with input focus. The MENUKEY acts as if the MENU button had been clicked on the **RectButton** with input focus.

RESOURCES

Exclusives Resource Set				
Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmeasure	XtCMeasure	int	1	SGI
XtNnoneSet	XtCNoneSet	Boolean	FALSE	SGI
XtNreferenceName	XtCReferenceName	String	NULL	GI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	GI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNlayoutType

Range of Values:

OL_FIXEDROWS/"fixedrows"
OL_FIXEDCOLS/"fixedcols"

This resource controls the type of layout of the child widgets by the **Exclusives** composite. The choices are to specify the number of rows or the number of columns. Only one of these dimensions can be specified directly; the other is determined by the number of child widgets added, and will always be enough to show all the child widgets.

The values of the **XtNlayoutType** resource can be

OL_FIXEDROWS if the layout should have a fixed number of rows;

OL_FIXEDCOLS if the layout should have a fixed number of columns.

XtNmeasure

Range of Values:

0 < XtNmeasure

This resource gives the number of rows or columns in the layout of the child widgets. If there are not enough child widgets to fill a row or column, the remaining space is left blank. If there is only one row (column), and it is not filled with child widgets, the remaining "space" is of zero width (height).

XtNnoneSet

Range of Values:

`TRUE`
`FALSE`

This resource controls whether the buttons controlled by the **Exclusives** composite can be toggled into an unset mode directly. If set to FALSE, at all times exactly one button must be set. Attempting to select the currently set button does nothing. If set to TRUE, at all times no more than one button can be set. However, the user can select the currently set button again to toggle it back into an unset mode.

NAME

FlatCheckBox – is a performance improvement over the **NonExclusives** widget that is populated with CheckBox widgets

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <FCheckBox.h>

widget = XtCreateWidget(name, flatCheckBoxWidgetClass, ...);
```

DESCRIPTION

Keyboard Traversal

The FlatCheckbox widget is a Primitive widget that manages the traversal between a set of sub-objects. When the user traverses to a FlatCheckbox widget, the first sub-object in the set will display itself as having input focus (see the CheckBox Widget for a description of this appearance.) The MOVEUP, MOVE-DOWN, MOVERIGHT, and MOVELEFT keys move the input focus between the sub-objects. To traverse out of the FlatCheckbox widget, the following keys can be used:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application.
PREVWINDOW	moves to the previous window in the application.
NEXTAPP	moves to the first window in the next application.
PREVAPP	moves to the first window in the previous application.

Keyboard Operation

Flat CheckBox Activation Types

Activation Type	Expected Results
OL_SELECTKEY	These controls have two states: "set" and "not set". (When set, its border is thickened.) Pressing the SELECTKEY while a flat checkbox item has focus will toggle the checkbox's current state. If the control is "set", then toggling the control will call the **XtNunselect** callback list. If the control is "not set", then toggling the control will call the **XtNselect** callback list.

Display of Keyboard Mnemonic

The **FlatCheckbox** widget displays the mnemonic accelerator of a sub-object as part of the sub-object's label. If the mnemonic character is in the label, then that character is highlighted according to the value of the application resource **XtNshowMneumonics()**. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource **XtNshowMneumonics()**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **FlatCheckbox** widget displays the keyboard accelerator as part of the sub-object's label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The accelerator-Text is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

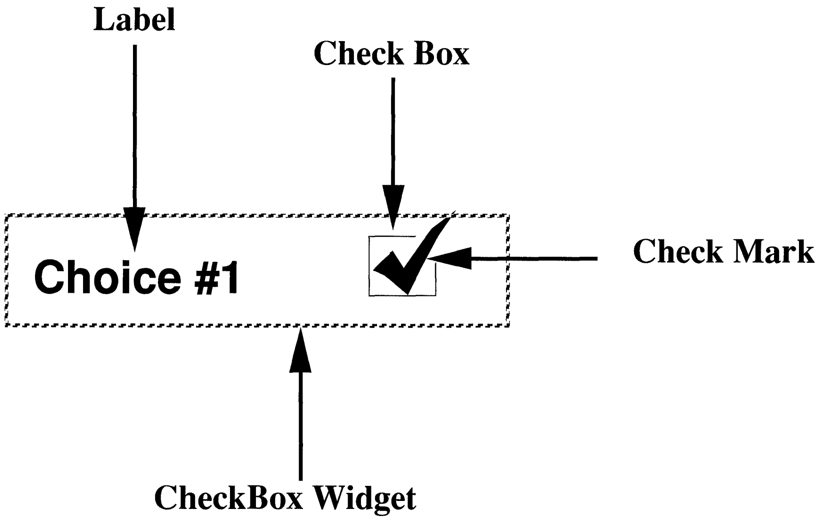


Figure 1. Flat CheckBox Item

FlatCheckbox Coloration

The **FlatCheckBox** container inherits its background color from the container's parent widget. Setting the background color affects only the sub-objects' background.

On a monochrome display, the FlatCheckbox widget indicates that it has input focus by inverting the foreground color and parent's background colors within the bounding box of the first sub-object.

On color displays, when the FlatCheckbox widget receives the input focus, the background color within the bounding box of the first sub-object is changed to the input focus color set in the **XtNinputFocusColor** resource. When the FlatCheckbox sub-object loses the input focus, the background color reverts to its parent's **XtNbackground** color or **XtNbackgroundPixmap**.

EXCEPTIONS:

— If the input focus color is the same as the parent's background color, then the FlatCheckbox widget inverts the foreground and background colors of the sub-object when it has input focus.

— If the input focus color is the same as the font color or foreground color, then the FlatCheckbox widget inverts the foreground and background colors of the sub-object when it has input focus.

RESOURCES

The following table lists the resources for the **FlatCheckBox**. Resources that have a bullet (•) in the **Access** column denote sub-object resources. If these resources are not included in the **XtNitemFields** list, they are inherited from the container widget. An application can change the default values for sub-object resources by setting them directly on the container. Even though a sub-object resource is not included in the **XtNitemFields** list, the application can query the value of any sub-object resource with **OlFlatGetValues()**.

Flat CheckBox Resource Set

Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI•
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI•
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G•
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI•
XtNbackgroundPixmap	XtCPixmap	Pixmap	None	SGI•
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI•
XtNclientData	XtCClientData	XtPointer	NULL	SGI•
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdepth	XtCDepth	Cardinal	(parent's)	GI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI•
XtNfontColor	XtCFontColor	Pixel	XtDefaultForeground	SGI•
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI
XtNgravity	XtCGravity	int	CenterGravity	SGI
XtNhPad	XtCHPad	Dimension	0	SGI
XtNhSpace	XtCHSpace	Dimension	(calculated)	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Black	SGI•
XtNitemFields	XtCItemFields	String *	NULL	GI
XtNitemGravity	XtCItemGravity	int	NorthWestGravity	SGI
XtNitemMaxHeight	XtCItemMaxHeight	Dimension	OL_IGNORE	SGI
XtNitemMaxWidth	XtCItemMaxWidth	Dimension	OL_IGNORE	SGI
XtNitemMinHeight	XtCItemMinHeight	Dimension	OL_IGNORE	SGI
XtNitemMinWidth	XtCItemMinWidth	Dimension	OL_IGNORE	SGI
XtNitems	XtCItems	XtPointer	NULL	SGI
XtNitemsTouched	XtCItemsTouched	Boolean	FALSE	SG

Flat CheckBox Resource Set				
Name	Class	Type	Default	Access
XtNlabel	XtCLabel	String	NULL	SGI•
XtNlabelImage	XtCLabelImage	XImage *	NULL	SGI•
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI•
XtNlabelTile	XtCLabelTile	Boolean	FALSE	SGI•
XtNlayoutHeight	XtCLayoutHeight	OlDefine	OL_MINIMIZE	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNlayoutWidth	XtCLayoutWidth	OlDefine	OL_MINIMIZE	SGI
XtNmanaged	XtCManaged	Boolean	TRUE	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI•
XtNmeasure	XtCMeasure	int	1	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI•
XtNnumItemFields	XtCNumItemFields	Cardinal	0	SGI
XtNnumItems	XtCNumItems	Cardinal	0	SGI
XtNposition	XtCPosition	OlDefine	OL_LEFT	SGI•
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNsameHeight	XtCSameHeight	OlDefine	OL_ALL	SGI
XtNsameWidth	XtCSameWidth	OlDefine	OL_COLUMNS	SGI
XtNselectProc	XtCCallbackProc	XtCallbackProc	NULL	SGI•
XtNsensitive	XtCSensitive	Boolean	TRUE	SGI•
XtNset	XtCSet	Boolean	FALSE	SGI†•
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI•
XtNunselectProc	XtCCallbackProc	XtCallbackProc	NULL	SGI•
XtNuserData	XtCUserData	XtPointer	NULL	SGI•
XtNvPad	XtCVPad	Dimension	0	SGI
XtNvSpace	XtCVSpace	Dimension	(calculated)	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNancestorSensitive

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource indicates the sensitivity of the sub-object's ancestors. If TRUE, all the sub-object's ancestors are sensitive and the sub-object is sensitive to user input. If FALSE, one or more of the sub-object's ancestors are insensitive, so the sub-object displays an inactive visual and is not sensitive to user input.

XtNbackground

This is the pixel color used to fill in the background of the check box.

XtNbackgroundPixmap

This resource specifies the pixmap that is displayed as the sub-object's label. Any supplied pixmap must have the same depth as the flat widget's depth. Pixmaps of **None** and **ParentRelative** are not considered valid values. If either **XtNlabel** or **XtNlabelImage** has a non-NULL value, this resource is ignored.

XtNclientData

This is the client data supplied to all callback procedures.

XtNitems

This is the list of sub-object items. This value must point to a static list since flat containers reference this list after initialization but do not cache its information.

XtNitemFields

This is the list of resource names used to parse the records in the **XtNitems** list. This resource does not have to point to static information since the flat container does not use this information after initialization. Though the flat container does not reference this resource's value after initialization, it holds onto it for responding to an **XtGetValues()** request and supplying it in the **OlFlatCallData** structure during callbacks. Therefore, if the application plans on querying this resource, it's recommended that the application make this resource point to static information.

XtNitemsTouched

Range of Values:

```
TRUE
FALSE
```

Whenever the application modifies an item list directly, it must supply this resource (with a value of **TRUE**) to the flat widget container so that the container can update the visual. If the resource value is supplied, the flat widget container treats its current item list as a new list and hence, updates its entire visual. Since the list is treated as a new list, the flat container may request a change in geometry from its parent.

Note:

It is not necessary to use this resource if the application modifies the list with the **OlFlatSetValues** procedure; nor is it necessary to use this resource whenever the application supplies a new list to the flat container.

XtNlabel

This is the text string that appears in the sub-object.

XtNlabelImage

This is an **XImage** pointer that can appear in a sub-object. This resource is ignored if **XtNlabel** is non-NULL.

XtNlabelJustify

Range of Values:

```
OL_LEFT/"left"
OL_CENTER/"center"
OL_RIGHT/"right"
```

This resource specifies the justification of the label or **XImage** that appears within a sub-object.

XtNlabelTile

Range of Values:

```
TRUE
FALSE
```

This resource augments the **XtNlabelImage/XtNlabelPixmap** resource to allow tiling of the sub-object's background. For an image/pixmap that is smaller than the sub-object's background, the label area is tiled with the image/pixmap to fill the sub-object's background if this resource is **TRUE**; otherwise, the label is placed as described by the **XtNlabelJustify** resource.

The **XtNlabelTile** resource is ignored for text labels.

XtNmappedWhenManaged

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource specifies whether or not a managed sub-object is displayed. Regardless of this resource's value, all managed sub-objects will be included when determining the layout.

Note:
This resource is never inherited from the container, so its default value is always **TRUE**.

XtNnumItems

This resource specifies the number of sub-object items.

XtNnumItemFields

This resource indicates the number of resource names contained in **XtNitem-Fields**.

XtNposition

Range of Values:

```
OL_LEFT/"left"
OL_RIGHT/"right"
```

This resource determines on which side of the check box the label is to be placed. The value of **OL_LEFT** or **OL_RIGHT** indicates the label is placed to the left or to the right of the check box, respectively.

XtNsameHeight

Range of Values:

```
OL_ALL/"all"
OL_ROWS/"rows"
OL_NONE/"none"
```

This resource specifies the rows that are forced to the same height.

XtNsameWidth

Range of Values:

```
OL_ALL/"all"
OL_COLUMNS/"columns"
OL_NONE/"none"
```

This resource specifies the columns that are forced to the same width.

XtNselectProc

This callback procedure is called whenever the sub-object becomes selected by user input.

XtNsensitive

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

If **TRUE**, the sub-object is sensitive to user input. If **FALSE**, the sub-object is insensitive to user input and an inactive visual is displayed to indicate this state.

Note:

This resource is never inherited from the container, so its default value is always **TRUE**.

XtNset

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource reflects the current state of the sub-object.

Note:

This resource is never inherited from the container, so its default value is always **FALSE**.

Even if the application does not use `XtNset` in its item fields list, the container will correctly maintain the set item and the application can change the set item via `OlFlatSetValues`.

XtNunselectProc

This callback procedure is called whenever the sub-object becomes unselected by user input.

NAME

FlatExclusives – allows the user to select one of a series of choices

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <FExclusive.h>

widget = XtCreateWidget(name, flatExclusivesWidgetClass, ...);
```

DESCRIPTION

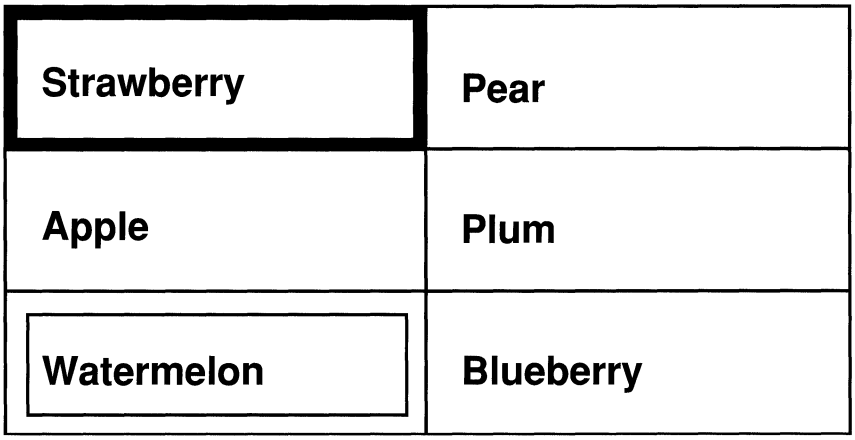


Figure 1. Flat Exclusives Widget

Selection Control - One Set

In one mode operation (i.e., **XtNnoneSet** is FALSE), exactly one sub-object in a **FlatExclusives** widget must be "set," i.e., the **XtNset** resource is TRUE for one of the sub-objects. A warning is generated if two or more sub-objects are set. If no items are set, the **FlatExclusives** makes the first sub-object that is both managed and mapped when managed be the set item. No warning is produced in this case. The **FlatExclusives** maintains this condition by ensuring that when a sub-object is set by the user clicking SELECT over it, the sub-object that was set is cleared and its **XtNunselectProc** procedure is called and the sub-object under the pointer is made to be set and its **XtNselectProc** procedure is called. However, clicking SELECT over a sub-object that is already set does nothing.

Selection Control - None Set

In the other mode of operation (i.e., **XtNnoneSet** is TRUE), at most one sub-object in a **FlatExclusives** widget can be "set." A warning is generated if two or more sub-objects are set. The **FlatExclusives** maintains this condition by ensuring that when a sub-object is set by the user clicking SELECT over it, the sub-object that was set is cleared and its **XtNunselectProc** procedure is called and the sub-object under the pointer is made to be set and its **XtNselectProc** procedure is called. Clicking SELECT over a sub-object that is already set clears it and its **XtNunselectProc** procedure is called.

Use in a Menu

The **FlatExclusives** widget can be added as child in a menu pane to implement a one-of-many menu choice.

FlatExclusives Coloration

The **FlatExclusives** container inherits its background color from the container's parent widget. Setting the background color affects only the sub-objects' background.

Keyboard Traversal

The FlatExclusives widget is a Primitive widget that manages the traversal between a set of sub-objects. When the user traverses to a FlatExclusives widget, the first sub-object in the set will display itself as having input focus (see the RectButton Widget for a description of this appearance.) The MOVEUP, MOVEDOWN, MOVERIGHT, and MOVELEFT keys move the input focus between the sub-objects. To traverse out of the FlatExclusives widget, the following keys can be used:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application.
PREVWINDOW	moves to the previous window in the application.
NEXTAPP	moves to the first window in the next application.
PREVAPP	moves to the first window in the previous application.

Keyboard Operation

Flat Exclusives Activation Types	
Activation Type	Expected Results
OL_MENUDEFAULTKEY	If the **FlatExclusives** is on a menu, this command will set the item with focus to be menu's default; otherwise, this command is ignored.
OL_SELECTKEY	This command acts as if the SELECT mouse button had been clicked on the **RectButton** with focus. See "**Selection Control**" sections above.

Display of Keyboard Mnemonic

The **FlatExclusives** widget displays the mnemonic accelerator of a sub-object as part of the sub-object's label. If the mnemonic character is in the label, then that character is highlighted according to the value of the application resource **XtNshowMneumonics()**. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource **XtNshowMneumonics()**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **FlatExclusives** widget displays the keyboard accelerator as part of the sub-object's label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

RESOURCES

The following table lists the resources for the **FlatExclusives**. Resources that have a bullet (•) in the **Access** column denote sub-object resources. If these resources are not included in the **XtNitemFields** list, they are inherited from the container widget. An application can change the default values for sub-object resources by setting them on the container directly. Even though a sub-object resource is not included in the **XtNitemFields** list, the application can query the value of any sub-object resource with **OlFlatGetValues()**.

Flat Exclusives Resource Set

Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI•
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI•
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G•
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI•
XtNbackgroundPixmap	XtCPixmap	Pixmap	None	SGI•
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI•
XtNclientData	XtCClientData	XtPointer	NULL	SGI•
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdefault	XtCDefault	Boolean	FALSE	SGI†•
XtNdepth	XtCDepth	Cardinal	(parent's)	GI
XtNdim	XtCDim	Boolean	FALSE	SGI•
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI•
XtNfontColor	XtCFontColor	Pixel	XtDefaultForeground	SGI•
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI
XtNgravity	XtCGravity	int	CenterGravity	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Black	SGI•

Flat Exclusives Resource Set

Name	Class	Type	Default	Access
XtNhPad	XtCHPad	Dimension	0	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNitemFields	XtCItemFields	String *	NULL	GI
XtNitemMaxHeight	XtCItemMaxHeight	Dimension	OL_IGNORE	SGI
XtNitemMaxWidth	XtCItemMaxWidth	Dimension	OL_IGNORE	SGI
XtNitemMinHeight	XtCItemMinHeight	Dimension	OL_IGNORE	SGI
XtNitemMinWidth	XtCItemMinWidth	Dimension	OL_IGNORE	SGI
XtNitems	XtCItems	XtPointer	NULL	SGI
XtNitemsTouched	XtCItemsTouched	Boolean	FALSE	SG
XtNlabel	XtCLabel	String	NULL	SGI•
XtNlabelImage	XtCLabelImage	XImage *	NULL	SGI•
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI•
XtNlabelTile	XtCLabelTile	Boolean	FALSE	SGI•
XtNlayoutHeight	XtCLayoutHeight	OlDefine	OL_MINIMIZE	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNlayoutWidth	XtCLayoutWidth	OlDefine	OL_MINIMIZE	SGI
XtNmanaged	XtCManaged	Boolean	TRUE	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI•
XtNmeasure	XtCMeasure	int	1	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI•
XtNnoneSet	XtCNoneSet	Boolean	FALSE	SGI
XtNnumItemFields	XtCNumItemFields	Cardinal	0	SGI
XtNnumItems	XtCNumItems	Cardinal	0	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNsameHeight	XtCSameHeight	OlDefine	OL_ALL	SGI
XtNsameWidth	XtCSameWidth	OlDefine	OL_COLUMNS	SGI
XtNselectProc	XtCCallbackProc	XtCallbackProc	NULL	SGI•
XtNsensitive	XtCSensitive	Boolean	TRUE	SGI•
XtNset	XtCSet	Boolean	FALSE	SGI†•
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI•
XtNunselectProc	XtCCallbackProc	XtCallbackProc	NULL	SGI•
XtNuserData	XtCUserData	XtPointer	NULL	SGI•
XtNvPad	XtCVPad	Dimension	0	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNancestorSensitive

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource indicates the sensitivity of the sub-object's ancestors. If TRUE, all the sub-object's ancestors are sensitive and the sub-object is sensitive to user input. If FALSE, one or more of the sub-object's ancestors are insensitive, so the sub-object displays an inactive visual and is not sensitive to user input.

XtNbackground

This is the pixel color used to fill in the background of the sub-object.

XtNbackgroundPixmap

This resource specifies the pixmap that is displayed as the sub-object's label. Any supplied pixmap must have the same depth as the flat widget's depth. Pixmaps of **None** and **ParentRelative** are not considered valid values. If either **XtNlabel** or **XtNlabelImage** has a non-NULL value, this resource is ignored.

XtNclientData

This is the client data supplied to all callback procedures.

XtNdefault

Range of Values:

TRUE/"true"
FALSE/"false"

When used on the sub-object, this resource specifies whether or not the sub-object is a default item. If more than one item is a set as a default item, a warning is generated and all but the first default item is unselected.

When used on the container, this resource indicates whether or not one of the sub-objects is a default item. If a sub-object is a default item, **XtNdefault** has a value of TRUE; else it has a value of FALSE. Setting this resource on the container widget indicates whether or not one of the sub-objects should be a default item. If the application sets this value to TRUE on the container, the container will set the first managed and mapped sub-object as the default item if a default item does not exist. If the application sets this value to FALSE, the container will unset its default item if one exists.

Even if the application does not use **XtNdefault** in its item fields list, the container will correctly maintain the default item and the application can change the default item via **OlFlatSetValues**.

XtNdim

Range of Values:

TRUE/"true"
FALSE/"false"

If TRUE, the sub-object shows a dimmed visual indicating that the item represents the state of one or more objects, that as a group, are in different states.

XtNitemFields

This is the list of resource names used to parse the records in the **XtNitems** list. This resource does not have to point to static information since the flat container does not use this information after initialization. Though the flat container does not reference this resource's value after initialization, it holds onto it for responding to an **XtGetValues()** request and supplying it in the **OlFlatCallData** structure during callbacks. Therefore, if the application plans on querying this resource, it's recommended that the application make this resource point to static information.

XtNitemsTouched

Range of Values:

```
TRUE
FALSE
```

Whenever the application modifies an item list directly, it must supply this resource (with a value of TRUE) to the flat widget container so that the container can update the visual. If the resource value is supplied, the flat widget container treats its current item list as a new list and hence, updates its entire visual. Since the list is treated as a new list, the flat container may request a change in geometry from its parent.

Note: It is not necessary to use this resource if the application modifies the list with the **OlFlatSetValues** procedure; nor is it necessary to use this resource whenever the application supplies a new list to the flat container.

XtNlabel

This is the text string that appears in the sub-object.

XtNlabelImage

This is an **XImage** pointer that can appear in a sub-object. This resource is ignored if **XtNlabel** is non-NULL.

XtNlabelJustify

Range of Values:

```
OL_LEFT/"left"
OL_CENTER/"center"
OL_RIGHT/"right"
```

This resource specifies the justification of the label or **XImage** that appears within a sub-object.

XtNlabelTile

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource augments the **XtNlabelImage/XtNlabelPixmap** resource to allow tiling of the sub-object's background. For an image/pixmap that is smaller than the sub-object's background, the label area is tiled with the image/pixmap to fill the sub-object's background if this resource is TRUE; otherwise, the label is placed as described by the **XtNlabelJustify** resource.

The **XtNlabelTile** resource is ignored for text labels.

XtNmappedWhenManaged

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource specifies whether or not a managed sub-object is displayed. Regardless of this resource's value, all managed sub-objects will be including when determining the layout.

Note: This resource is never inherited from the container, so its default value is always TRUE.

XtNnoneSet

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource controls whether the settings can be toggled into an unset mode directly. If set to FALSE, exactly one sub-object must be in the set state always. Attempting to select the currently set sub-object does nothing. If set to TRUE, no more than one sub-object can be set at any time. However, the user can select the currently set sub-object and toggle it back to an unset state.

XtNnumItems

This resource specifies the number of sub-object items.

XtNnumItemFields

This resource indicates the number of resource names contained in **XtNitem-Fields**.

XtNsameHeight

Range of Values:

```
OL_ALL/"all"
OL_ROWS/"rows"
```

This resource specifies the rows that are forced to the same height.

XtNsameWidth

Range of Values:

```
OL_ALL/"all"
OL_COLUMNS/"columns"
```

This resource specifies the columns that are forced to the same width.

XtNselectProc

This callback procedure is called whenever the sub-object becomes selected by user input.

XtNsensitive

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

If TRUE, the sub-object is sensitive to user input. If FALSE, the sub-object is insensitive to user input and an inactive visual is displayed to indicate this state.

Note: This resource is never inherited from the container, so its default value is always TRUE.

XtNset

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource reflects the current state of the sub-object.

Note: This resource is never inherited from the container, so its default value is always FALSE.

Even if the application does not use **`XtNset`** in its item fields list, the container will correctly maintain the set item and the application can change the set item via **`OlFlatSetValues`**.

XtNunselectProc

This callback procedure is called whenever the sub-object becomes unselected by user input.

NAME

`FlatNonexclusives` – a Primitive widget allowing the user to select one or more choices

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <FNonexclus.h>

widget = XtCreateWidget(name, flatNonexclusivesWidgetClass, ...);
```

DESCRIPTION

Default Spacing

The default spacing between items is 50% of the prevailing point size for the container's font.

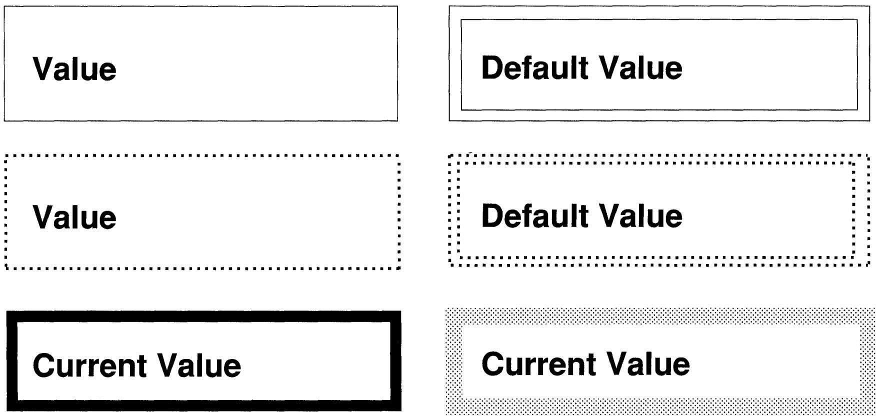


Figure 1. Example of Flat Nonexclusive Buttons

Selection Control

Clicking the SELECT mouse button over an object that is set will cause the object to become unset and its **`XtNunselectProc`** procedure is called. If the object is unset, clicking the SELECT mouse button over it causes it to become set and its **`XtNselectProc`** procedure is called.

Use in a Menu

The **FlatNonexclusives** can be added as a child in a menu pane to implement a several-of-many menu choice.

FlatNonexclusives Coloration

The **FlatNonexclusives** container inherits its background color from the container's parent widget. Setting the background color affects only the sub-objects' background.

Keyboard Traversal

The FlatNonexclusives widget is a Primitive widget that manages the traversal between a set of sub-objects. When the user traverses to a FlatNonexclusives widget, the first sub-object in the set will display itself as having input focus (see the RectButton Widget for a description of this appearance.) The MOVEUP, MOVEDOWN, MOVERIGHT, and MOVELEFT keys move the input focus between the sub-objects. To traverse out of the FlatNonexclusives widget, the following keys can be used:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application.
PREVWINDOW	moves to the previous window in the application.
NEXTAPP	moves to the first window in the next application.
PREVAPP	moves to the first window in the previous application.

Keyboard Operation

Flat Nonexclusives Activation Types

Activation Type	Expected Results
OL_MENUDEFAULTKEY	If the **FlatNonexclusives** is on a menu, this command will set the item with focus to be menu's default; otherwise, this command is ignored.
OL_SELECTKEY	This command acts as if the SELECT mouse button had been clicked on the **RectButton** with focus. See "**Selection Control**" section above.

Display of Keyboard Mnemonic

The **FlatNonexclusives** widget displays the mnemonic accelerator of a sub-object as part of the sub-object's label. If the mnemonic character is in the label, then that character is highlighted according to the value of the application resource **XtNshowMneumonics()**. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource **XtNshowMneumonics()**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **FlatNonexclusives** widget displays the keyboard accelerator as part of the sub-object's label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

RESOURCES

The following table lists the resources for the **FlatNonexclusives**. Resources that have a bullet (•) in the **Access** column denote sub-object resources. If these resources are not included in the **XtNitemFields** list, they are inherited from the container widget. An application can change the default values for sub-object resources by setting them directly on the container. Even though a sub-object resource is not included in the **XtNitemFields** list, the application can query the value of any sub-object resource with **OlFlatGetValues()**.

Flat Nonexclusives Resource Set				
Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI•
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI•
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G•
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI•
XtNbackgroundPixmap	XtCPixmap	Pixmap	None	SGI•
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI•
XtNclientData	XtCClientData	XtPointer	NULL	SGI•
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdefault	XtCDefault	Boolean	FALSE	SGI†•
XtNdepth	XtCDepth	Cardinal	(parent's)	GI
XtNdim	XtCDim	Boolean	FALSE	SGI•
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI•
XtNfontColor	XtCFontColor	Pixel	XtDefaultForeground	SGI•
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI
XtNgravity	XtCGravity	int	CenterGravity	SGI
XtNhPad	XtCHPad	Dimension	0	SGI
XtNhSpace	XtCHSpace	Dimension	(calculated)	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Black	SGI•
XtNitemFields	XtCItemFields	String *	NULL	GI
XtNitemGravity	XtCItemGravity	int	NorthWestGravity	SGI
XtNitemMaxHeight	XtCItemMaxHeight	Dimension	OL_IGNORE	SGI
XtNitemMaxWidth	XtCItemMaxWidth	Dimension	OL_IGNORE	SGI
XtNitemMinHeight	XtCItemMinHeight	Dimension	OL_IGNORE	SGI
XtNitemMinWidth	XtCItemMinWidth	Dimension	OL_IGNORE	SGI
XtNitems	XtCItems	XtPointer	NULL	SGI

Flat Nonexclusives Resource Set				
Name	Class	Type	Default	Access
XtNitemsTouched	XtCItemsTouched	Boolean	FALSE	SG
XtNlabel	XtCLabel	String	NULL	SGI•
XtNlabelImage	XtCLabelImage	XImage *	NULL	SGI•
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI•
XtNlabelTile	XtCLabelTile	Boolean	FALSE	SGI•
XtNlayoutHeight	XtCLayoutHeight	OlDefine	OL_MINIMIZE	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNlayoutWidth	XtCLayoutWidth	OlDefine	OL_MINIMIZE	SGI
XtNmanaged	XtCManaged	Boolean	TRUE	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI•
XtNmeasure	XtCMeasure	int	1	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI•
XtNnumItemFields	XtCNumItemFields	Cardinal	0	SGI
XtNnumItems	XtCNumItems	Cardinal	0	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNsameHeight	XtCSameHeight	OlDefine	OL_ALL	SGI
XtNsameWidth	XtCSameWidth	OlDefine	OL_COLUMNS	SGI
XtNselectProc	XtCCallbackProc	XtCallbackProc	NULL	SGI•
XtNsensitive	XtCSensitive	Boolean	TRUE	SGI•
XtNset	XtCSet	Boolean	FALSE	SGI†•
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI•
XtNunselectProc	XtCCallbackProc	XtCallbackProc	NULL	SGI•
XtNuserData	XtCUserData	XtPointer	NULL	SGI•
XtNvPad	XtCVPad	Dimension	0	SGI
XtNvSpace	XtCVSpace	Dimension	(calculated)	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNancestorSensitive

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource indicates the sensitivity of the sub-object's ancestors. If TRUE, all the sub-object's ancestors are sensitive and the sub-object is sensitive to user input. If FALSE, one or more of the sub-object's ancestors are insensitive, so the sub-object displays an inactive visual and is not sensitive to user input.

XtNbackground

This is the pixel color used to fill in the background of the sub-object.

XtNbackgroundPixmap

This resource specifies the pixmap that is displayed as the sub-object's label. Any supplied pixmap must have the same depth as the flat widget's depth. Pixmaps of **None** and **ParentRelative** are not considered valid values. If either **XtNlabel** or **XtNlabelImage** has a non-NULL value, this resource is ignored.

XtNclientData

This is the client data supplied to all callback procedures.

XtNdefault

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

When used on the sub-object, this resource specifies whether or not the sub-object is a default item. If more than one item is a set as a default item, a warning is generated and all but the first default item is unselected.

When used on the container, this resource indicates whether or not one of the sub-objects is a default item. If a sub-object is a default item, **XtNdefault** has a value of TRUE; else it has a value of FALSE. Setting this resource on the container widget indicates whether or not one of the sub-objects should be a default item. If the application sets this value to TRUE on the container, the container will set the first managed and mapped sub-object as the default item if a default item does not exist. If the application sets this value to FALSE, the container will unset its default item if one exists.

Even if the application does not use **XtNdefault** in its item fields list, the container will correctly maintain the default item and the application can change the default item via **OlFlatSetValues**.

XtNdim

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

If TRUE, the sub-object shows a dimmed visual indicating that the item represents the state of one or more objects, that as a group, are in different states.

XtNitems

This is the list of sub-object items. This value must point to a static list since flat containers reference this list after initialization but do not cache its information.

XtNitemFields

This is the list of resource names used to parse the records in the **XtNitems** list. This resource does not have to point to static information since the flat container does not use this information after initialization. Though the flat container does not reference this resource's value after initialization, it holds onto it for responding to an **XtGetValues()** request and supplying it in the **OlFlatCallData** structure during callbacks. Therefore, if the application plans on querying this resource, it's recommended that the application make this resource point to static information.

XtNitemsTouched

Range of Values:

```
TRUE
FALSE
```

Whenever the application modifies an item list directly, it must supply this resource (with a value of TRUE) to the flat widget container so that the container can update the visual. If the resource value is supplied, the flat widget container treats its current item list as a new list and hence, updates its entire visual. Since the list is treated as a new list, the flat container may request a change in geometry from its parent.

Note: It is not necessary to use this resource if the application modifies the list with the **OlFlatSetValues** procedure, nor is it necessary to use this resource whenever the application supplies a new list to the flat container.

XtNlabel

This is the text string that appears in the sub-object.

XtNlabelImage

This is an **XImage** pointer that can appear in a sub-object. This resource is ignored if **XtNlabel** is non-NULL.

XtNlabelJustify

Range of Values:

```
OL_LEFT/"left"
OL_CENTER/"center"
OL_RIGHT/"right"
```

This resource specifies the justification of the label or **XImage** that appears within a sub-object.

XtNlabelTile

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource augments the **XtNlabelImage/XtNlabelPixmap** resource to allow tiling of the sub-object's background. For an image/pixmap that is smaller than the sub-object's background, the label area is tiled with the image/pixmap to fill the sub-object's background if this resource is TRUE; otherwise, the label is placed as described by the **XtNlabelJustify** resource.

The **XtNlabelTile** resource is ignored for text labels.

XtNmappedWhenManaged

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource specifies whether or not a managed sub-object is displayed. Regardless of this resource's value, all managed sub-objects will be including when determining the layout.

Note: This resource is never inherited from the container, so its default value is always TRUE

XtNnumItems

This resource specifies the number of sub-object items.

XtNnumItemFields

This resource indicates the number of resource names contained in **XtNitemFields**.

XtNsameHeight

Range of Values:

```
OL_ALL/"all"
OL_ROWS/"rows"
OL_NONE/"none"
```

This resource specifies the rows that are forced to the same height.

XtNsameWidth

Range of Values:

```
OL_ALL/"all"
OL_COLUMNS/"columns"
OL_NONE/"none"
```

This resource specifies the columns that are forced to the same width.

XtNselectProc

This callback procedure is called whenever the sub-object becomes selected by user input.

XtNsensitive

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

If TRUE, the sub-object is sensitive to user input If FALSE, the sub-object is insensitive to user input and an inactive visual is displayed to indicate this state.

Note: This resource is never inherited from the container, so its default value is always TRUE.

XtNset

Range of Values:

```
TRUE/"true"
FALSE/"false"
```

This resource reflects the current state of the sub-object.

Note:

This resource is never inherited from the container, so its default value is always FALSE.

Even if the application does not use **XtNset** in its item fields list, the container will correctly maintain the set item and the application can change the set item via **OlFlatSetValues**.

XtNunselectProc
This callback procedure is called whenever the sub-object becomes unselected by user input.

NAME

FooterPanel – provides a convenient way to put a footer at the bottom of a window

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <FooterPane.h>

widget = XtCreateWidget(name, footerPanelWidgetClass, ...);
```

DESCRIPTION

Consistent Interface for Attaching Footer

The **FooterPanel** widget is a simple composite that provides a consistent interface for attaching a footer message to the bottom of a base window. The **FooterPanel** composite accepts two children: a Top Child and a Footer Child. (These are attached to the top and bottom of the **FooterPanel** widget, respectively.) The children are identified in the order they are added: the Top Child is the first child added; the Footer Child is the second.

Initial Size

The initial height of the **FooterPanel** widget is the sum of the initial heights of its children. The initial width is the widest of the initial widths of its children.

Sizing

The **FooterPanel** widget attempts to allow its children to grow or shrink to any size, by asking its parent to allow it to grow to the width of the widest child and the height of the sum of its children's height. When it is not allowed to grow to this desired size, or when it is resized smaller by its parent, the **FooterPanel** imposes the size restriction as follows: It resizes both children to its width, but forces the Top Child to absorb all the height restriction; it does not resize the height of the Footer Child. Conversely, when it is resized larger by its parent, the **FooterPanel** widget gives all the height increase to the Top Child and resizes both children to the new width.

The **FooterPanel** widget never overlaps its children. If necessary, it will resize the Top Child to zero height. If its height becomes too small to accommodate the Footer Child's height, it clips the Footer Child.

If queried by its parent about its preferred size, it in turn queries its children. The width in this query is the same for each child: the width in the parent's query. The height in the query of the Footer Child is the child's existing height, and the height in the query of the Top Child is the height in the parent's query minus the existing height of the Footer Child. The **FooterPanel** widget's response, then, to its parent's query is a width equal to the wider preference of its children and a height equal to the sum of their preferred heights.

Works with All Children

The **FooterPanel** composite widget works with all the widgets defined in this document, except those that are sub-classed from the **Shell** widget class.

FooterPanel Coloration

The **FooterPanel** widget is "invisible" in that it imposes no coloration of its own.

RESOURCES

FooterPanel Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNstring	XtCString	String	NULL	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNstring

This resource is the string that will be drawn. The string must be null terminated.

See Appendix A, "General Resources," for a description of the other **FooterPanel** resources.

NAME

Form – a composite widget allowing sophisticated management of other widgets in its boundaries

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Form.h>

widget = XtCreateWidget(name, formWidgetClass, ...);
```

DESCRIPTION

The **Form** widget is a constraint-based manager that provides a layout language used to establish spatial relationships between its children. It then manipulates these relationships when the Form is resized, new children are added to the Form, or its children are moved, resized, unmanaged, remanaged, rearranged, or destroyed.

Spanning Constraints

A widget can be created with a set of constraints in such a manner that it spans the width or height of a form. Constraints that cause a widget to span both the width and height of a form can also be specified.

Row Constraints

Sets of widgets can be set up as a row so that resizing a form may increase or decrease the spacing between the widgets. The form may also make the widgets smaller if desired.

Column Constraints

Sets of widgets can be displayed in a single column or in multiple columns. The form may increase or decrease the spacing between widgets or resize the widgets.

Automatic Form Resizing

The form calculates new sizes or positions for its children whenever they change size or position. The new form size thus generated is passed as a geometry request to the parent of the form. Once resized, the form, using its children's constraints, tries to rearrange its children as intelligently as possible.

Managing, Unmanaging and Destroying Children

When a widget within a form is unmanaged or destroyed, it is removed from the constraint processing and the constraints are reprocessed to reposition and/or resize the form and its contents. Any widgets that referenced it are rereferenced to the widget that it had been referencing. For the unmanaged case, if the widget is remanaged, the widgets that were previously referencing it are rereferenced to it, thereby reestablishing the original layout.

Works with All Children

The **Form** composite widget works with all the widgets defined in this document, except those that are sub-classed from the **Shell** widget class.

Form Coloration

Figure 1 illustrates the resources that affect the coloration of the **Form** widget.

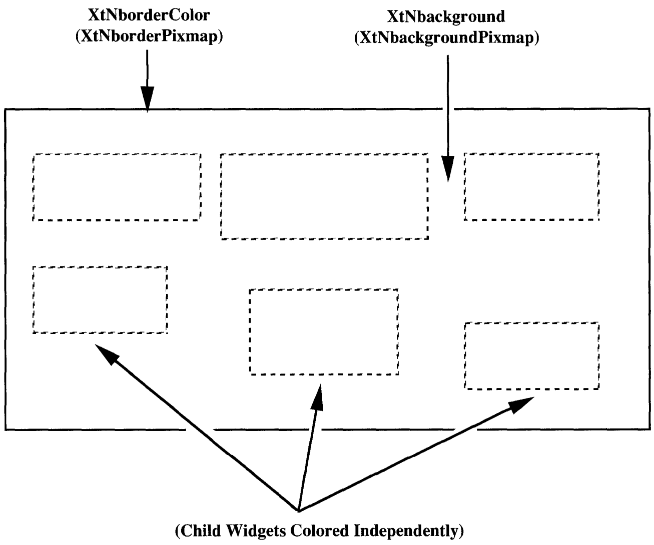


Figure 1. Form Coloration

RESOURCES

Form Resource Set				
Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	White	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

CONSTRAINT RESOURCES

Each child widget attached to the **Form** composite widget is constrained by the following resources: (In essence, these resources become resources for each child widget and can be set and read just like any other resources defined for the child.)

Form Constraint Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNxAddWidth	XtCXAddWidth	Boolean	FALSE	SGI
XtNxAttachOffset	XtCXAttachOffset	int	0	SGI
XtNxAttachRight	XtCXAttachRight	Boolean	FALSE	SGI
XtNxOffset	XtCXOffset	int	0	SGI
XtNxRefName	XtCXRefName	String	NULL	SGI
XtNxRefWidget	XtCXRefWidget	Widget	(form)	SGI
XtNxResizable	XtCXResizable	Boolean	FALSE	SGI
XtNxVaryOffset	XtCXVaryOffset	Boolean	FALSE	SGI
XtNyAddHeight	XtCYAddHeight	Boolean	FALSE	SGI
XtNyAttachBottom	XtCYAttachBottom	Boolean	FALSE	SGI
XtNyAttachOffset	XtCYAttachOffset	int	0	SGI
XtNyOffset	XtCYOffset	int	0	SGI
XtNyRefName	XtCYRefName	String	NULL	SGI
XtNyRefWidget	XtCYRefWidget	Widget	(form)	SGI
XtNyResizable	XtCYResizable	Boolean	FALSE	SGI
XtNyVaryOffset	XtCYVaryOffset	Boolean	FALSE	SGI

XtNxAddWidth
XtNyAddHeight

Range of Values:

TRUE
FALSE

These resources indicate whether to add the width or height of the corresponding reference widget to a widget's location when determining the widget's position.

XtNxAttachOffset
XtNyAttachOffset

Range of Values:

$0 \leq$ **XtNxAttachOffset**
$0 \leq$ **XtNyAttachOffset**

When a widget is attached to the right or bottom edge of the form, the separation between the widget and the form defaults to zero pixels. These resources allow that separation to be set to some other value. Also, for widgets that are not attached to the right or bottom edge of the form, these resources specify the minimum spacing between the widget and the form.

XtNxAttachRight
XtNyAttachBottom

Range of Values:

  `TRUE`
  `FALSE`

Widgets are normally referenced from "form left" to "form right" or from "form top" to "form bottom." These resources allow this reference to occur on the opposite edges of the form. When used with the `XtNxVaryOffset` and `XtNyVaryOffset` resources, they allow a widget to float along the right or bottom edge of the form. This is done by setting both the `XtNxAttachRight` (`XtNyAttachBottom`) and `XtNxVaryOffset` (`XtNyVaryOffset`) resources to TRUE. A widget can also span the width (height) of the form by setting the `XtNxAttachRight` (`XtNyAttachBottom`) resource to TRUE and the `XtNxVaryOffset` (`XtNyVaryOffset`) resource to FALSE.

XtNxOffset
XtNyOffset

Range of Values:

  `0 ≤ XtNxOffset`
  `0 ≤ XtNyOffset`

The location of a widget is determined by the widget it references. As the default, a widget's position on the form exactly matches its reference widget's location. There are two additional data used to determine the location. These resources define integer values representing the number of pixels to add to the reference widget's location when calculating the widget's location.

XtNxRefName
XtNyRefName

Range of Values:

  (the name of a widget already created as a child of the form)

When a widget is added as a child of the form, its position is determined by the widget it references. These resources allow the name of the reference widget to be given. The form converts this name to a widget to use for the referencing. Any widget that is a direct child of the form or the form widget itself can be used as a reference widget.

If one of these resources is set and the corresponding resource, `XtNxRefWidget` or `XtNyRefWidget`, is also set, they must agree: the name given in `XtNxRefName` or `XtNyRefName` must match the name of the identified widget. The advantage of using these resources rather than `XtNxRefWidget` and `XtNyRefWidget` is that the references can be used before the widget instances are made.

XtNxRefWidget
XtNyRefWidget

Range of Values:

  (the ID of a widget already created as a child)

Instead of naming the reference widget, an application can give the reference widget's ID using these resources.

If both a widget ID and a widget name is given for a reference in the same dimension (x or y), they must refer to the same widget. If not, a warning is made and the widget ID is used.

XtNxResizable
XtNyResizable

Range of Values:

TRUE
FALSE

These resources specify whether the form can resize (expand or shrink) a widget. When a form's size becomes smaller, the form will resize its children only after resizing all the inter-widget spacing of widgets with their **XtNxVaryOffset** (**XtNyVaryOffset**) resource set to TRUE. The form keeps track of a widget's initial size or its size generated through calls to **XtSetValues()**, so that when the form then becomes larger, the widget will grow to its original size and no larger.

XtNxVaryOffset
XtNyVaryOffset

Range of Values:

TRUE
FALSE

When a form is resized, it processes the constraints contained within its children. These resources allow the spacing between a widget and the widget it references to vary (either increase or decrease) when a form's size changes. For widgets that directly reference the form widget, these resources are ignored. The spacing between a widget and its reference widget can decrease to zero pixels if the **XtNxAddWidth** (**XtNyAddHeight**) resource is FALSE or to one pixel if **XtNxAddWidth** (**XtNyAddHeight**) is TRUE.

NAME

Gauge – the graphical equivalent of a read only analog control

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Gauge.h>

widget = XtCreateWidget(name, gaugeWidgetClass, ...)
```

DESCRIPTION

Gauge Components

The **Gauge** widget is merely an indicator of amount of space available in any container it is measuring.

It consists of the following elements:

— Bar (typically)

— Shaded Bar (typically)

— Current Value (not visible)

— Minimum Value (not visible)

— Maximum Value (not visible)

Figure 1. Horizontal Gauge Widget

Application Notification

The application is responsible for providing any feedback to the end user deemed appropriate, such as updating the Current Value in a text field.

RESOURCES

Gauge Resource Set

Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfont	XtCFont	FontStruct *	(OPEN LOOK default)	SGI
XtNfontColor	XtCFontColor	Pixel	Black	SGI
XtNfontGroup	XtCFontGroup	OlFontList	NULL	SGI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNgranularity	XtCGranularity	int	1	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNminLabel	XtCLabel	String	NULL	SGI
XtNmaxLabel	XtCLabel	String	NULL	SGI
XtNorientation	XtCOrientation	OlDefine	OL_VERTICAL	GI
XtNrecomputeSize	XtCRecomputeSize	Boolean	FALSE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNsliderMax	XtCSliderMax	int	100	SGI
XtNsliderMin	XtCSliderMax	int	0	SGI
XtNsliderValue	XtCSliderValue	int	0	SGI
XtNspan	XtCSpan	Dimension	OL_IGNORE	SGI
XtNticks	XtCTicks	int	0	SGI
XtNtickUnit	XtCTickUnit	OlDefine	OL_NONE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNminLabel

This is the label to be placed next to the minimum value position. For a vertical gauge, the label is placed to the right of the minimum value position. If there is not enough space for the entire label and **XtNrecomputeSize** is FALSE, the label will be truncated from the end. If there is not enough space for the entire label and **XtNrecomputeSize** is TRUE, then the widget will request for more space to show the entire label.

For an horizontal gauge, the label is placed centered and below the minimum value position. If there is not enough room to center the label and **XtNrecomputeSize** is set to FALSE, the beginning of the label will be aligned with the left anchor and is drawn to the right. If this label collides with the max label, some part of the labels will overlap. If there is not enough room to center the label and **XtNrecomputeSize** is set to TRUE, the widget will request for more space to center the label below the minimum value position.

XtNmaxLabel

This is the label to be placed next to the maximum value position. For a vertical gauge, the label is placed to the right of the minimum value position. If there is not enough space for the entire label and **XtNrecomputeSize** is FALSE, the label will be truncated from the end. If there is not enough space for the entire label and **XtNrecomputeSize** is TRUE, then the widget will request for more space to show the entire label.

For an horizontal gauge, the label is placed centered and below the maximum value position. If there is not enough room to center the label and XtNrecomputeSize is set to FALSE, the end of the label will be aligned with the left anchor. If this label collides with the min label, some part of the labels will overlap. If there is not enough room to center the label and **XtNrecomputeSize** is set to TRUE, the widget will request for more space to center the label below the maximum value position.

XtNorientation

Range of Values:

OL_HORIZONTAL/"horizontal"
OL_VERTICAL/"vertical"

This resource defines the direction for the visual presentation of the widget.

XtNsliderMax
XtNsliderMin

Range of Values:

XtNsliderMin < XtNsliderMax

These two resources give the range of values tracked by the **Gauge** widget. Mathematically, the range is open on the right; that is, the range is the following subset of the set of integers:

XtNsliderMin ≤ range ≤ **XtNsliderMax**

XtNsliderValue

Range of Values:

XtNsliderMin ≤ **XtNsliderValue** ≤ **XtNsliderMax**

This resource gives the current position of the Drag Box, in the range [**XtNsliderMin** , **XtNsliderMax**]. The **Gauge** widget keeps this resource up to date.

XtNticks

This is the interval between tick marks. The unit of the interval value is determined by **XtNtickUnit**.

XtNtickUnit

Range of values:

OL_NONE/"none"
OL_SLIDERVALUE/"slidervalue"
OL_PERCENT/"percent"

This resource can have one of the values: OL_NONE, OL_SLIDERVALUE, and OL_PERCENT. If it is OL_NONE, then no tick marks will be displayed and `XtNticks` is ignored. If it is OL_PERCENT, then `XtNticks` is interpreted as the percent of the gauge value range. If it is OL_SLIDERVALUE, the `XtNticks` is interpreted as the same unit as gauge value.

Note: To be consistent with the scrollbar widget, we recommend that the effective spacing between tick marks, designated in `XtNticks` and `XtNtickUnit` be less than or equal to the spacing in `XtNgranularity`.

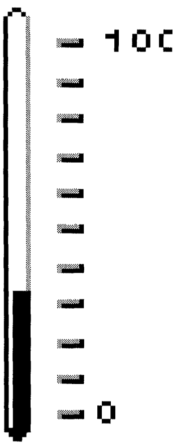


Figure 2. Gauge Widget with Tick Marks

XtNrecomputeSize

This resource, if set to TRUE, allows the gauge widget to resize itself whenever needed, to compensate for the space needed to show the tick marks and the labels. The gauge widget uses the `XtNspan`, the sizes of the labels, and `XtNtickUnit` to determine the preferred size.

XtNfont

This resource specifies the font used to draw the labels. It defaults to the OPEN LOOK standard font.

XtNfontcolor

This resource specifies the color used to draw the labels. It defaults to the foreground color of the gauge widget.

XtNspan

If **`XtNrecomputeSize`** is set to TRUE, then **`XtNspan`** should be set to reflect the preferred length of the gauge, not counting the space needed for the labels. The gauge widget uses the span value, the sizes of the labels, and **`XtNtickUnit`** to determine the preferred size.

NAME

MenuButton – provides a button with a MenuShell attached

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <MenuButton.h>

static Widget button, menupane, w;

Arg args[1];

button = XtCreateWidget(name, MenuButtonWidgetClass, ...);
OR
button = XtCreateWidget(name, menubuttonGadgetClass, ...);
XtSetArg(args[0], XtNmenuPane, &menupane);
XtGetValues(button, args, 1);

w = XtCreateWidget(name, widget-class, menupane, ...);
```

DESCRIPTION

The **MenuButton** widget provides the features of menu default selection and menu previewing as well as the features of the **Menu** widget.

MenuButton Components

Each menu button has the following parts:

Label

Border

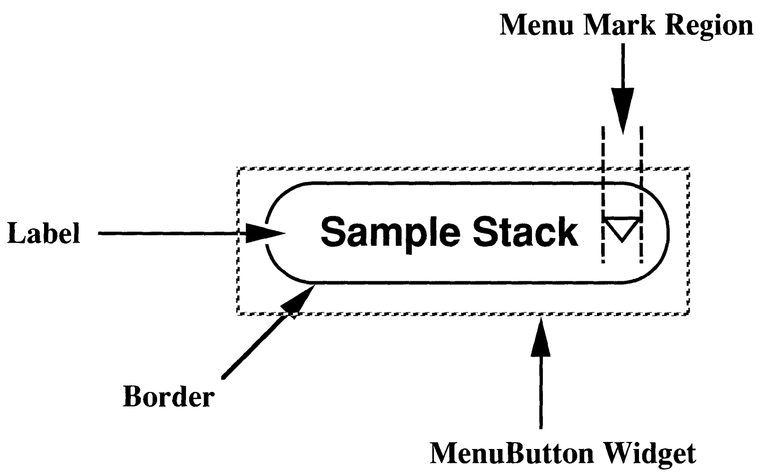


Figure 1. Menu Button

Each menu button also has the components of a **Menu** widget. These are not shown in Figure 1.

All Features of the Menu Widget

The **MenuButton** widget includes all the features of the **Menu** widget; the features of that widget apply here.

Selecting the Default Item

As an interface to a menu, each **MenuButton** widget has a Default Item. If the power-user option is on, this Default Item is selected by clicking SELECT over the **MenuButton** widget. If the Default Item is inactive (its **XtNsensitive** resource is FALSE), or busy (its **XtNbusy** resource is TRUE), the system beeps. (If the power-user option is off, clicking SELECT brings up a pop-up menu. The power-user option is set in the property sheet of the Workspace Manager. See the *OPEN LOOK™ GUI User's Guide* for more information on setting the power-user option.)

Since the Default Item may be the **MenuButton** widget itself, selecting it really selects *its* Default Item; this recurses through the menu tree until a non-**MenuButton** widget is found as the Default Item. The Default Item may be the pushpin in a menu.

If a pushpin is the Default Item, the menu is brought up as a *pinned menu*.

Previewing the Default Item

If the menu button is not in a *pop-up menu* and the power-user option is on, pressing SELECT, or moving the *pointer* into the menu button while SELECT is pressed, displays the *highlighted* label of the Default Item in place of the menu button's label. Releasing SELECT restores the original colors and label, and selects the Default Item as described above. Moving the pointer off the menu button before releasing also restores the original colors and label, but does not select the Default Item. (If the power-user option is off, pressing SELECT and releasing it displays a stayup menu. See **`Selecting the Default Item`** above for comments about the power-user option.)

This Default Item is the one in the menu directly under the menu button, not necessarily the Default Item at the end of the menu tree, that is activated when the Default Item is selected (see above).

NOTE:

The previewing feature is not accessible with keyboard only operation. This feature functions only when using a mouse to SELECT an item.

Popping Up the Menu—Not in a Menu

When the **`MenuButton`** widget is in a control area, pressing or clicking MENU when the pointer is within or on the Border pops up the menu button's menu in the direction of the menu mark.

Popping Up the Menu—As a Menu Button in a Menu

When the **`MenuButton`** widget is in a *stay-up menu*, pressing or clicking MENU when the pointer is within or on the Border pops up the menu button's menu in the direction of the menu mark. When the **`MenuButton`** widget is in a pop-up menu, moving the pointer into the menu mark region pops up the menu in the direction of the menu mark. The position is computed when the movement into the menu mark region is first detected, but rapid pointer motion and internal delays in popping up the menu may let the pointer wander.

Moving the pointer out of the **`MenuButton`** widget, but not directly into the newly popped up menu, causes that menu to be popped down. This occurs even if the pointer is moved into and out of the newly popped up menu in the interim.

Menu Placement When There is No Room

If the right or bottom edge of the screen is too close to allow the menu placement described above, the menu pops up aligned with the edge of the screen and the pointer is shifted horizontally to keep it four points from the left edge of the menu items. If the left edge of the screen is too close, the menu pops up four points from the edge and the pointer is shifted to lie on the edge. The pointer does not jump back after the menu is dismissed.

MenuButton Coloration

On a monochrome display, the MenuButton widget indicates that it has input focus by inverting the foreground and background colors of the control.

On color displays, when the MenuButton widget receives the input focus, the background color is changed to the input focus color set in the **XtNinput-FocusColor** resource.

EXCEPTIONS:

— If the input focus color is the same as the font color for the control labels, then the coloration of the active control is inverted.

— If the input focus color is the same as the Input Window Header Color and the active control is in the window header, then invert the colors.

— If the input focus color is the same as the window background color, then the MenuButton widget inverts the foreground and background colors when it has input focus.

Figure 2 illustrates the resources that affect the coloration of the **MenuButton** widget. Events that occur outside the Border (but within the **MenuButton** widget) are still in the domain of the menu button.

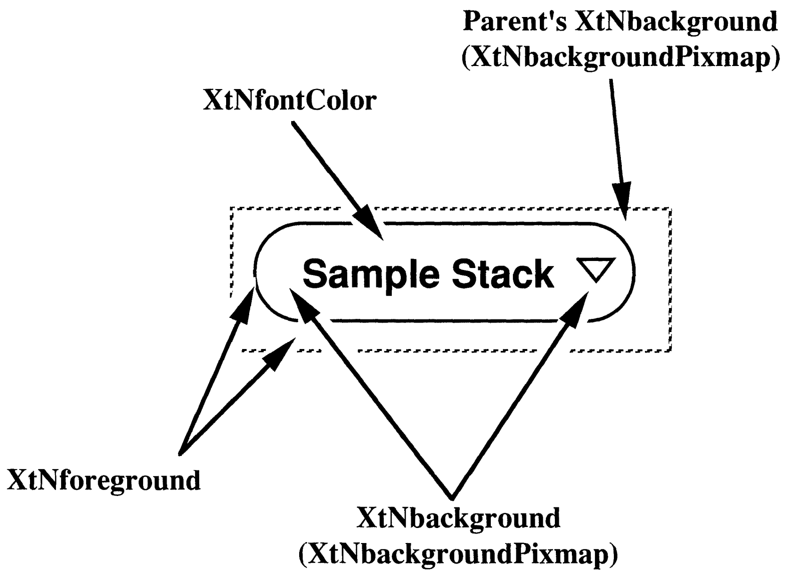


Figure 2. Menu Button Coloration

Label Appearance

The **XtNwidth**, **XtNheight**, **XtNrecomputeSize**, and **XtNlabelJustify** resources interact to produce a truncated, clipped, centered, or left-justified label as shown in Figure 3.

XtNwidth	XtNrecomputeSize	XtNlabelJustify	Result
any value	TRUE	any	Just Fits ▽
> needed for label	FALSE	OL_LEFT	Left Justified ▽
> needed for label	FALSE	OL_CENTER	Centered ▽
< needed for label	FALSE	any	Trunc▷ ▽
XtNheight	**XtNrecomputeSize**	**XtNlabelJustify**	**Result**
any value	TRUE	any	Just Fits ▽
> needed for label	FALSE	any	Centered ▽
< needed for label	FALSE	any	Clipped ▽

Figure 3. Label Appearance

When the label is centered or left-justified, the extra space is filled with the background color of the **MenuButton** widget, as determined by the **XtNbackground** and **XtNbackgroundPixmap** resources.

When a text label is truncated, the truncation occurs at a character boundary and a solid-white triangle is inserted to show that part of the label is missing. The triangle, of course, requires that more of the label be truncated than would otherwise be necessary. If the width of the button is too small to show even one character with the triangle, only the triangle is shown. If the width is so small that the entire triangle cannot be shown, the triangle is clipped on the right.

Keyboard Traversal

The default value of the **XtNtraversalOn** resource is True.

Keyboard traversal within a Menu is done using the PREV_FIELD, NEXT_FIELD, MOVEUP, MOVEDOWN, MOVELEFT and MOVERIGHT keys. The PREV_FIELD, MOVEUP, and MOVELEFT keys move the input focus to the previous Menu item with keyboard traversal enabled. If the input focus is on the first item of the Menu, then pressing one of these keys will wrap to the last item of the Menu with keyboard traversal enabled. The NEXT_FIELD, MOVEDOWN, and MOVERIGHT keys move the input focus to the next Menu item with keyboard traversal enabled. If the input focus is on the last item of the Menu, then pressing one of these keys will wrap to the first item of the Menu with keyboard traversal enabled.

To traverse out of the menu, the following keys can be used:

NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application

Keyboard Operation

The action of the SELECTKEY depends on whether the user has selected the power-user option. (The power-user option is set in the property sheet of the Workspace Manager. See the **`GUI User's Guide`** for more information on setting this option.) While focus is on the **`MenuButton`** and the power-user option is on, pressing the SELECTKEY activates the default menu item. If the power-user option is off, pressing the SELECTKEY posts the stayup menu.

The DEFAULTACTION key will activate the default control in the MenuButton widget as if the user clicked the SELECT button on the control. To dismiss a MenuButton's submenu while focus is with the submenu, the CANCEL key is used.

The MENUDEFAULTKEY can be used by the user to change the default control in the MenuButton widget. When the user presses the MENUDEFAULTKEY, the control which has input focus will become the default control.

MenuButton/MenuGadget Activation Types	
Activation Type	Expected Results
OL_MENUKEY	Popup the MenuButton's submenu and set focus to the menu's default item.
OL_MENUDEFAULTKEY	If the MenuButton is on a menu, this sets the MenuButton to be the menu's default.
OL_SELECTKEY	See the above discussion of SELECTKEY.

Display of Keyboard Mnemonic

The **`MenuButton`** widget displays the mnemonic accelerator for its child as part of its label. If the mnemonic character is in the label, then that character is highlighted according to the value of the application resource XtNshowMneumonics. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource XtNshowMneumonics.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **`MenuButton`** widget displays the keyboard accelerator as part of its label. The string in the **`XtNacceleratorText`** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

MenuButton Gadgets

MenuButton gadgets cannot be parents (i.e. cannot be used as the parent parameter when creating a widget or other gadget.

Gadgets share some core fields. But since they are not subclasses of **Core**, they do not have all **Core** fields. In particular, they don't have a name field or a translation field (so translations cannot be specified/overridden).

SUBSTRUCTURE

Menu Component

Name: menu
Class: Menu

Application Resources				
Name	Class	Type	Default	Access
*XtNcenter	XtCCenter	Boolean	TRUE	I
*XtNhPad	XtCHPad	Dimension	4	I
*XtNhSpace	XtCHSpace	Dimension	4	I
*XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	I
*XtNmeasure	XtCMeasure	int	1	I
XtNpushpin	XtCPushpin	OlDefine	OL_NONE	I
XtNpushpinDefault	XtCPushpinDefault	Boolean	FALSE	I
*XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	I
XtNtitle	XtCTitle	String	(widget's name)	I
*XtNvPad	XtCVPad	Dimension	4	I
*XtNvSpace	XtCVSpace	Dimension	4	I

* See the **Menu** and **ControlArea** widgets for more information on these resources.

RESOURCES

MenuButton Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI
XtNancestorSensitive	XtCAncestorSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
‡ XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdefault	XtCDefault	Boolean	FALSE	SGI
‡ XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfontGroup	XtCFontGroup	Pixel	XtDefaultForeground	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI

MenuButton Resource Set				
Name	**Class**	**Type**	**Default**	**Access**
XtNlabel	XtCLabel	String	(class name)	SGI
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI
‡ XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmenuMark	XtCMenuMark	OlDefine	(calculated)	SGI
XtNmenuPane	XtCMenuPane	Widget	(none)	G
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI
XtNrecomputeSize	XtCRecomputeSize	Boolean	TRUE	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

‡ These resources are not available to **MenuButton** gadgets.

XtNdefault

Range of Values:

TRUE
FALSE

If this resource is TRUE, the Border is doubled to two lines to show that the menu button contains the default choice of several buttons.

XtNlabel

This resource is a pointer to the text for the Label of the **MenuButton** widget.

XtNlabelJustify

Range of Values:

OL_LEFT/"left"
OL_CENTER/"center"

This resource dictates whether the Label should be left-justified or centered within the widget width.

XtNmenuMark

Range of Values:

OL_DOWN
OL_RIGHT

This resource specifies the direction of the menu arrow.

XtNmenuPane

This is the widget where menu items can be attached; its value is available once the **MenuButton** widget has been created.

XtNrecomputeSize

Range of Values:

TRUE
FALSE

This resource indicates whether the **MenuButton** widget should calculate its size and automatically set the **XtNheight** and **XtNwidth** resources. If set to TRUE, the **MenuButton** widget will do normal size calculations that may cause its geometry to change. If set to FALSE, the **MenuButton** widget will leave its size alone; this may cause truncation of the visible image being shown by the **Menu-Button** widget if the fixed size is too small, or may cause padding if the fixed size is too large. The location of the padding is determined by the **XtNlabelJus-tify** resource.

SEE ALSO

MenuShell "Programmatic Menu Popup and Popdown"

NAME

MenuShell – used to create a menu not associated with a menu button

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Menu.h>

static Widget menu, menupane, w;

Arg args[1];

menu = XtCreatePopupShell(name, menuShellWidgetClass, ...);
XtSetArg(args[0], XtNmenuPane, &menupane);
XtGetValues(menu, args, 1);

w = XtCreateWidget(name, widget-class, menupane, ...);
```

DESCRIPTION

Menu versus MenuButton

The **Menu** widget is used to create a menu not associated with either a menu button or an abbreviated menu button. For example, a **Menu** widget can be attached to a button, such as an **OblongButton** widget, but this does not make the button into a menu button. However, all the features of the **Menu** widget (except those related to menu creation) also pertain to the MenuButton menu.

Menu Components

A menu contains a set of Items that are presented to the end user for his or her selection. These are specified by the application as widgets attached to the menu. One of these Items is a Default Item. (A menu always has exactly one Default Item.) The Items are laid out in a Control Area. A menu also has a Title, a Title Separator, a Border or Window Border, and an optional Pushpin. Sometimes it also has a Drop Shadow. See Figure 1.

The application chooses the label for the Title and whether a menu has a Pushpin.

Sub-class of the Shell Widget

The **Menu** widget is a sub-class of the **Shell** widget. Therefore, as the SYNOPSIS shows, the **XtCreatePopupShell()** routine is used to create a menu instead of the normal **XtCreateWidget()**.

The following table lists the VendorShell resources and defaults for the OPEN LOOK Menu Shell. The Menu Shell is also a subclass of VendorShell.

Default Window Decorations		
Resource	Type	Default
XtNmenuButton	Boolean	FALSE
XtNpushpin	OlDefine	OL_NONE
XtNresizeCorners	Boolean	FALSE
XtNwindowHeader	Boolean	TRUE

Menu Pane

The Menu Pane is not described as a separate widget in these requirements; the only interface to it for the application programmer is as a parent widget to which the widgets comprising the menu items are attached. The menu items are not attached directly to the **Menu** widget, since a shell widget can take only one child. The SYNOPSIS shows how the widget ID of the Menu Pane is obtained from the **Menu** widget.

Connecting a Menu to a Widget

A menu can be connected to any widget, including primitive widgets. The connection is made by creating the menu widget as a child of the other widget. Of course, being a shell widget, the **Menu** widget is not a normal widget-child of its parent, but a pop-up child. If the application allows it, the menu augments the parent's event list so that the popping-up of the menu is handled automatically.

Popup Control

Pressing MENU when the pointer is over the parent of the **Menu** widget causes the menu to be popped up. The menu is presented as a pop-up menu, where the Items are available for a *press-drag-release* type of selection (see below). Clicking MENU when the pointer is over the parent of the **Menu** widget also causes the menu to be popped up, but the menu is presented as a stay-up menu, where the Items are available for a *click-move-click* type of selection, instead (see below). A "slow click" (a press with a noticeable delay before the release) may show the menu as a pop-up on the press, then as a stay-up on the *release.*

Use of the Pushpin

The Pushpin is presented to the end user like any of the items to be selected from the menu, except that it is always the top-most item, and is presented visually as an "adornment" of the header, next to the Title (if present). The end user selects the Pushpin, pushing it in to cause the menu to remain on the display as an OPEN LOOK window or pinned menu, and pulling it out to make the menu a stay-up menu. To the end user, a pinned menu behaves indistinguishably from a command window.

The Default Item

If none of the menu items are explicitly set as the default item, the menu picks the first menu item to be the default item. If the menu contains a pushpin and no other menu item is explicitly set as the default item, the pushpin is chosen as the default item.

Components Shown when Popped Up

A pop-up or stay-up menu shows the Title, Border, Pushpin (if available), Items, and Drop Shadow. The Title is left out if the menu is from either a menu button or an abbreviated menu button. A pinned menu shows the Window Border, Title, Pushpin, Items, but no Drop Shadow.

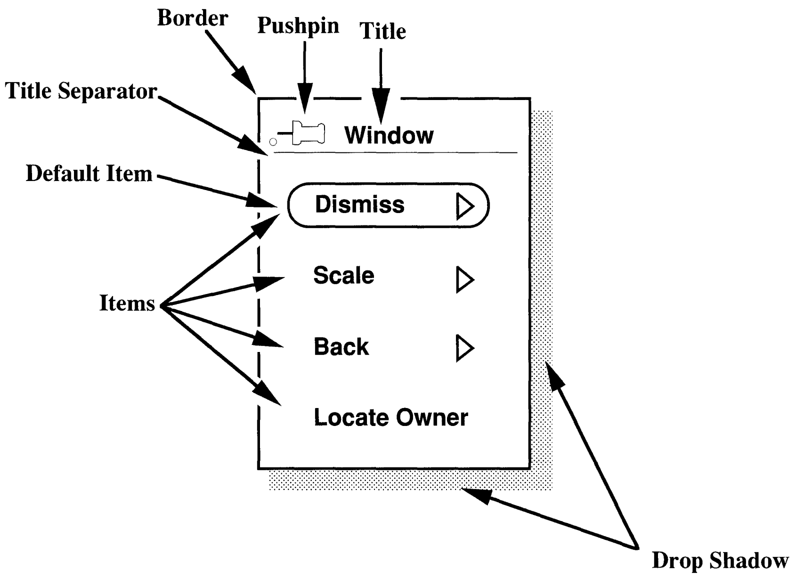


Figure 1. Menu Components

Popup Position

If the menu is not from a menu button, the menu pops up so that the Default Item is vertically centered four points to the right of the pointer. If the right or bottom edge of the screen is too close to allow this placement, the menu pops up with the Drop Shadow aligned with the edge of the screen, and the mouse pointer is shifted horizontally to keep it four points from the left edge of the Default Item.

For the pop-up position when the menu is from a menu button, see **MenuButton**(3W).

Programmatic Menu Popup and Popdown

Four convenience routines are provided to programmatically control the mapping and unmapping of menus.

```
void OlMenuPopup(menu, emanate, item_index, state, set_position, x, y, position_proc)
    Widget              menu;
    Widget              emanate;
    Cardinal            item_index
    OlDefine            state;
    Boolean             set_position;
    Position            x;
    Position            y;
    OlMenuPositionProc  position_proc;
```

menu	A menuShellWidget id obtained by creating a menu explicitly.
emanate	This field specifies the object that the menu is currently associated with and it is supplied to the *position_proc* when the menu positioning is done. If this field is NULL, the menu's parent object is used as the emanate object for later positioning calculations.
item_index	If emanate is a flattened widget this parameter specifies the particular item.
state	**Range of values:** **OL_PINNED_MENU** **OL_PRESS_DRAG_MENU** **OL_STAYUP_MENU** This specifies the state the menu should be in when it visibly appears on the screen.
set_position	A Flag indicating whether the following two arguments (x and y) are used to help position the menu. If the flag is NULL the current Pointer Location is used to initialize x and y.
x y	These coordinates are used by the positioning routine. Typically, these values represent the pointer with respect to the RootWindow. For example, **xevent->xbutton.x_root** and **xevent->xbutton.y_root.** However, if the menu's state is OL_PINNED_MENU, these coordinates represent the desired upper-left hand corner of the pinned menu.
position_proc	Procedure called to determine the menu's position if the menu's state is either OL_PINNED_MENU or OL_STAYUP_MENU. If the menu's state is OL_PINNED_MENU, the position_proc value is ignored. If this procedure is NULL, the default positioning routine (that is, the one associated with the emanate widget or the menu's parent) is used. The type of this procedure is:

```
void (*OlMenuPositionProc)(menu, emanate, item_index, state, mx, my, px, py)
     Widget          menu;
     Widget          emanate;
     Cardinal        item_index
     OlDefine        state;
     Position *,     mx;
     Position *,     my;
     Position *,     px;
     Position *,     px;
```

menu	**MenuShellWidget** id to be positioned.
emanate	Menu's emanate widget.

item_index	Emanate item_index or OL_NO_ITEM
state	menu's state, either OL_PRESS_DRAG_MENU or OL_STAYUP_MENU
mx	Pointer containing the menu's current x location. If the position routine wants to move the menu, it should change this value. The position routine should
my	Pointer containing the menu's current y location. If the position routine wants to move the menu, it should change this value. The position routine should not move the menu explicitly.
px	Represents the x location supplied to the OlMenuPopup routine. If the position routine changes this value, the pointer is warped to the new x location.
py	Represents the y location supplied to the OlMenuPopup routine. If the position routine changes this value, the pointer is warped to the new y location.

```
void OlMenuPost(menu)
        Widget    menu;
```

A convenience routine that is equivalent to **OlMenuPopup(menu, NULL, OL_STAYUP_MENU,** FALSE, **0, 0, (OlMenuPositionProc)NULL.**

void OlMenuPopdown(*menu, dismiss_pinned)*

```
        Widget    menu;
        Boolean   dismiss_pinned;
```

This routine pops down a menu. If a menu is pinned, a value of TRUE for *dismiss_pinned* is required to dismiss it. If a menu does not have a pushpin or the menu is not pinned, the *dismiss_pinned* field is ignored.

void OlMenuUnpost(*menu)*

```
        Widget    menu;
```

A convenience routine that is equivalent to **OlMenuPopdown(menu,** FALSE).

Press-Drag-Release vs Click-Move-Click Selection Control

The **Menu** arranges for its children to respond to either the press-drag-release or the click-move-click type of selection. With the press-drag-release type of control, the user keeps MENU pressed and moves the pointer to the Item of choice; releasing MENU selects the Item and pops the menu down. If the pointer is not over an Item when MENU is released, the menu simply pops down. With the click-move-click type of control, the user moves the pointer to the Item of choice (MENU has already been released to end a click); clicking SELECT or MENU selects the Item and pops the menu down. If the pointer is not over an Item when SELECT or MENU is clicked, the menu simply pops down.

These selection methods apply to all menu items except menu buttons. For example, in Figure 1 above, Locate Owner can be selected using the methods described here. For the other items in Figure 1 (which are menu buttons), see **MenuButton**(3W) for the explanation of menu button selection behavior.

Converting a Stay-up Menu to a Pop-up Menu

Pressing MENU in a stay-up menu converts it to a pop-up menu. Thus the click-move-click selection control becomes a press-drag-release selection control.

Highlighting of Menu Items

In the press-drag-release type of selection control, each menu Item highlights while the pointer is over it. The form of the highlighting depends on the type of widget making up the Item. Again, the `Menu` widget arranges for its children to respond in this way. No highlighting occurs when the click-move-click type of selection control is used.

Menu Coloration

Figure 2 illustrates the resources that affect the coloration of the `Menu` widget.

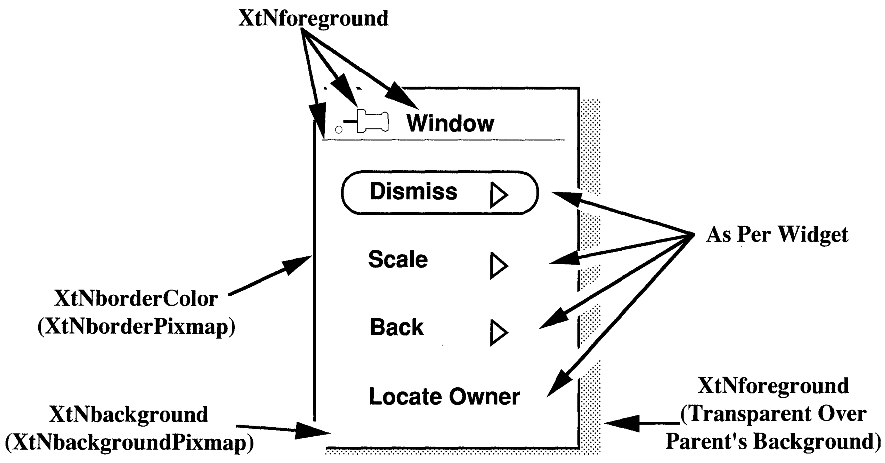


Figure 2. Menu Coloration

Keyboard Traversal

By default, all Menus will allow traversal among the traversable controls added to the widget.

Popping up a Menu via the keyboard is done by traversing to a MenuButton, using NEXT_FIELD, PREV_FIELD, MOVEUP, MOVEDOWN, MOVERIGHT, or LEFT, and pressing the MENUKEY key. If a Menu is attached to a control besides a MenuButton, it can be popped up by traversing to that control and pressing the MENUKEY.

Keyboard traversal within a Menu is done using the PREV_FIELD, NEXT_FIELD, MOVEUP, MOVEDOWN, MOVELEFT and MOVERIGHT keys. The PREV_FIELD, MOVEUP, and MOVELEFT keys move the input focus to the previous Menu item with keyboard traversal enabled. If the input focus is on the first item of the Menu, then pressing one of these keys will wrap to the last item of the Menu with keyboard traversal enabled. The NEXT_FIELD, MOVEDOWN, and MOVERIGHT keys move the input focus to the next Menu item with keyboard traversal enabled. If the input focus is on the last item of the Menu, then pressing one of these keys will wrap to the first item of the Menu with keyboard traversal enabled.

To traverse out of the menu, the following keys can be used:

CANCEL	dismisses the menu and returns focus to the originating control
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application

Keyboard Operation

If input focus is on a MenuButton with in a Menu, pressing the MENUKEY will post the cascading Menu associated with the MenuButton, and input focus will be on the first Menu item with traversal enabled.

The DEFAULTACTION key will activate the default control in the Menu widget as if the user clicked the SELECT button on the control.

The MENUDEFAULTKEY can be used by the user to change the default control in the Menu widget. When the user presses the MENUDEFAULTKEY, the control which has input focus will become the default control.

The TOGGLEPUSHPIN key changes the state of the pushpin in the window header. If the pushpin is in, TOGGLEPUSHPIN will pull the pin out and dismiss the window. If the pushpin is out, TOGGLEPUSHPIN will stick the pin in.

MenuShell Activation Types	
Activation Type	Expected Results
OL_CANCEL	Dismiss this menu and any other menus cascading off of it.
OL_DEFAULTACTION	Calls `OlActivateWidget` for the default item with the activation_type as OL_SELECTKEY.
OL_TOGGLEPUSHPIN	Same semantics as TOGGLEPUSHPIN above.

SUBSTRUCTURE

Menu Pane component

Application Resources				
Name	**Class**	**Type**	**Default**	**Access**
XtNcenter	XtCCenter	Boolean	TRUE	I
XtNhPad	XtCHPad	Dimension	4	I
XtNhSpace	XtCHSpace	Dimension	4	I
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	I
XtNmeasure	XtCMeasure	int	1	I
XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	I
XtNvPad	XtCVPad	Dimension	4	I
XtNvSpace	XtCVSpace	Dimension	4	I

RESOURCES

Menu Resource Set				
Name	Class	Type	Default	Access
XtNallowShellResize	XtCAllowShellResize	Boolean	TRUE	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNcreatePopupChildProc	XtCCreatePopupChildProc	XtCreatePopupChildProc	NULL	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfocusWidget	XtCFocusWidget	Widget	NULL	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNheightInc	XtCHeightInc	int	-1	SGI
XtNinput	XtCInput	Boolean	FALSE	G
XtNmaxAspectX	XtCMaxAspectX	Position	-1	SGI
XtNmaxAspectY	XtCMaxAspectY	Position	-1	SGI
XtNmaxHeight	XtCMaxHeight	Dimension	OL_IGNORE	SGI
XtNmaxWidth	XtCMaxWidth	Dimension	OL_IGNORE	SGI
XtNmenuAugment	XtCMenuAugment	Boolean	TRUE	GI
XtNmenuPane	XtCMenuPane	Widget	(none)	G
XtNminAspectX	XtCMinAspectX	Position	-1	SGI
XtNminAspectY	XtCMinAspectY	Position	-1	SGI
XtNminHeight	XtCMinHeight	Dimension	OL_IGNORE	SGI
XtNminWidth	XtCMinWidth	Dimension	OL_IGNORE	SGI
XtNpopdownCallback	XtCCallback	XtCallbackList	NULL	SI
XtNpopupCallback	XtCCallback	XtCallbackList	NULL	SI
XtNpushpin	XtCPushpin	OlDefine	OL_NONE	GI
XtNpushpinDefault	XtCPushpinDefault	Boolean	FALSE	GI
XtNsaveUnder	XtCSaveUnder	Boolean	FALSE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtitle	XtCTitle	String	(widget's name)	SGI

Menu Resource Set				
Name	Class	Type	Default	Access
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNwidthInc	XtCWidthInc	int	-1	SGI

XtNfocusWidget

This is the ID of the widget to get focus the next time this shell takes focus. Therefore, as a user traverses objects via the keyboard or explicitly sets focus to an object (for example, clicking SELECT), the value of the XtNfocusWidget resource is updated to reflect this as the object with focus.

XtNmenuAugment

Range of Values:

TRUE
FALSE

If this resource is TRUE, the **Menu** widget will augment its parent's event handling so that the pressing or clicking of MENU automatically pops up the menu. If FALSE, the application is responsible for detecting when the menu should be popped up. (Please see the earlier section on "Programmatic Menu Popup and Popdown.")

XtNmenuPane

This is the widget where menu items can be attached; its value is available once the **Menu** widget has been created.

XtNpushpin

Range of Values:

OL_NONE/"none"
OL_OUT/"out"

This resource controls whether the **Menu** widget has a pushpin. If set to **OL_NONE**, no pushpin will be included in the list of menu items, which means the user cannot pin the menu to keep it around. If set to **OL_OUT**, a pushpin will be included as an item the user can select; if the end user selects the pushpin, the menu will be made into an OPEN LOOK window. Note that the pushpin item is always at the top of the menu list. (This resource is also available in other widgets, but with three allowed values, including **OL_IN**. This third value is not allowed for the **Menu** widget.)

XtNpushpinDefault

Range of Values:

TRUE
FALSE

Setting this resource to TRUE makes the Pushpin the Default Item.

Note:
If a menu has a pushpin and none of the menu pane items have been designated as the default, the pushpin automatically becomes the menu's Default Item.

XtNtitle

This resource gives the Title of the **Menu** widget.

NAME

Nonexclusives – allows the end-user to select one or more of a set of choices

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Nonexclusi.h>

widget = XtCreateWidget(name, nonexclusivesWidgetClass, ...);
```

DESCRIPTION

The **Nonexclusives** widget provides a simple way to build a several-of-many button selection object. It manages a set of rectangular buttons or check boxes, providing layout management and selection control.

Grid Layout and Button Labels

The **Nonexclusives** widget lays out the rectangular buttons or check boxes in a grid in the order they are added as child widgets by the application. The number of rows or columns in this grid can be controlled by the application. If the grid has more than one row, the **Nonexclusives** widget forces the rectangular buttons or check boxes in each column to be the same size as the widest in the column. (Note: If the grid is a single row, each button will be only as wide as necessary to display the label.)

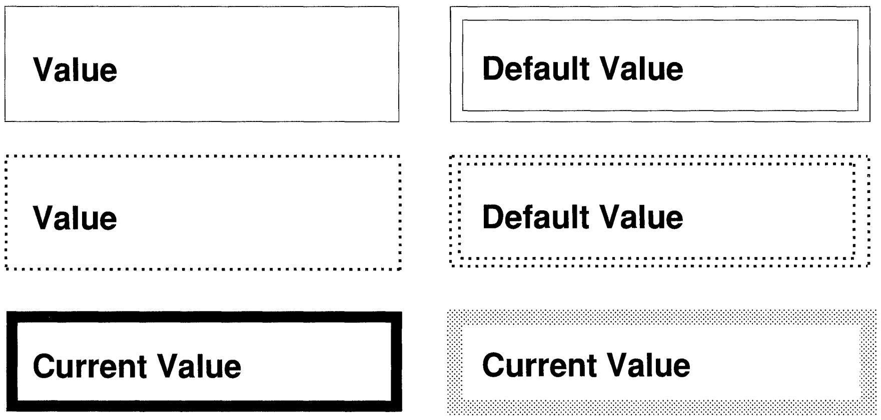


Figure 1. Example of Nonexclusive Buttons

Use in a Menu

The **Nonexclusives** widget can be added as a single child to a menu pane to implement a several-of-many menu choice. Only **RectButton** widgets can be used in a **Nonexclusives** widget in a menu.

Child Constraint

The **Nonexclusives** widget constrains its child widgets to be of class **rectButtonWidgetClass** or **checkBoxWidgetClass**. Additionally, all the child widgets must be of the same class.

Nonexclusives Coloration

There is no explicit foreground or background in the **Nonexclusives** composite widget; each rectangular button has its own foreground and background. The space between the rectangular buttons or check boxes is the same color or pixmap as the parent of the **Nonexclusives** widget.

Keyboard Traversal

The Nonexclusives widget manages the traversal between a set of RectButtons. When the user traverses to a Nonexclusives widget, the first RectButton in the set will receive input focus. The MOVEUP, MOVEDOWN, MOVERIGHT, and MOVELEFT keys move the input focus between the RectButtons. To traverse out of the Nonexclusives widget, the following keys can be used:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application.
PREVWINDOW	moves to the previous window in the application.
NEXTAPP	moves to the first window in the next application.
PREVAPP	moves to the first window in the previous application.

These controls have two states: "set" and "not set". Pressing the SELECTKEY on a nonexclusive control will toggle the current state. If the control is in a Menu, then the MENUKEY will also toggle the current state. If the control is "set", then toggling the control will call the **XtNunselect** callback list. If the control is "not set", then toggling the control will call the **XtNselect** callback list.

RESOURCES

Nonexclusives Resource Set

Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmeasure	XtCMeasure	int	1	SGI
XtNreferenceName	XtCReferenceName	String	NULL	GI

Nonexclusives Resource Set (cont'd)				
Name	**Class**	**Type**	**Default**	**Access**
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	GI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNlayoutType

Range of Values:

OL_FIXEDROWS/"fixedrows"
OL_FIXEDCOLS/"fixedcols"

This resource controls the type of layout of the child widgets by the **Nonexclusives** composite. The choices are to specify the number of rows or the number of columns. Only one of these dimensions can be specified directly; the other is determined by the number of child widgets added, and will always be enough to show all the child widgets.

The values of the **XtNlayoutType** resource can be

OL_FIXEDROWS if the layout should have a fixed number of rows;

OL_FIXEDCOLS if the layout should have a fixed number of columns.

XtNmeasure

Range of Values:

0 < XtNmeasure

This resource gives the number of rows or columns in the layout of the child widgets. If there are not enough child widgets to fill a row or column, the remaining space is left blank. If there is only one row (column), and it is not filled with child widgets, the remaining "space" is of zero width (height).

NAME

`NoticeShell` – contains a message area which is used for user confirmation

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Notice.h>

static Widget notice, textarea, controlarea, w;

Arg args[2];

notice = XtCreatePopupShell(name, noticeShellWidgetClass, ...);
XtSetArg(args[0], XtNtextArea, &textarea);
XtSetArg(args[1], XtNcontrolArea, &controlarea);
XtGetValues(notice, args, 2);

w = XtCreateWidget(name, widget-class, controlarea, ...);
.
.
.
XtPopup(notice, XtGrabExclusive);
```

DESCRIPTION

Notice Components

The **Notice** widget has three components: a Text Area where the message to the end user is displayed; a Control Area containing one or more widgets that the end user uses to control how to continue with an application; and a Default Button. Another important element is the Emanate Widget, which is typically the control activated by the end user that requires immediate attention. The application identifies the Emanate Widget to the **Notice** widget.

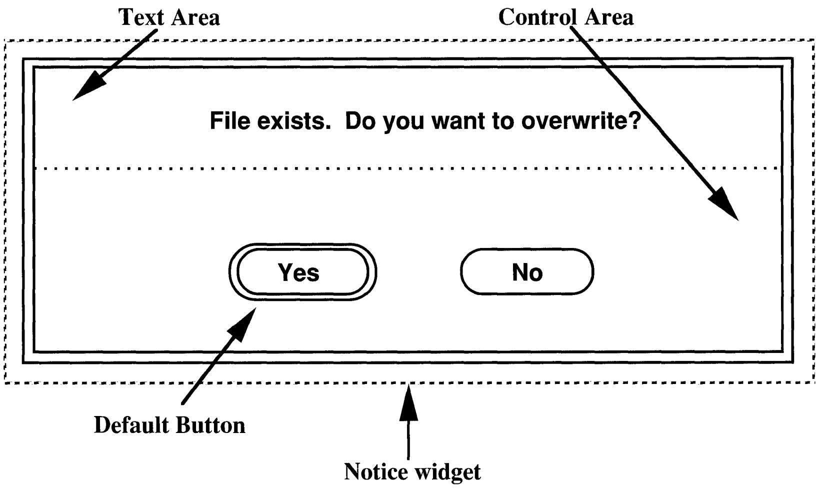


Figure 1. Notice Widget

Sub-class of the Shell Widget

The `Notice` widget is a sub-class of the `Shell` widget. Therefore, as the SYNOPSIS shows, the `XtCreatePopupShell()` routine is used to create a notice instead of the normal `XtCreateWidget()`.

The following table lists the VendorShell resources and defaults for the Notice Shell. The Notice Shell is also a subclass of the OPEN LOOK VendorShell.

Default Window Decorations		
Resource	Type	Default
XtNmenuButton	Boolean	FALSE
XtNpushpin	OlDefine	OL_NONE
XtNresizeCorners	Boolean	FALSE
XtNwindowHeader	Boolean	FALSE

Popping the Notice Up/Down

The application controls when the `Notice` widget is to be displayed or popped up. As shown in the SYNOPSIS, the `XtPopup()` routine can be used for this.

However, the application does not need to control when the `Notice` widget is to be popped down. The widget itself detects when to pop down: the end user clicks SELECT on an `OblongButton` widget in the Control Area. This behavior requires that there be at least one `OblongButton` widget in the Control Area. If other types of controls are used instead, the application can "manually" pop the notice down using a routine such as `XtPopdown()`.

Busy Button, Busy Application

When the **Notice** pops up, it "freezes" the entire application except the Notice to prevent the end user from interacting with any other part of the application. As feedback of this to the user, the **Notice** causes the headers of all the base windows and pop-up windows to be stippled in the "busy" pattern, and causes a stipple pattern in the Emanate Widget. The latter stipple pattern is caused by setting the **XtNbusy** resource to TRUE in the Emanate Widget. If the widget does not recognize this resource, nothing will happen.

On popping down, the **Notice** widget clears all stipple patterns and "unfreezes" the application.

Text and Control Areas

The Text and Control Areas are handled by separate widget interfaces. The SYNOPSIS shows how the widget IDs of the Text Area (**textarea**) and the Control Area (**controlarea**) are obtained from the **Notice** widget.

The Text and Control Areas abut so that there is no space between the two. An application can control the distance between the text and the controls by setting margins in the Control Area.

Notice Coloration

Figure 2 illustrates the resources that affect the coloration of the **Notice** widget.

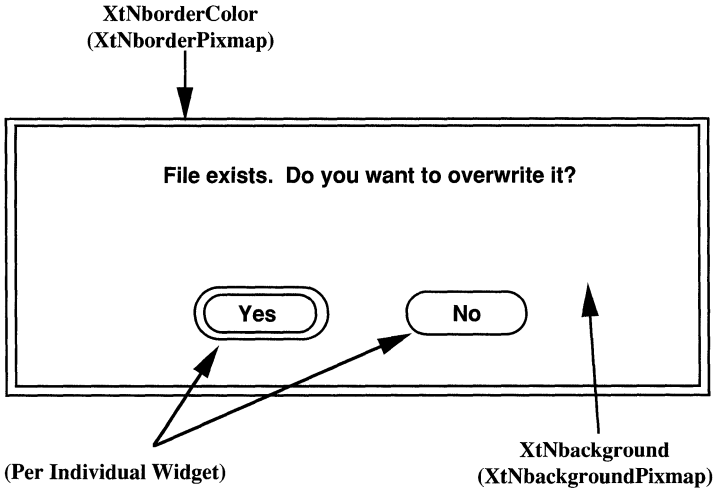


Figure 2. Notice Coloration

Keyboard Traversal

The **Notice** widget limits keyboard traversal of the application to the buttons within the **ControlArea**. The user can traverse between the controls in the **ControlArea** using the NEXT_FIELD, PREV_FIELD, MOVEUP, MOVEDOWN, MOVERIGHT, and MOVELEFT keys. The NEXTAPP key will traverse to the next application, and the PREVAPP key will traverse to the the previous application, but the NEXTWINDOW and PREVWINDOW keys are disabled. When keyboard traversal is used to move back to the Notice's application, focus goes to the Notice.

Notice Activation Types	
Activation Type	Expected Results
OL_CANCEL	Beep
OL_DEFAULTACTION	Call **OlActivateWidget** for the default widget with parameter OL_SELECTKEY

SUBSTRUCTURE

Control Area component

Name: controlarea
Class: ControlArea

Application Resources				
Name	Class	Type	Default	Access
XtNhPad	XtCHPad	Dimension	0	I
XtNhSpace	XtCHSpace	Dimension	4	I
XtNlayoutType	XtCLayoutType	OllDefine	OL_FIXEDROWS	I
XtNmeasure	XtCMeasure	int	1	I
XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	I
XtNvPad	XtCVPad	Dimension	0	I
XtNvSpace	XtCVSpace	Dimension	4	I

See the **ControlArea** widget for the descriptions of these resources.

Text Area component

Name: textarea
Class: StaticText

Application Resources*(cO				
Name	Class	Type	Default	Access
XtNalignment	XtCAlignment	int	OL_LEFT	I
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	XtDefaultForeground	SGI
XtNfontGroup	XtCFontGroup	OlFontList	NULL	SGI
XtNlineSpace	XtCLineSpace	int	0	I
XtNstring	XtCString	String	NULL	I
XtNstrip	XtCStrip	Boolean	TRUE	I
XtNwrap	XtCWrap	Boolean	TRUE	I

See the **StaticText** widget for the descriptions of these resources.

RESOURCES

Notice Resource Set				
Name	Class	Type	Default	Access
XtNallowShellResize	XtCAllowShellResize	Boolean	TRUE	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNcontrolArea	XtCControlArea	Widget	(none)	G
XtNcreatePopupChildProc	XtCCreatePopupChildProc	XtCreatePopupChildProc	NULL	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNemanateWidget	XtCEmanateWidget	Widget	(parent's)	SGI
XtNfocusWidget	XtCFocusWidget	Widget	NULL	SGI
XtNgeometry	XtCGeometry	String	NULL	GI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNpopdownCallback	XtCCallback	XtCallbackList	NULL	SI
XtNpopupCallback	XtCCallback	XtCallbackList	NULL	SI
XtNsaveUnder	XtCSaveUnder	Boolean	FALSE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtextArea	XtCTextArea	Widget	(none)	G
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNcontrolArea

This is the widget ID of the **ControlArea** class composite child widget where controls can be attached; its value is available once the **Notice** widget has been created.

Any widgets of the class **OblongButton** added to the Control Area are assumed to be window disposition controls; that is, when the end user activates one of them, the **Notice** widget pops itself down.

XtNemanateWidget

Range of Values:

(ID of existing widget)

This resource identifies the Emanate Widget. On popping up, the **Notice** widget attempts to set this widget to be busy, by making its **XtNbusy** resource TRUE; if the widget doesn't recognize the resource, nothing happens. On popping down, the **Notice** widget clears the **XtNbusy** resource.

When the **Notice** widget pops up, it tries not to cover this widget; this may fail depending on its location and the size of the **Notice** widget.

The default for this resource is the parent. The parent, however, cannot be a Gadget (OblongButtonGadget, for instance). To emanate a Notice from a Gadget, specify another widget as the parent and set **XtNemanateWidget** to the Gadget.

XtNtextArea

This is the widget ID of the **StaticText** class child widget that controls the Text Area; its value is available once the **Notice** widget has been created.

NAME

`OblongButton` - a one-choice element or button used to execute a command

SYNOPSIS

```
#include <Intrinsic.h>
#include <OpenLook.h>
#include <StringDefs.h>
#include <OblongButt.h>

widget = XtCreateWidget(name, oblongButtonWidgetClass, ...);
OR
widget = XtCreateWidget(name, oblongButtonGadgetClass, ...);
```

DESCRIPTION

OblongButton Components

The **OblongButton** consists of a Label surrounded by a rounded oblong, Border.

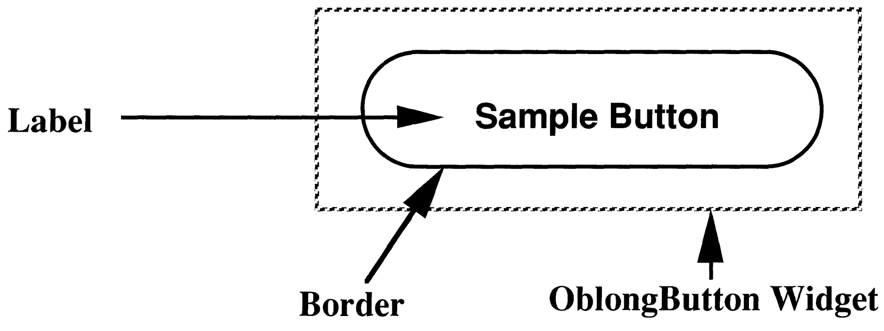


Figure 1. Oblong Buttons

Busy Button while Action Takes Place

Each **OblongButton** is associated with an application-defined action implemented as a list of callbacks. To let the end user know that an action is still taking place, the **OblongButton** stipples the area inside the border before issuing the callbacks. When the last callback returns, the **OblongButton** restores its original appearance. If the application's action continues to be "busy" after the callbacks return, the application should set the **XtNbusy** resource to TRUE before returning from the callbacks, then reset it to FALSE when the action is no longer taking place.

The "busy" stipple pattern is designed to show enough dots to gray the button noticeably, while still leaving a text label legible.

Oblong Buttons in a Pop-up Menu

Entering an oblong button while MENU is depressed previews the set appearance of the button. Releasing MENU then restores the original appearance and invokes the action for the button as described above. Leaving the button before releasing MENU restores the appearance but does not invoke the action.

Oblong Buttons not in a Pop-up Menu

Clicking SELECT on an oblong button starts the action associated with the button. Pressing SELECT, or moving the pointer into the button while SELECT is pressed, previews the set appearance of the button. Releasing SELECT restores the appearance and invokes the action for the button as described above. Moving the pointer off the button before releasing SELECT also restores the appearance, but does not invoke the action.

If the oblong button is in a stay-up menu, clicking or pressing MENU works the same as SELECT. If the oblong button is not in a stay-up (or pop-up) menu, clicking or pressing MENU does not do anything; the event is passed up to an ancestor widget.

OblongButton Gadgets

`OblongButton` gadgets cannot be parents (i.e., be used as the parent parameter when creating a widget or other gadget).

Correct button behavior is not guaranteed if gadgets are positioned so that they overlap.

Gadgets share some core fields but, since they are not subclasses of Core, do not have all Core fields. In particular, they don't have a name field or a translation field (so translations cannot be specified/overriden).

Event Handlers cannot be added to gadgets using **`XtAddEventHandler`**.

Label Appearance

The **`XtNwidth`**, **`XtNheight`**, **`XtNrecomputeSize`**, and **`XtNlabelJustify`** resources interact to produce a truncated, clipped, centered, or left-justified label as shown in Figure 3.

XtNwidth	XtNrecomputeSize	XtNlabelJustify	Result
any value	TRUE	any	Just Fits
> needed for label	FALSE	OL_LEFT	Left Justified
> needed for label	FALSE	OL_CENTER	Centered
< needed for label	FALSE	any	Trunc▷

XtNheight	XtNrecomputeSize	XtNlabelJustify	Result
any value	TRUE	any	Just Fits
> needed for label	FALSE	any	Centered
< needed for label	FALSE	any	Clipped

Figure 3. Label Appearance

When the label is centered or left-justified, the extra space is filled with the background color of the **OblongButton** widget, as determined by the **XtNbackground** and **XtNbackgroundPixmap** resources.

When a text label is truncated, the truncation occurs at a character boundary and a solid triangle is inserted to show that part of the label is missing. The triangle requires that more of the label be truncated than would otherwise be necessary. If the width of the button is too small to show even one character with the triangle, only the triangle is shown. If the width is so small that the entire triangle cannot be shown, the triangle is clipped on the right.

An image label is simply truncated; no triangle is shown.

See also the **XtNlabelTile** resource for how it affects the appearance of a label image.

OblongButton Coloration

Figure 2 illustrates the resources that affect the coloration of the **OblongButton** widget.

Note: Events that occur outside the Border (but within the **OblongButton** widget) are still in the domain of the button.

On a monochrome display, the OblongButton widget indicates that it has input focus by inverting the foreground and background colors of the control.

On color displays, when the OblongButton widget receives the input focus, the background color is changed to the input focus color set in the **XtNinputFocusColor** resource.

EXCEPTIONS:

— If the input focus color is the same as the font color for the control labels, then the coloration of the active control and fonts is inverted.

— If the input focus color is the same as the Input Window Header Color and the active control is in the window header, then the colors are inverted.

— If the input focus color is the same as the window background color, then the OblongButton widget inverts the foreground and background colors when it has input focus.

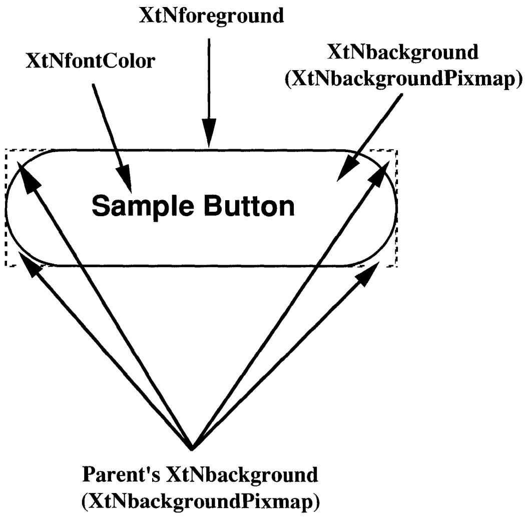


Figure 2. Oblong Button Coloration

Keyboard Traversal

The default value of the **XtNtraversalOn** resource is True.

The OblongButton widget responds to the following keyboard navigation keys:

NEXT_FIELD, MOVEDOWN, and MOVERIGHT
move to the next traversable widget in the window

PREV_FIELD, MOVEUP, and MOVELEFT
move to the previous traversable widget in the window

NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application

The OblongButton will respond to the SELECTKEY by acting as if the SELECT buttons had been clicked.

Oblong Button/Gadget Activation Types	
Activation Type	Expected Results
OL_MENUDEFAULTKEY	Set the sub-object as the shell's default object (if on a menu)
OL_SELECTKEY	Call its callbacks

Display of Keyboard Mnemonic

The **OblongButton** widget displays the mnemonic accelerator for its child as part of its label. If the mnemonic character is in the label, then that character is displayed/highlighted according to the If the mnemonic character is not in the label, value of the application resource **XtNshowMneumonics**. it is displayed to the right of the label in parenthesis and displayed/highlighted according to the value of the application resource **XtNshowMneumonics**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **OblongButton** widget displays the keyboard accelerator as part of its label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

RESOURCES

OblongButton Resource Set

Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
‡ XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNbusy	XtCBusy	Boolean	FALSE	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdefault	XtCDefault	Boolean	FALSE	SGI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI

OblongButton Resource Set				
Name	Class	Type	Default	Access
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNlabel	XtCLabel	String	(class name)	SGI
XtNlabelImage	XtCLabelImage	XImage *	NULL	SGI
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI
XtNlabelTile	XtCLabelTile	Boolean	FALSE	SGI
XtNlabelType	XtCLabelType	OlDefine	OL_STRING	SGI
‡ XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI
XtNrecomputeSize	XtCRecomputeSize	Boolean	TRUE	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNselect	XtCCallback	XtCallbackList	NULL	SI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

‡ These resources are not available to OblongButton gadgets.

XtNbusy

Range of Values:

TRUE
FALSE

This resource controls whether the button interior should be stippled to show that the action associated with the button is "busy." While **XtNbusy** is TRUE, the system will beep if the end user attempts to select the button; the attempt is refused and no callbacks are invoked.

XtNdefault

Range of Values:

TRUE
FALSE

If this resource is TRUE, and the button is in a menu, an oval ring is drawn around the button to show that the button is the default choice of one or more buttons.

XtNlabel

This resource is a pointer to the text for the Label. This resource is ignored if the **XtNlabelType** resource has the value **OL_IMAGE**.

XtNlabelImage

This resource is a pointer to the image for the Label. This resource is ignored unless the **XtNlabelType** resource has the value **OL_IMAGE**.

If the image is of type **XYBitmap**, the image is highlighted when appropriate by reversing the 0 and 1 values of each pixel (i.e. by "'xor'ing" the image data). If the image is of type **XYPixmap** or **ZPixmap**, the image is not highlighted, although the space around the image inside the Border is highlighted.

If the image is smaller than the space available for it inside the Border and **XtNlabelTile** is FALSE, the image is centered vertically and either centered or left-justified horizontally, depending on the value of the **XtNlabelJustify** resource. If the image is larger than the space available for it, it is clipped so that it does not stray outside the Border. If the **XtNdefault** resource is TRUE so that the Border is doubled, the space available is that inside the inner line of the Border.

XtNlabelJustify

Range of Values:

OL_LEFT/"left"
OL_CENTER/"center"

This resource dictates whether the Label should be left-justified or centered within the widget width.

XtNlabelTile

Range of Values:

TRUE
FALSE

This resource augments the **XtNlabelImage/XtNlabelPixmap** resource to allow tiling the sub-object's background. For an image/pixmap that is smaller than the sub-object's background, the label area is tiled with the image/pixmap to fill the sub-object's background if this resource is TRUE; otherwise, the label is placed as described by the **XtNlabelJustify** resource.

The **XtNlabelTile** resource is ignored for text labels.

XtNlabelType

Range of Values:

OL_STRING/"string"
OL_IMAGE/"image"
OL_POPUP/"popup"

This resource identifies the form that the Label takes. It can have the value **OL_STRING** for text, **OL_IMAGE** for an image, or **OL_POPUP** for text followed by an ellipsis (such as **label...**).

XtNrecomputeSize

Range of Values:

TRUE
FALSE

This resource indicates whether the **OblongButton** widget should calculate its size and automatically set the **XtNheight** and **XtNwidth** resources. If set to TRUE, the **OblongButton** widget will do normal size calculations that may cause its geometry to change. If set to FALSE, the **OblongButton** widget will leave its size alone; this may cause truncation of the visible image being shown by the **OblongButton** widget if the fixed size is too small, or may cause padding if the fixed size is too large. The location of the padding is determined by the **XtNla-belJustify** resource.

XtNselect

This is the list of callbacks invoked when the widget is selected.

NAME

`PopupWindowShell` – creates an OPEN LOOK property window or command window

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <PopupWindo.h>

static void
Apply (w,client_data,call_data)
Widget w;
XtPointer client_data, call_data;
{
     printf ("Apply callback!\n");
}

Arg   args[3];
Widget      popupwindow, parent;
Widget      upper, lower, panel;

static XtCallbackRec applycalls[] = {
     { Apply, NULL },
     { NULL, NULL },
};

XtSetArg(args[0], XtNapply, (XtArgVal) applycalls);

popupwindow = XtCreatePopupShell(     name,
                                 popupWindowShellWidgetClass,
                                 parent, args, 1);

XtSetArg(args[0], XtNupperControlArea, &upper);
XtSetArg(args[1], XtNlowerControlArea, &lower);
XtSetArg(args[2], XtNfooterPanel, &panel);

XtGetValues(popupshell, args, 3);

w = XtCreateWidget(name, widget-class, upper, ...);
w = XtCreateWidget(name, widget-class, lower, ...);
w = XtCreateWidget(name, widget-class, panel,
.
.
.
XtPopup(popupwindow, XtGrabNone);
```

DESCRIPTION

Controls not Automatically Related to Selected Objects

The **PopupWindow** widget can be used to implement the OPEN LOOK property window. It manages the creation of a property window and provides a simple interface for populating the window with controls. However, it has no innate semantics to relate the controls with a selected object; this must be handled by the application. For example, the application must dim all the controls if an object selected by the end user is incompatible with a displayed property window.

PopupWindow Components

The **PopupWindow** widget has the following parts:

— Upper Control Area

— Lower Control Area

— Window Border

— Popup Window Menu

— Settings Menu (Conditional)

— Apply Button (Conditional)

— Reset Button (Conditional)

— Reset to Factory Button (Conditional)

— Set Defaults Button (Conditional)

— Header

— Window Mark

— Pushpin (Optional)

— Resize Corners (Optional)

— Footer (Optional)

The Window Border, Popup Window Menu, Header, Window Mark, and Push-pin provide the end user with window management controls over the **PopupWin-dow** widget. The Apply, Reset, Reset to Factory, and Set Defaults Buttons are automatically created, if needed, to help create a standard layout of a property window. The application controls which of these, if any, appear in the pop-up window.

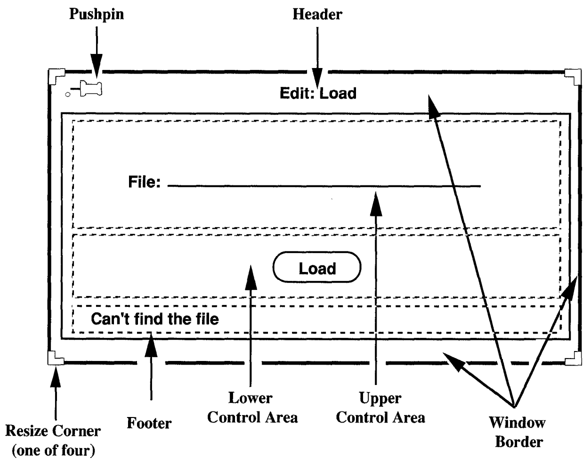


Figure 1. PopupWindow

Automatic Addition of Buttons, Settings Menu

To aid in the creation of a property window, the **PopupWindow** has several callbacks typically used in such a pop-up window, for applying, resetting, etc. For each of these callbacks that the application sets in the argument list used for creation of the **PopupWindow**, the **PopupWindow** widget automatically creates a button in the Lower Control Area, and the same button in the Settings Menu. If none of the callbacks are defined, no buttons are automatically created and no Settings Menu is created.

If the application is building a command window, it has to create whatever buttons and menus are needed.

Sub-class of the Shell Widget

The **PopupWindow** widget is a sub-class of the **Shell** widget. Therefore, as the SYNOPSIS shows, the **XtCreatePopupShell()** routine is used to create a pop-up window instead of the normal **XtCreateWidget()**.

The following table lists the VendorShell resources and defaults for the PopupWindowShell. The PopupWindowShell is also a subclass of the OPEN LOOK VendorShell.

Default Window Decorations		
Resource	Type	Default
XtNmenuButton	Boolean	FALSE
XtNpushpin	OlDefine	OL_OUT
XtNresizeCorners	Boolean	FALSE
XtNwindowHeader	Boolean	TRUE

Popping the Pop-up Window Up/Down

The application controls when the **PopupWindow** widget is to be displayed, or popped up. As indicated in the SYNOPSIS, the **XtPopup()** routine can be used for this.

The application also has the responsibility for raising a mapped pop-up window to the front if the user attempts to pop it up and it's already up. This can be accomplished using the **XRaiseWindow** function.

However, the application cannot control when the **PopupWindow** widget is to be popped down, since the end user may have pinned it up with the intent that it stays up until he or she dismisses it. The widget itself detects when to pop down: the end user clicks SELECT on an **OblongButton** widget in the Lower Control Area, or the end user dismisses the pop-up window using the Popup Window Menu or pushpin.

Upper and Lower Control Areas

The Upper and Lower Control Areas are handled by separate widget interfaces. The SYNOPSIS shows how the widget IDs of the control areas (**upper** and **lower**) and footer container (**panel**) are obtained from the **PopupWindow** widget.

The two Control Areas and the Footer abut so that there is no space between them. An application can control the distance between the controls in the Control Areas by setting margins in each area.

If the **PopupWindow** widget automatically creates the Apply, Reset, Reset to Factory, or Set Defaults Buttons, it puts them in that order in the Lower Control Area. No space is left for a missing button. These buttons will also appear before any buttons added to the Lower Control Area by the application.

PopupWindow Coloration

Figure 2 illustrates the resources that affect the coloration of the **PopupWindow** widget.

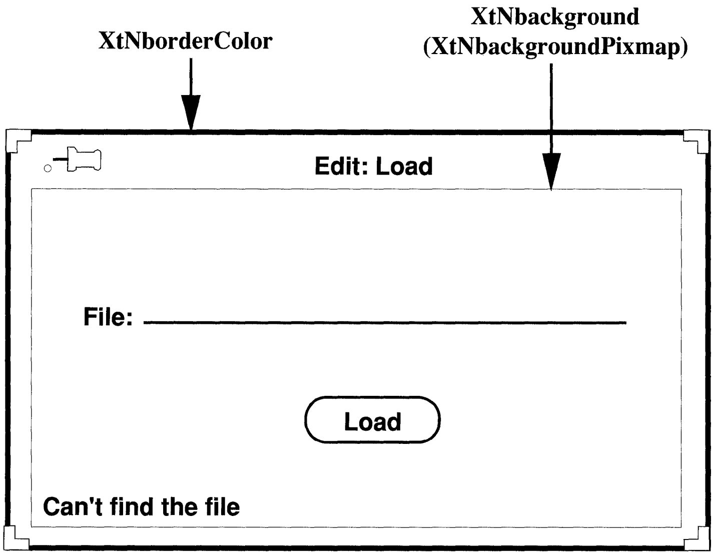


Figure 2. Popup Window Coloration

Keyboard Traversal

The **PopupWindow** widget has a number of components which the user can traverse between. The buttons in the Lower Control Area and in the Settings Menu have the following mnemonics.

Resource	Button Name	Mnemonic
XtNapply	Apply	A
XtNreset	Reset	R
XtNresetFactory	Reset to Factory	F
XtNsetDefaults	Set Defaults	S

These mnemonics will be displayed in the button labels according to the value returned by OlQueryMnemonicDisplay(). The buttons are created with **XtNtraversalOn** set to True.

The TOGGLEPUSHPIN key changes the state of the pushpin in the window header. If the pushpin is in, TOGGLEPUSHPIN will pull the pin out and pop down the window. If the pushpin is out, TOGGLEPUSHPIN will stick the pin in.

PopupWindow Activation Types	
Activation Type	Expected Results
OL_CANCEL	Popdown window
OL_DEFAULTACTION	Call OlActivateWidget for the default widget with parameter OL_SELECTKEY
OL_TOGGLEPUSHPIN	Toggle pushpin state

SUBSTRUCTURE

Lower Control Area and Upper Control Area components

Names: lower, upper
Class: ControlArea

The following resources are directed to *both* Control Area components. To set different values for the same resources in the different Control Areas, the application must access the resources using the appropriate Control Area widget IDs.

Application Resources				
Name	Class	Type	Default	Access
XtNalignCaptions	XtCAlignCaptions	Boolean	†	I
XtNcenter	XtCCenter	Boolean	FALSE	I
XtNhPad	XtCHPad	Dimension	4	I
XtNhSpace	XtCHSpace	Dimension	4	I
XtNlayoutType	XtCLayoutType	OlDefine	‡	I
XtNmeasure	XtCMeasure	int	1	I
XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	I
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNvPad	XtCVPad	Dimension	4	I
XtNvSpace	XtCVSpace	Dimension	4	I

† The default is TRUE for the Upper Control Area and FALSE for the Lower Control Area.

‡ The default is OL_FIXEDCOLS for the Upper Control Area and OL_FIXEDROWS for the Lower Control Area.

Footer

Names: panel
Class: FooterPanel

RESOURCES

PopupWindow Resource Set				
Name	Class	Type	Default	Access
XtNallowShellResize	XtCAllowShellResize	Boolean	TRUE	SGI
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G*
XtNapply	XtCCallback	XtCallbackList	NULL	I
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†

PopupWindow Resource Set				
Name	Class	Type	Default	Access
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNcreatePopupChildProc	XtCCreatePopupChildProc	XtCreatePopupChildProc	NULL	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfooterPanel	XtCFooterPanel	Widget	(none)	G
XtNgeometry	XtCGeometry	String	NULL	GI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNheightInc	XtCHeightInc	int	-1	SGI
XtNfocusWidget	XtCFocusWidget	Widget	NULL	SGI
XtNinput	XtCInput	Boolean	FALSE	G
XtNlowerControlArea	XtCLowerControlArea	Widget	(none)	G
XtNmaxAspectX	XtCMaxAspectX	int	-1	SGI
XtNmaxAspectY	XtCMaxAspectY	int	-1	SGI
XtNmaxHeight	XtCMaxHeight	int	OL_IGNORE	SGI
XtNmaxWidth	XtCMaxWidth	int	OL_IGNORE	SGI
XtNminAspectX	XtCMinAspectX	int	-1	SGI
XtNminAspectY	XtCMinAspectY	int	-1	SGI
XtNminHeight	XtCMinHeight	int	OL_IGNORE	SGI
XtNminWidth	XtCMinWidth	int	OL_IGNORE	SGI
XtNpopdownCallback	XtCCallback	XtCallbackList	NULL	SI
XtNpopupCallback	XtCCallback	XtCallbackList	NULL	SI
XtNpushpin	XtCPushpin	OlDefine	OL_OUT	GI
XtNresetButton	XtCResetButton	Widget	NULL	G
XtNresetFactory	XtCCallback	XtCallbackList	NULL	I
XtNresizeCorners	XtCResizeCorners	Boolean	True	SGI
XtNsaveUnder	XtCSaveUnder	Boolean	FALSE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNsetDefaults	XtCCallback	XtCallbackList	NULL	I
XtNtitle	XtCTitle	String	NULL	SGI
XtNupperControlArea	XtCUpperControlArea	Widget	(none)	G
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNverify	XtCCallback	XtCallbackList	NULL	I
XtNwidth	XtCWidth	Position	(calculated)	SGI
XtNwidthInc	XtCWidthInc	Position	-1	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

The following resources provide the widget identifier for the buttons that are created in the PopupWindow widget. The application can add an accelerator to these buttons, or change the default mnemonic by accessing the Button's resources.

XtNfooterPanel

This is the widget ID of the **FooterPanel** class composite child widget that handles the Footer; its value is available once the **PopupWindow** widget has been created. If the application wants a footer, it can add one to the composite identified by this resource.

XtNlowerControlArea
XtNupperControlArea

These are the widget IDs of the **ControlArea** class composite child widgets that handle the Lower Control Area and Upper Control Area, respectively. The application can use each widget ID to populate the **PopupWindow** with controls. These widget IDs are available once the **PopupWindow** widget has been created.

Any widgets of the class **OblongButton** added to the Lower Control Area are assumed to be window disposition controls; that is, when the end user activates one of them the **PopupWindow** widget should pop itself down, if allowed by the application and the state of the pushpin.

XtNverify

This resource defines the callbacks to be invoked when the **PopupWindow** attempts to pop itself down. The **call_data** parameter is a pointer to a variable of type **Boolean**. It is initially set to TRUE, and the application should set a value that reflects whether the pop-down is allowed. Typically, the application will use this to prevent a pop-down so that an error message can be displayed.

Since more than one callback routine may be registered for this resource, each callback routine can first check the value pointed to by the **call_data** parameter to see if a previous callback in the list has already rejected the pop-down attempt. If one has, the subsequent callback need not continue evaluating whether a pop-down is allowed. If the value is still TRUE after the last callback returns, the pop-down continues.

Since these callbacks are issued before the **PopupWindow** checks the state of the pushpin, the application should not assume that the pop-down will occur even though it has allowed it.

NAME

`RectButton` – a primitive widget consisting of a label surrounded by a rectangular border

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <RectButton.h>

widget = XtCreateWidget(name, rectButtonWidgetClass, ...);
```

DESCRIPTION

RectButton Components

The `RectButton` widget implements one of the OPEN LOOK button widgets. It consists of a Label surrounded by a rectangular Border. The Border can change to reflect that the button may be a default of several buttons (double border), or represents a current state of an object (thick border), or represents a current state of one of several objects with different states (dimmed border).

Figure 1 shows several buttons, in normal, default, and current states (two versions).

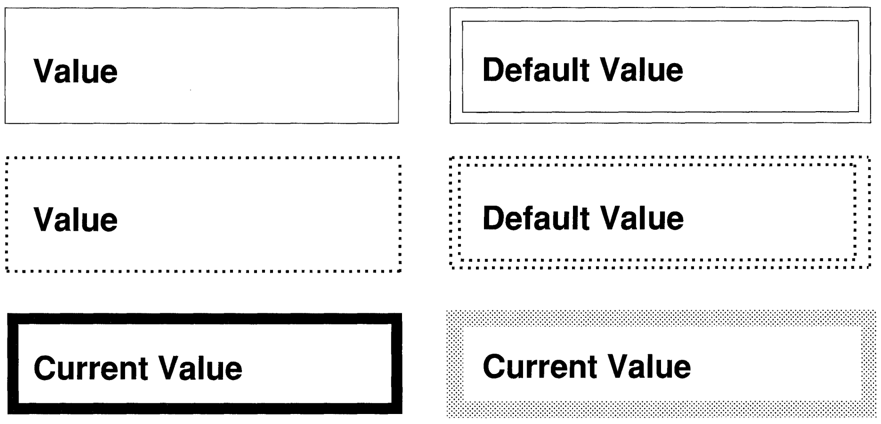


Figure 1. Rectangular Buttons

Use of Rectangular Buttons

Rectangular buttons are not used alone but in one of the **`Exclusives`** or **`Nonexclusives`** composite widgets for implementing a one-of-many or several-of-many selection. Making this widget a child of a different composite widget will not produce an error message, but proper behavior is not guaranteed.

Toggling the State

A **RectButton** widget has two states: "set" and "not set". (When set, its border is thickened.) Toggling this state alternates a resource (**XtNset**) between "true" and "false" and starts an action associated with the button. The **RectButton** widget is typically toggled by the user using SELECT or MENU, except that it is possible to disable user toggling of a button that is already set.

Work in Exclusives/Nonexclusives Only

If a **RectButton** widget is not the child of an Exclusives or **NonExclusives** widget, it will toggle between set and unset status, as in **Nonexclusives.**

Rectangular Buttons in a Pop-up Menu

Entering a rectangular button while MENU is depressed changes the appearance of the button from unset to set state or vice versa, to reflect the state the button would be in if MENU were released. Releasing MENU toggles the state associated with the button. Leaving the button before releasing MENU restore the original state appearance and does not toggle the button.

Rectangular Buttons Not in a Pop-up Menu

Clicking SELECT on a rectangular button toggles the state associated with it. Pressing SELECT, or moving the pointer into the button while SELECT is pressed, changes the border from unset to set state or vice versa, to reflect the state the button would be in if SELECT were released. Releasing SELECT toggles the state. Moving the pointer off the button before releasing SELECT restores the state appearance and does not toggle the button. but does not toggle the state.

If the button is in a stay-up menu, clicking or pressing MENU works the same as SELECT. If the button is not in a stay-up (or pop-up) menu, clicking or pressing MENU does not do anything; the event is passed up to an ancestor widget.

XtNdim

Range of Values:

TRUE
FALSE

If this resource is TRUE, then the button border is dimmed to show that the button represents the state of one or more of several objects that, as a group, are in different states.

XtNlabel

This resource is a pointer to the text for the Label. This resource is ignored if the **XtNlabelType** resource has the value **OL_IMAGE**.

XtNlabelImage

This resource is a pointer to the image for the Label. This resource is ignored unless the **XtNlabelType** resource has the value **OL_IMAGE**.

If the image is of type **XYBitmap**, the image is highlighted when appropriate by reversing the 0 and 1 values of each pixel (for example, by "'xor'ing" the image data). If the image is of type **XYPixmap** or **ZPixmap**, the image is not highlighted, although the space around the image inside the Border is highlighted.

If the image is smaller than the space available for it inside the Border and **XtNlabelTile** is FALSE, the image is centered vertically and either centered or left-justified horizontally, depending on the value of the **XtNlabelJustify** resource. If the image is larger than the space available for it, it is clipped so that it does not stray outside the Border. If the **XtNdefault** resource is TRUE so that the Border is doubled, the space available is that inside the inner line of the Border.

XtNlabelJustify

Range of Values:

OL_LEFT/"left"
OL_CENTER/"center"

This resource dictates whether the Label should be left-justified or centered within the widget width.

XtNlabelTile

Range of Values:

TRUE
FALSE

This resource augments the **XtNlabelImage/XtNlabelPixmap** resource to allow tiling of the sub-object's background. For an image/pixmap that is smaller than the sub-object's background, the label area is tiled with the image/pixmap to fill the sub-object's background if this resource is TRUE; otherwise, the label is placed as described by the **XtNlabelJustify** resource.

The **XtNlabelTile** resource is ignored for text labels.

XtNlabelType

Range of Values:

OL_STRING/"string"
OL_IMAGE/"image"

This resource identifies the form that the Label takes. It can have the value **OL_STRING** or **OL_IMAGE** for text or image, respectively.

XtNrecomputeSize

Range of Values:

TRUE
FALSE

This resource indicates whether the **RectButton** widget should calculate its size and automatically set the **XtNheight** and **XtNwidth** resources. If set to TRUE, the **RectButton** widget will do normal size calculations that may cause its geometry to change. If set to FALSE, the **RectButton** widget will leave its size alone; this may cause truncation of the visible image being shown by the **RectButton** widget if the fixed size is too small, or may cause padding if the fixed size is too large. The location of the padding is determined by the **XtNlabelJustify** resource.

XtNselect

This is the list of callbacks invoked when the widget is selected.

XtNset

Range of Values:

TRUE
FALSE

This resource reflects the current state of the button. The button's border is thickened to show a TRUE state.

XtNunselect

This is the list of callbacks invoked when a **RectButton** widget is toggled into the "unset" mode by the end user to make **XtNset** be FALSE. Note that simply setting **XtNset** to FALSE with a call to **XtSetValues()** does not issue the **XtNunselect** callbacks.

XtNdim, XtNdefault, XtNset

The **XtNdim**, **XtNdefault**, and **XtNset** resources can be set independently; however, all these states cannot be reflected in the visual appearance of the rectangular button, as the state table in Figure 3 shows.

XtNset	XtNdefault	XtNdim	Border appearance
TRUE	TRUE/FALSE	TRUE	Dimmed
TRUE	TRUE/FALSE	FALSE	Thickened
FALSE	TRUE	TRUE	Open
FALSE	TRUE	FALSE	Open
FALSE	FALSE	TRUE	Normal
FALSE	FALSE	FALSE	Normal

Figure 3. Rectangular Button Appearance when Set/Default/Dim

Label Appearance

The **XtNwidth**, **XtNheight**, **XtNrecomputeSize**, and **XtNlabelJustify** resources interact to produce a truncated, clipped, centered, or left-justified label as shown in Figure 4.

XtNwidth	XtNrecomputeSize	XtNlabelJustify	Result
any value	TRUE	any	Just Fits
> needed for label	FALSE	OL_LEFT	Left Justified
> needed for label	FALSE	OL_CENTER	Centered
< needed for label	FALSE	any	Trunc▷
XtNheight	**XtNrecomputeSize**	**XtNlabelJustify**	**Result**
any value	TRUE	any	Just Fits
> needed for label	FALSE	any	Centered
< needed for label	FALSE	any	Clipped

Figure 4. Label Appearance

When the label is centered or left-justified, the extra space is filled with the background color of the **RectButton** widget, as determined by the **XtNbackground** and **XtNbackgroundPixmap** resources.

When the label is truncated, a solid-black triangle is inserted to show that part of the label is missing. The triangle requires that more of the label be truncated than would otherwise be necessary. If the width of the button is too small to show even one character with the triangle, only the triangle is shown. If the width is so small that the entire triangle cannot be shown, the triangle is clipped on the right.

See also the **XtNlabelTile** resource for how it affects the appearance of a label.

RectButton Coloration

Figure 2 illustrates the resources that affect the coloration of the **RectButton** widget.

On a monochrome display, the RectButton widget indicates that it has input focus by inverting the foreground and background colors of the control.

On color displays, when the RectButton widget receives the input focus, the background color is changed to the input focus color set in the **XtNinputFocusColor** resource.

EXCEPTIONS:

— If the input focus color is the same as the font color for the control labels, then the coloration of the active control is inverted.

— If the input focus color is the same as the Input Window Header Color and the active control is in the window header, then invert the colors.

— If the input focus color is the same as the window background color, then the RectButton widget inverts the foreground and background colors when it has input focus.

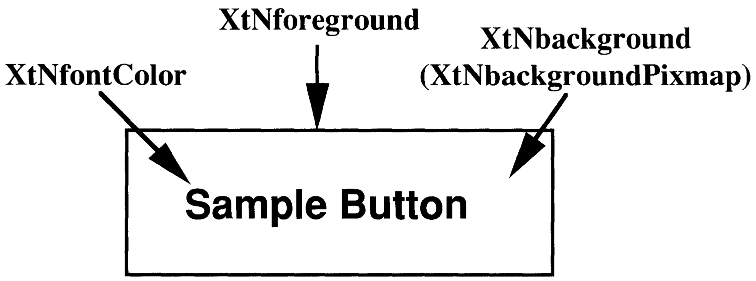


Figure 2. Rectangular Button Coloration

Keyboard Traversal

The default value of the `XtNtraversalOn` resource is True.

The RectButton widget responds to the following keyboard navigation keys:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
MOVEUP	moves to the RectButton above the current widget in the Nonexclusives or Exclusives composite
MOVEDOWN	moves to the RectButton below the current widget in the Nonexclusives or Exclusives composite

LEFT	moves to the RectButton to the left of the current widget in the Nonexclusives or Exclusives composite
MOVERIGHT	moves to the RectButton to the right of the current widget in the Nonexclusives or Exclusives composite
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application

The RectButton will respond to the SELECTKEY by acting as if the SELECT buttons had been clicked.

RectButton Activation Types

Activation Type	Expected Results
OL_MENUDEFAULTKEY	Set the sub-object as the shell's default object (if on a menu)
OL_SELECTKEY	Call its callbacks

Display of Keyboard Mnemonic

The **RectButton** widget displays the mnemonic accelerator for its child as part of its label. If the mnemonic character is in the label, then that character is highlighted according to the value of the application resource **XtNshowMneumonics**. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource **XtNshowMneumonics**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

Display of Keyboard Accelerators

The **RectButton** widget displays the keyboard accelerator as part of its label. The string in the **XtNacceleratorText** resource is displayed to the right of the label (or mnemonic) separated by at least one space. The acceleratorText is right justified.

If truncation is necessary, the accelerator is truncated as a unit. The accelerator is truncated before the mnemonic or the label.

RESOURCES

RectButton Resource Set

Name	Class	Type	Default	Access
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI

RectButton Resource Set				
Name	Class	Type	Default	Access
XtNdefault	XtCDefault	Boolean	FALSE	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNdim	XtCDim	Boolean	FALSE	SGI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNfontGroup	XtCFontGroup			
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNlabel	XtCLabel	String	(class name)	SGI
XtNlabelImage	XtCLabelImage	XImage *	NULL	SGI
XtNlabelJustify	XtCLabelJustify	OlDefine	OL_LEFT	SGI
XtNlabelTile	XtCLabelTile	Boolean	FALSE	SGI
XtNlabelType	XtCLabelType	int	OL_STRING	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNrecomputeSize	XtCRecomputeSize	Boolean	TRUE	SGI
XtNselect	XtCCallback	XtCallbackList	NULL	SI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNset	XtCSet	Boolean	TRUE	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNunselect	XtCCallback	XtCallbackList	NULL	SI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI

XtNdefault

Range of Values:

TRUE
FALSE

If this resource is TRUE, the Border is doubled to two lines, to show that the button is the default choice of one or more buttons.

NAME

`Scrollbar` – moves or scrolls the view of an associated pane

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Scrollbar.h>

static Widget scrollbar, menupane, w;

Arg args[1];

scrollbar = XtCreateWidget(name, scrollbarWidgetClass, . . .);

     /*use the following instruction to add a button to the
       scrollbar menu*/

XtSetArg(args[0], XtNmenuPane, &menupane);
XtGetValues(scrollbar, args, 1)
w = XtCreateWidget(name, widget-class, menupane, . . .);
```

DESCRIPTION

Scrollbar Components

Each full scrollbar has the following parts:

— Top (Left) Anchor

— Bottom (Right) Anchor

— Up (Left) Arrow

— Down (Right) Arrow

— Drag Area

— Elevator

— Cable

— Proportion Indicator

— Scrollbar Menu

— Page Indicator (optional)

A scrollbar consists of two Anchors, an Elevator, a Cable, a Proportion Indicator, a Menu, and optionally a Page Indicator. The Anchors are located at both ends of the cable. They are used to move the view to the corresponding extreme of the item or list of items being viewed. The Elevator, which slides along the length of the cable, consists of the Up Arrow, Down Arrow, and a Drag Area in the middle for moving the view. The arrow boxes are used to move the view in the direction of the arrow by one unit of granularity. The Drag Area is used to move the view by tracking the position of the mouse pointer relative to the scrollbar. The Proportion Indicator moves along with the Elevator to indicate the size of the view and its position relative to the entire item or list of items being viewed. The optional Page Indicator located next to the Drag Area indicates the page number of the content being viewed. The Page Indicator will be displayed only when the SELECT button is pressed in the Drag Area.

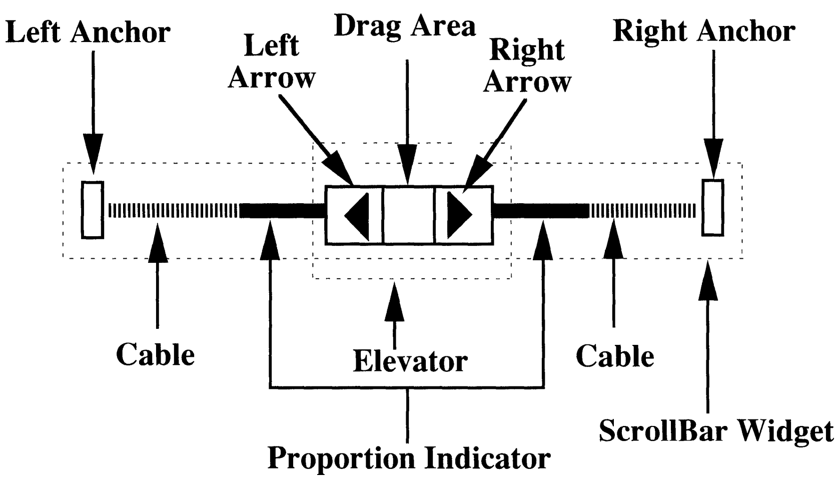


Figure 1. Horizontal Scroll Bar

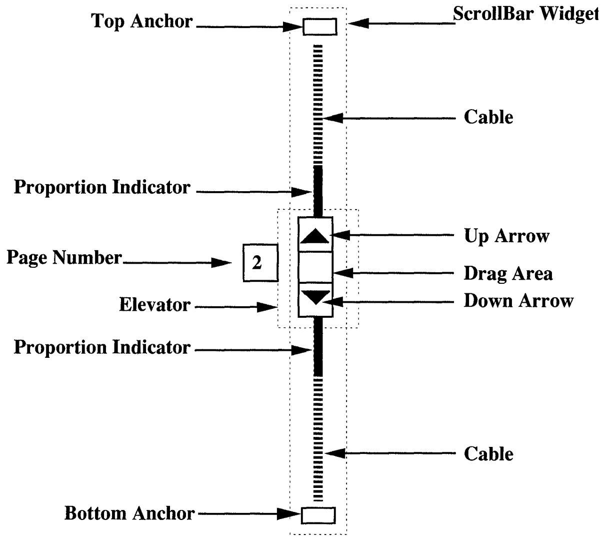


Figure 2. Vertical Scroll Bar

Because a scrollbar can be seen and used horizontally as well as vertically, the parts Top Anchor and Bottom Anchor have the aliases Left Anchor and Right Anchor, respectively.

Each scrollbar is associated with a Content, as defined by the application. The Content is composed of Units (for example, lines of text) that are visible in a viewing area. For a scrollbar to be useful, the Content typically has more Units than can fit in the viewing area. Hence, "scrolling" the Content brings Units into view as other Units move out of view. The amount of the Content that is visible at one time is called a pane in the descriptions below.

Abbreviated Scrollbar

The `Scrollbar` widget responds to a parent's request to resize smaller by shortening the Cable (and Proportion Indicator) but leaving the other elements full-sized. The `Scrollbar` widget will eliminate the Cable and drag area entirely, if necessary, to meet a resize request. These abbreviated scrollbars are shown in Figure 3.

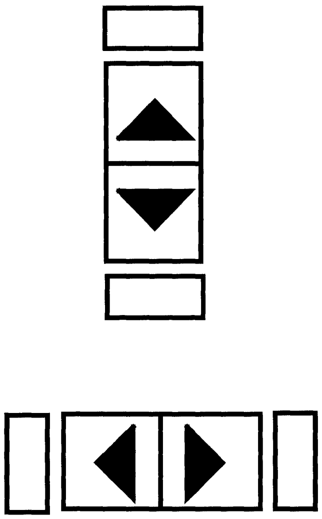


Figure 3. Abbreviated Scroll Bars

Minimum Scrollbar

If necessary, the Scrollbar widget will eliminate the anchors (in addition to the Cable and drag area) to meet a resize request to form a minimum scrollbar.

Elevator Motion

As visual feedback to the user, the Elevator moves up and down (or left and right) along the line of the Cable as the Content scrolls or changes panes. The range of motion of the Elevator is not necessarily the full distance between the Anchors. The application decides how far the Elevator can be moved by evaluating each attempt to move it.

The user manipulates the scrollbar by pressing or clicking SELECT. The action performed depends on the position of the pointer and whether the application is willing to scroll the Content.

Scrolling One Unit

Clicking SELECT on one of the Up, Down, Left, or Right Arrows moves the Elevator in the direction of the arrow, moves the pointer to stay on the Arrow, and changes the Content to move one Unit out of view and another Unit into view, such that the view scrolls in the opposite direction of the Elevator motion. If the application cannot scroll this time, the Elevator and pointer do not move, and the view does not change.

Pressing SELECT on an Arrow repeats the action described above.

When SELECT is clicked or pressed, the Arrow highlights while the scrolling action takes place. If SELECT is pressed, the highlighting stays until SELECT is released.

When the Elevator has reached the end of a Cable, the Arrow in that direction is made inactive.

Scrolling Several Units

Dragging SELECT on the Drag Area moves the Elevator along the Cable, to track the component of the pointer motion parallel to the Cable. The Content scrolls in the opposite direction, bringing one or more Units into view as other Units move out of view.

If granularity is enforced and the Elevator is moved to a position that represents a non-integral number of Units, the closest integral number of Units is considered instead. If granularity is not enforced, the Elevator is moved by the non-integral number of Units. The **XtNsliderMoved** callback allows the application to enforce granularity.

When the application reaches the limit that it can scroll, the view no longer changes and the Elevator stops moving.

While dragging SELECT, the Drag Area highlights. The pointer is constrained to stay within the Drag Area as the Elevator moves.

Scrolling to Limits

Clicking SELECT on one of the Top, Bottom, Left, or Right Anchors causes the view of the Content to change to the top-most, bottom-most, left-most, or right-most pane, respectively, and moves the Elevator to the limit in the direction of the Anchor. If the Elevator is already at the limit, nothing happens.

Clicking SELECT on an Anchor highlights the Anchor while the scrolling action takes place.

Scrolling a Pane of Units

Clicking SELECT on the Cable above/left-of or below/right-of the Elevator causes the view of the Content to change to the previous or next pane, respectively. The pointer is moved along the direction of the Elevator travel to keep it off the Elevator. If only a partial pane remains before the limit of the Content is reached, the effect is as if the user clicked SELECT on the corresponding Anchor. If the application cannot move to another pane, the view does not change and the Elevator and pointer do not move.

Pressing SELECT on the Cable repeats the action described above.

Elevator Approaching Limits

The application calibrates the scrollbar so that the position of the elevator on the scrollbar is in units useful to the application. In general, these units will not be pixels or points. If the scrollbar is close enough to an Anchor, the separation in application units may equate to zero pixels, because of the discrete nature of pixels. Here, the elevator is kept away from the Anchor so that two points of the Cable length are visible. The Elevator is placed at the limit of motion only when the user explicitly moves the elevator to an Anchor by clicking SELECT on the Anchor, or drags the Elevator until it reaches the limit.

Indicating View Proportion

The Proportion Indicator gives a gross measure of what part of the Content is in view. Its size relative to the length of the Cable is the same as the size of the pane relative to the size of the Content. However, the scrollbar widget does not maintain this relation but relies on the application to provide the length of the Proportion Indicator.

The Proportion Indicator moves with the Elevator such that both reach the limits together. When the Content is scrolled to the beginning, the proportion indicator and the elevator align at the left or top end of the scrollbar, as in Figure 4. When the Content is scrolled to the end, the proportion indicator and the elevator align at the right or bottom end of the scrollbar, as in Figure 5. For intermediate positions, the Elevator is positioned proportionally between the ends of the Proportion Indicator. Thus, as the Content is scrolled at a constant rate (for example, by dragging SELECT), the Elevator creeps from one end of the Proportion Indicator to the other at a constant rate.

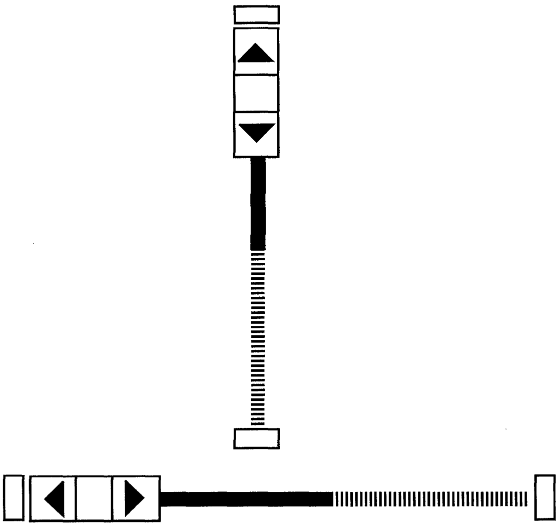


Figure 4. Elevator and Proportion Indicator at Left/Top Limits

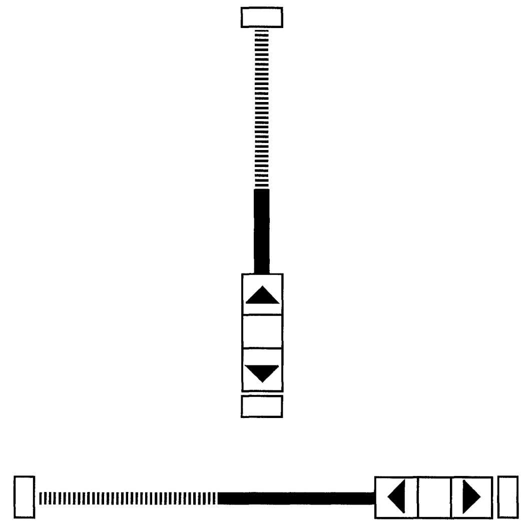


Figure 5. Elevator and Proportion Indicator at Right/Bottom Limits

Scrollbar Menu

The Scrollbar Menu (not shown in the figures) pops up when the user presses MENU anywhere over the scrollbar widget. The menu has three default choices depending on the scrollbar orientation.

`Here to Top`
`Here to Left`
	This choice scrolls the Content so that the Unit next to the pointer is placed at the top or left of the viewing area.

`Top to Here`
`Left to Here`
	This choice scrolls the Content so that the Unit at the top or left of the viewing area is placed next to the pointer.

`Previous`	This choice scrolls the Content to restore the previous view. The scrollbar widget remembers only the last two scroll positions, so repeated access to this choice alternates the Content between two views. Note: If the Scrollbar menu was invoked from the keyboard, then only the "Previous" button is usable. In this case, the "Here To" button and the "To Here" button are not sensitive.

An application can add choices to this menu, using the same technique for populating other menus (see **`MENU WIDGET`**(3W)). The ID of the menu widget is available as a resource of the scrollbar.

Scrollbar Coloration

When the Scrollbar widget receives the input focus through keyboard traversal, the background color of the widget changes to the input focus color, found in the resource **XtNinputFocusColor**. If the user traverses out of the Scrollbar widget, the background of the widget reverts to its original background color.

EXCEPTION: If the input focus color is the same as either the foreground or background color, then the widget shows input focus by switching the background and foreground colors.

Figure 6 illustrates the resources that affect the coloration of the **Scrollbar** widget.

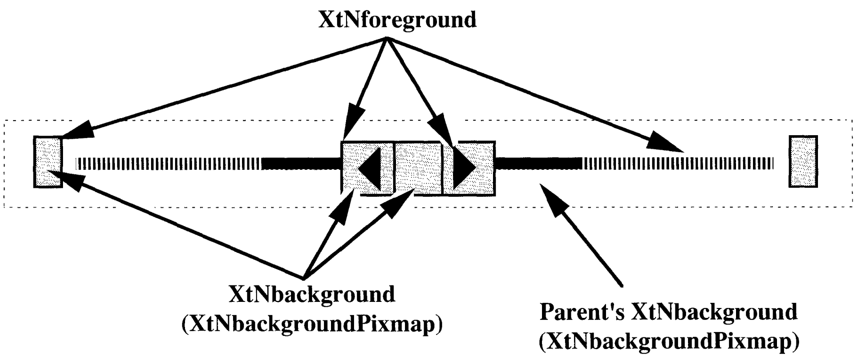


Figure 6. Scrollbar Coloration

Keyboard Traversal

The **Scrollbar**'s default values of the **XtNtraversalOn** resource is True.

The user can operate the Scrollbar by using the keyboard to move the Elevator and access the Anchors. The following keys manipulate the Scrollbar:

— SCROLLUP and SCROLLDOWN (SCROLLLEFT and SCROLLRIGHT for horizontal Scrollbars) move the Elevator one Unit in the given direction. The Content changes to move one Unit out of view and another Unit into view, such that the view scrolls in the opposite direction of the Elevator motion. If the application cannot scroll at this time, the Elevator does not move and the view does not change.

The appropriate arrow in the Elevator highlights while the scrolling action takes place.

— SCROLLTOP and SCROLLBOTTOM (SCROLLLEFTEDGE and SCROLLRIGHTEDGE for horizontal Scrollbars) cause the view of the Content to change to the top-most, bottom-most, left-most, or right-most pane respectively. The Elevator moves to the limit in the direction of the Anchor.

These keys cause the appropriate Anchor to highlight while the scrolling action takes place.

— PAGEUP and PAGEDOWN (PAGELEFT and PAGERIGHT for horizontal Scrollbars) cause the view of the Content to change to the previous or next pane, respectively.

— MENUKEY posts the Scrollbar's Menu.

Vertical Scrollbar Activation Types	
Activation Type	Expected Results
OL_MENUKEY, or OL_VSBMENU	Popup the scrollbar menu
OL_PAGEUP	Scrolls up one view
OL_PAGEDOWN	Scrolls down one view
OL_SCROLLUP	Scrolls up one Unit
OL_SCROLLDOWN	Scrolls down one Unit
OL_SCROLLTOP	Scrolls to top edge of pane
OL_SCROLLBOTTOM	Scrolls to bottom edge of pane

Horizontal Scrollbar Activation Types	
Activation Type	Expected Results
OL_MENUKEY, or OL_HSBMENU	Popup the scrollbar menu
OL_PAGELEFT	Scrolls left one view
OL_PAGERIGHT	Scrolls right one view
OL_SCROLLRIGHT	Scrolls right one Unit
OL_SCROLLLEFT	Scrolls left one Unit
OL_SCROLLRIGHTEDGE	Scrolls to right edge of pane
OL_SCROLLLEFTEDGE	Scrolls to left edge of pane

The Scrollbar widget responds to the following keyboard navigation keys:

— NEXT_FIELD, MOVEDOWN, and MOVERIGHT move to the next traversable widget in the window

— PREV_FIELD, MOVEUP, and MOVELEFT move to the previous traversable widget in the window

— NEXTWINDOW moves to the next window in the application

— PREVWINDOW moves to the previous window in the application

— NEXTAPP moves to the first window in the next application

— PREVAPP moves to the first window in the previous application

Operating the Scrollbar with keyboard disables any pointer warping.

Scrollbar Menu

The default choices in the Scrollbar Menu are created with **XtNtraversalOn** set to True and **XtNmnemonic** set to the first character of their label.

When the Scrollbar Menu is posted via keyboard traversal, the "Here to Top" and "Top to Here" buttons are not sensitive. These buttons depend on the position of the pointer when the menu is posted, and so they are not applicable when the menu is posted from the keyboard.

Display of Keyboard Mnemonic

The **Scrollbar** does not display the mnemonic accelerator. If the **Scrollbar** is the child of a **Caption** widget, the **Caption** widget can be used to display the **Scrollbar**'s mnemonic.

Display of Keyboard Accelerators

The **Scrollbar** does not respond to a keyboard accelerator because clicking the SELECT button on a Scrollbar activates depending on the pointer position. So, the **Scrollbar** does not display a keyboard accelerator.

SUBSTRUCTURE

Scrollbar Menu component

Name: ScrollMenu
Class: Menu

Application Resources				
Name	Class	Type	Default	Access
*XtNcenter	XtCCenter	Boolean	TRUE	I
*XtNhPad	XtCHPad	Dimension	4	I
*XtNhSpace	XtCHSpace	Dimension	4	I
*XtNlayoutType	XtCLayoutType	OlDefine	OL_FIXEDROWS	I
*XtNmeasure	XtCMeasure	int	1	I
XtNpushpin	XtCPushpin	OlDefine	OL_NONE	I
XtNpushpinDefault	XtCPushpinDefault	Boolean	FALSE	I
*XtNsameSize	XtCSameSize	OlDefine	OL_COLUMNS	I
XtNtitle	XtCTitle	String	"Scrollbar"	I
*XtNvPad	XtCVPad	Dimension	4	I
*XtNvSpace	XtCVSpace	Dimension	4	I

*See the **Menu** and **ControlArea** widgets for the descriptions of these resources.

RESOURCES

`Scrollbar` Resource Set				
Name	Class	Type	Default	Access
XtNancestorSensitive	XtCAncestorsensitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultbackground	SGI†
XtNbackgroundPixmap	XtCBackgroundPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNcurrentPage	XtCCurrentPage	int	1	SGIT
XtNdestroyCallback	XtCDestroyCallback	XtCallbackList	NULL	SI
XtNdragCBType	XtCDragCBType	OlDefine	OL_CONTINUOUS	SGI
XtNfontGroup	XtCFontGroup			
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI
XtNgranularity	XtCGranularity	int	1	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNinitialDelay	XtCInitialDelay	int	500	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmenuPane	XtCMenuPane	Widget	(none)	G
XtNorientation	XtCOrientation	OlDefine	OL_VERTICAL	GI
XtNproportionLength	XtCProportionLength	int	(variable)	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNrepeatRate	XtCRepeatRate	int	100	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNshowPage	XtCShowPage	OlDefine	OL_NONE	SGI
XtNsliderMax	XtCSliderMax	int	100	SGI
XtNsliderMin	XtCSliderMin	int	0	SGI
XtNsliderMoved	XtCSliderMoved	XtCallbackList	NULL	SI
XtNsliderValue	XtCSliderValue	int	0	SGI
XtNstopPosition	XtCStopPosition	OlDefine	OL_ALL	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNbackground

Whenever this resource is changed, the Anchors, the Elevator, and the Proportion Indicator will be redisplayed with the new color.

XtNcurrentPage

This resource is typically not selectable. However, there are two exceptions. If **XtNshowPage** is set via SetValues(), **XtNcurrentPage** should also be set in the same call. If **XtNshowPage** is already set, and later **XtNsliderValue** is changed via SetValues(), **XtNcurrentPage** should also be set in the same call.

XtNdragCBType

Range of values:

OL_CONTINUOUS/"continuous"
OL_GRANULARITY/"granularity"
OL_RELEASE/"release"

This resource determines the frequency of issuing **XtNsliderMoved** callbacks. If set to **OL_CONTINUOUS**, callbacks will be issued continuously (just like in Xt+ 2.0). If set to **OL_GRANULARITY**, callbacks will only be issued when the drag box crosses any granularity positions. If set to **OL_RELEASE**, callback will only be issued once when the SELECT button is released.

XtNgranularity

Range of Values:

1 ≤ XtNgranularity ≤ XtNsliderMax - XtNsliderMin

Clicking or pressing SELECT on an Up, Left, Down, or Right Arrow attempts to change the position of the Elevator by the distance given in this resource. Normally, the drag operation does not honor granularity unless enforcement is set in the **XtNsliderMoved** callback procedure.

XtNinitialDelay

Range of Values:

0 < XtNinitialDelay

This resource gives the time, in milliseconds, before the first action occurs when SELECT is pressed on the Cables or Arrows. Note that millisecond timing precision may not be possible for all implementations, so the value may be rounded up to the nearest available unit by the toolkit.

XtNmenuPane

This is the widget where scrollbar menu items can be attached; its value is set once the scrollbar is created. Menu items can be added to this widget just as they are to a menu pane for a **Menu** or **MenuButton** widget.

The menu initially contains the items

— Here to Top (Here to Left)

— Top to Here (Left to Here)

— Previous

If these items are removed from the menu by the application, a warning is generated (see **Error**(3W) in the Convenience Routines section).

XtNorientation

Range of Values:

OL_HORIZONTAL/"horizontal"
OL_VERTICAL/"vertical"

This resource defines the direction for the visual presentation of the widget. This resource cannot be changed via `SetValues()`.

XtNproportionLength

Range of Values:

`1 ≤ XtNproportionLength ≤ (XtNsliderMax - XtNsliderMin)`

Default:

`(XtNsliderMax - XtNsliderMin)`

This resource gives the size of the Proportion Indicator. The application uses the `XtNsliderMax` and `XtNsliderMin` resources to calibrate the scrollbar, making its overall length correspond to the overall length of the Content, and uses the `XtNproportionLength` resource to indicate how much of the Content is visible.

While this resource gives the overall length of the Proportion Indicator, the Elevator always covers part of it. If the Elevator would completely hide the Proportion Indicator, 3-point sections of it are shown above and below (or left of and right of) the Elevator. If the Elevator is too close to an Anchor to show all of a 3-point section, as much as possible of the section is shown on that side (this may be a zero-length section).

For example, if you have 100 items to be displayed and only one item is viewable in the pane at a time, then set XtNsliderMin to 0, XtNsliderMax to 100, and XtNproportionLength to 1. The possible sliderValues are from 0 to 99, inclusive. Another example, 100 items, but 25 items viewable at a time, then set XtNsliderMin to 0, XtNsliderMax to 100, XtNproportionLength to 25. The possible sliderValues are from 0 to 75, inclusive.

XtNrepeatRate

Range of Values:

`0 < XtNrepeatRate`

This resource gives the time, in milliseconds, between repeated actions when SELECT is pressed on the Cables or Arrows. Note that millisecond timing precision may not be possible for all implementations, so the value may be rounded up to the nearest available unit by the toolkit.

XtNshowPage

Range of Values:

```
OL_NONE/ "none"
OL_LEFT/ "left"
OL_RIGHT/ "right"
```

If `XtNshowPage` changes from `OL_NONE` to one of the other values, a pop-up window for the page indicator is created. If the value changes to `OL_NONE`, then the pop-up is destroyed.

This value is checked when dragging is initiated. If it is not set to `OL_NONE`, the page indicator will be popped to the screen. While dragging, the page number in the indicator is constantly updated.

NOTE:

The page indicator feature is not popped to the screen when using the keyboard rather than the mouse for drag operations.

XtNsliderMax
XtNsliderMin

Range of Values:

`XtNsliderMin < XtNsliderMax`

These two resources are used to calibrate the **Scrollbar** widget. An application should set their values to correspond to the range of the Content, and should set the value of the **XtNproportionLength** resource to the length of the view into the Content. This calibrates the scrollbar.

The **Scrollbar** uses the calibration to convert the pixel location of the Elevator into a value in the range

XtNsliderMin ≤ range ≤ XtNsliderMax - XtNproportionLength

The explanation for this range relation follows: First, an application calibrates the scrollbar as described above, so that **XtNsliderMin** and **XtNsliderMax** span the length of the Content and **XtNproportionLength** gives the length of the view of the Content. Consider that the Elevator tracks a fixed position in the view; the position is arbitrary, but remains the same as the view is scrolled over the Content. This can be the first line in the view. As Figure 7 shows, when the view is at the top of the Content, the Elevator is at the top of the scrollbar and the calibrated position of the first line is **XtNsliderMin**. However, when the view is at the bottom of the content, the Elevator is at the bottom of the scrollbar and the calibrated position of the first line is **XtNsliderMax** – **XtNproportionLength**.

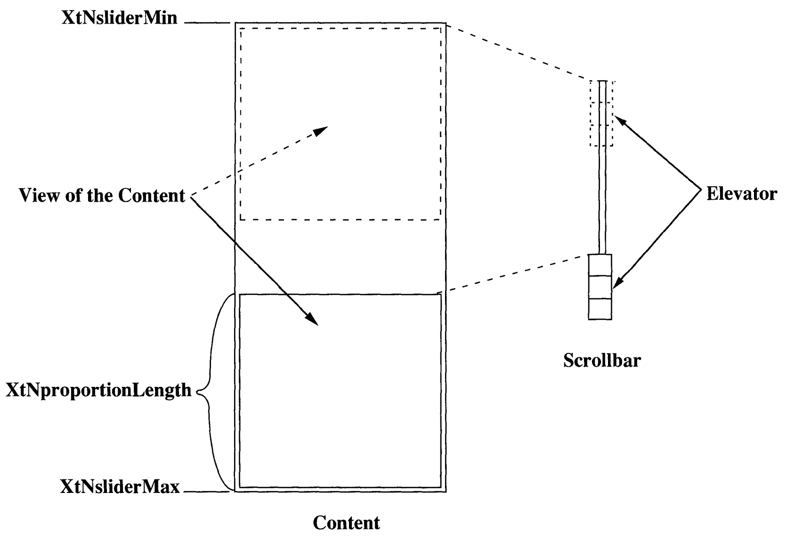


Figure 7. Elevator Range of Movement

XtNsliderMoved

This resource defines the callback lists used when the scrollbar is manipulated in various ways. The **Scrollbar** widget passes the final location of the Elevator, as an integer between **XtNsliderMin** and **XtNsliderMax** inclusive, in a structure pointed to by the **call_data** parameter. The structure, **OlScrollbarVerify**, looks like this:

```
typedef struct _OlScrollbarVerify {
        int new_location;
        int new_page;
        Boolean ok;
        int slider_min;
        int slider_max;
        int delta;
        Boolean move_cb_pending;
} OlScrollbarVerify;
```

new_location

When the **XtNsliderMoved** callbacks are made, the **new_location** member gives the position of the attempted scroll. This will be the new value of the **XtNsliderValue** resource if the scroll attempt is successful; however, the **XtNsliderValue** resource is not updated until after the callbacks return.

new_page

This will be the new value of the **XtNcurrentPage** resource if the scroll attempt is successful. **new_page** is used to set the page number. To see the page number, you have to set **XtNshowPage** to **OL_LEFT** or **OL_RIGHT**.

ok The **ok** member of this structure is initially set to TRUE; the application should set a value that reflects whether the scroll attempt is allowed. Since more than one callback routine may be registered for these resources, each callback routine can first check the **ok** member to see if a previous callback routine in the list has already rejected the scroll attempt. The scrollbar will complete the scroll attempt only if, after the last callback has returned, the **ok** member is still TRUE.

If the **ok** member is FALSE after the last callback returns, the **Scrollbar** restores the Elevator to the position it was in before the user attempted to move it. This is required only when the Elevator has been dragged. The **Scrollbar** does not move the Elevator for other scrollbar manipulations until the scroll attempt has been verified.

slidermin
slidermax

These are the same values as in the **XtNsliderMin** and **XtNsliderMax** resources.

delta This is the distance between the new scroll position and the old, as a signed value:

delta = new_location - *old location*

A callback can change the **new_location** value to reflect a partial scroll. For example, if the scrolling granularity causes a scroll attempt past the end of an application's partially full buffer, the application should adjust **new_location** to a value representing the end of the buffer. The adjusted value must lie between the values present before the attempted scroll and the new values given in the **OlScrollbarVerify** structure.

move_cb_pending

The boolean, **move_cb_pending**, is set to TRUE, if more callbacks are pending. If an application received a callback with this set to TRUE, it is guaranteed that a callback with **move_cb_pending** set to FALSE will follow shortly, before or when an operation is completed. Currently, **move_cb_pending** is set to TRUE only during a drag operation.

The **XtNsliderMoved** callbacks are issued when the Elevator position has been conditionally changed by the user

— clicking or pressing SELECT on the Up/Left or Down/Right arrow buttons;

— moving the Elevator to a new position by dragging SELECT on the Drag Area;

— clicking SELECT on the Top/Left or Bottom/Right Anchors;

— clicking or pressing SELECT on the Cable.

XtNsliderValue

Range of Values:

XtNsliderMin ≤ **XtNsliderValue** ≤ **XtNsliderMax - XtNproportionLength**

This resource gives the current position of the Elevator. The **Scrollbar** widget keeps this resource up to date.

XtNstopPosition

Range of values:

OL_ALL/"all"
OL_GRANULARITY/"granularity"

This resource determines the disposition of the drag box at the end of an drag operation. If set to **OL_ALL**, upon the release of the SELECT button in a drag operation, the drag box will be positioned at where it stops. If set to **OL_GRANULARITY**, the drag box will snap to the nearest granularity position.

NAME

ScrolledWindow – used as the basis for implementing a scrollable pane

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <ScrolledWi.h>

static Widget scrolledwindow, controlarea1, controlarea2, w;

Arg args[2];

scrolledwindow = XtCreateWidget(name, scrolledWindowWidgetClass, ...);

     /*Use the following instructions to add two buttons to the
           scrolling window. */

XtSetArg(args[0], XtNhMenuPane, &controlarea1);
XtSetArg(args[1], XtNvMenuPane, &controlarea2);
XtGetValues(scrolledwindow, args, 2);
w = XtCreateWidget(name, widget-class, controlarea1, ...);
w = XtCreateWidget(name, widget-class, controlarea2, ...);
```

DESCRIPTION

No Text or Graphics Semantics

The ScrolledWindow can be used as the basis for implementing an OPEN LOOK scrollable text or graphics pane. However, it has no innate text or graphics semantics. "Window" does not refer to an OPEN LOOK pop-up window or base window; it is a general term used because the ScrolledWindow widget provides a "window" onto a larger widget.

ScrolledWindow Components

The ScrolledWindow widget has the following components:

— Vertical Scrollbar (typically)

— Horizontal Scrollbar (typically)

— Content (not all visible)

— View of the Content (visible part of Content)

— View Border

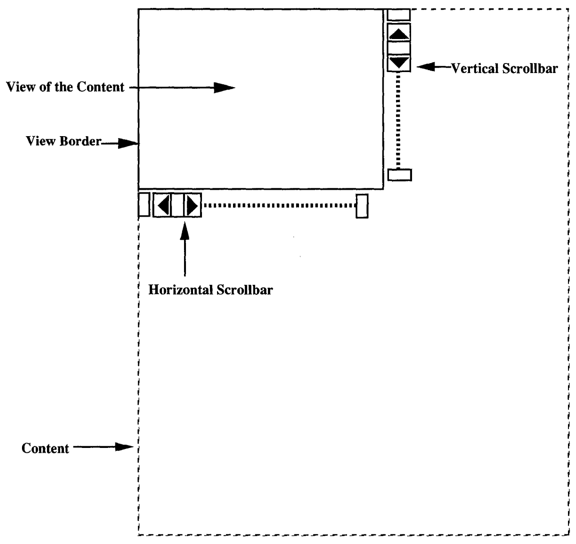


Figure 1. Scrolled Window

View Border

The View Border is a 1-point outline around the View of the Content.

View onto Larger Data Display

The **ScrolledWindow** widget incorporates the features of the **ScrollBar** class of widgets to implement a visible window (the View of the Content) onto another, typically larger, data display (the Content). The View of the Content can be scrolled through the Content using the scroll bars.

Child Widget as Content

To use the **ScrollWindow**, the application creates a widget capable of displaying the entire Content as a child of the **ScrolledWindow** widget. The **ScrolledWindow** widget positions the child widget "within" the View of the Content, and creates scroll bars for the horizontal and/or vertical dimensions, as needed. When the end user performs some action on the scroll bars, the child widget will be repositioned accordingly within the View of the Content.

The word "within" is used strictly in the widget sense: the larger child widget is positioned within the smaller View of the Content part of the **ScrolledWindow** widget, which necessarily forces the child widget to display only the visible part of itself. The protocol for this is through normal widget geometry interactions.

Upper Left Corner Fixed on Resize

If the **ScrolledWindow** widget is resized, the upper left corner of the View stays fixed over the same spot in the Content, unless this would cause the View to extend past the right or bottom edge of the Content. If necessary, the upper left corner will shift left or up only enough to keep the View from extending past the right or bottom edge.

View Never Larger than Content

The View of the Content is never made larger than needed to show the Content. Unless forced to appear, a scrollbar is removed from the side where it is no longer needed. Remaining scrollbars stay a fixed distance from the View.

Scrolling Sensitivity

The scrollbars are configured to scroll integer values, in pixels, through the width and length of the Content. This allows the finest degree of control of the positioning of the View of the Content. However, the application can set the step rate through these values to avoid a large number of view updates as the end user scrolls through the Content.

ScrolledWindow Coloration

Figure 2 illustrates which resources affect the coloration of the **ScrolledWindow** widget.

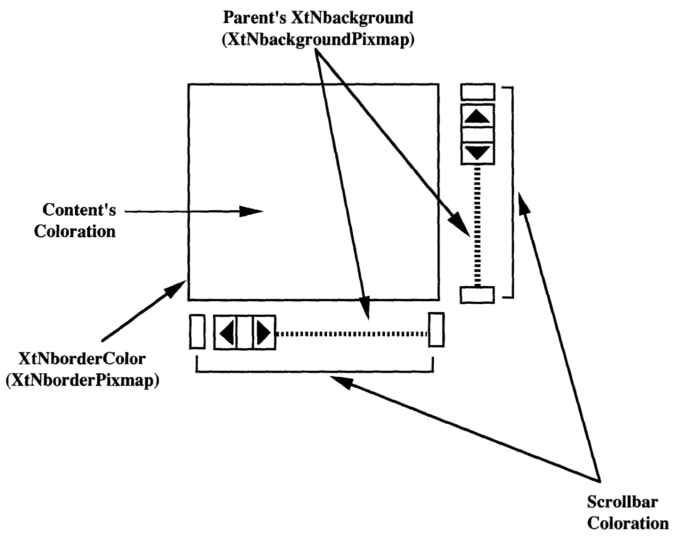


Figure 2. Scrolled Window Coloration

Application Controlled Scrolling

The **ScrolledWindow** widget also provides support for the application to control the scrolling of the content data within the view. In this mode of operation, the application creates a content window no larger than the view window. The application monitors user interaction with the Scrollbars and displays the appropriate data in the content window.

This mode of operation supports the scrolling of large amounts of data such as text.

The application specifies this mode of operation by setting the **XtNvAutoScroll** and/or **XtNhAutoScroll** resources to FALSE. Normally, these settings are combined with the setting of the **XtNvSliderMoved** and/or **XtNhSliderMoved** callbacks. Also, the application will specify an **XtNcomputeGeometries** callback which is used to layout the **ScrolledWindow.**

Keyboard Traversal

The **ScrolledWindow** controls the keyboard traversal between the Content, the Horizontal Scrollbar, and the Vertical Scrollbar. The Scrollbars that are created by the ScrolledWindow have the **XtNtraversalOn** resource set to False. A Content widget added to the ScrolledWindow with traversal enabled will be added to the traversalable widgets in the window with the Scrollbars so that the user can move between them with the NEXT_FIELD (or MOVEUP or MOVELEFT) and PREV_FIELD (or MOVEDOWN or MOVERIGHT) keys.

Scrolled Window Activation Types (if it has a Vertical Scrollbar)	
Activation Type	Expected Results
OL_VSBMENU	Popup the vertical scrollbar menu
OL_PAGEUP	Scrolls up one view
OL_PAGEDOWN	Scrolls down one view
OL_SCROLLUP	Scrolls up one Unit
OL_SCROLLDOWN	Scrolls down one Unit
OL_SCROLLTOP	Scrolls to top edge of pane
OL_SCROLLBOTTOM	Scrolls to bottom edge of pane

Scrolled Window Activation Types (if it has a Horizontal Scrollbar)	
Activation Type	Expected Results
OL_HSBMENU	Popup the horizontal scrollbar menu
OL_PAGELEFT	Scrolls left one view
OL_PAGERIGHT	Scrolls right one view
OL_SCROLLRIGHT	Scrolls right one Unit
OL_SCROLLLEFT	Scrolls left one Unit
OL_SCROLLRIGHTEDGE	Scrolls to right edge of pane
OL_SCROLLLEFTEDGE	Scrolls to left edge of pane

SUBSTRUCTURE

Vertical Scrollbar and Horizontal Scrollbar components

Names: HScrollbar, VScrollbar
Class: Scrollbar

See the regular resource list for alternate names used for some key `Scrollbar` resources.

RESOURCES

`ScrolledWindow` Resource Set				
Name	Class	Type	Default	Access
XtNalignHorizontal	XtCAlignHorizontal	int	OL_BOTTOM	SGI
XtNalignVertical	XtCAlignVertical	int	OL_RIGHT	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNborderColor	XtCBorderColor	Pixel	XtDefaultbackground	SGI
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI
XtNcomputeGeometries	XtCComputeGeometries	Function	Null Function	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNcurrentPage	XtCCurrentPage	int	1	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNforceHorizontalSB	XtCForceHorizontalSB	Boolean	FALSE	SGI
XtNforceVerticalSB	XtCForceVerticalSB	Boolean	FALSE	SGI
XtNforeground	XtCForeground	Pixel	Black	SGI
XtNhAutoScroll	XtCHAutoScroll	Boolean	TRUE	SGI
XtNhInitialDelay	XtCHInitialDelay	int	500	SGI
XtNhMenuPane	XtCHMenuPane	Widget	(none)	G
XtNhRepeatRate	XtCHRepeatRate	int	100	SGI
XtNhScrollbar	XtCHScrollbar	Widget	(none)	G
XtNhSliderMoved	XtCHSliderMoved	XtCallbackList	NULL	SI
XtNhStepSize	XtCHStepSize	int	1	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinitialX	XtCInitialX	Position	0	GI
XtNinitialY	XtCInitialY	Position	0	GI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNrecomputeHeight	XtCRecomputeHeight	Boolean	TRUE	SGI
XtNrecomputeWidth	XtCRecomputeWidth	Boolean	TRUE	SGI
XtNreferenceName	XtCReferenceName	String	NULL	GI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	GI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNshowPage	XtCShowPage	OlDefine	OL_NONE	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNviewHeight	XtCViewHeight	Dimension	(n/a)	SGI

ScrolledWindow Resource Set				
Name	Class	Type	Default	Access
XtNviewWidth	XtCViewWidth	Dimension	(n/a)	SGI
XtNvAutoScroll	XtCVAutoScroll	Boolean	TRUE	SGI
XtNvInitialDelay	XtCVInitialDelay	int	500	SGI
XtNvMenuPane	XtCVMenuPane	Widget	(none)	G
XtNvRepeatRate	XtCVRepeatRate	int	100	SGI
XtNvScrollbar	XtCVScrollbar	Widget	(none)	G
XtNvSliderMoved	XtCVSliderMoved	XtCallbackList	NULL	SI
XtNvStepSize	XtCVStepSize	int	1	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNalignHorizontal

Range of values:

OL_BOTTOM/"bottom"
OL_TOP/"top"

This resource is used to specify whether the horizontal scrollbar should be placed at the top or bottom of the **ScrolledWindow.** The default placement is at the bottom.

XtNalignVertical

Range of values:

OL_RIGHT/"right"
OL_LEFT/"left"

This resource is used to specify whether the vertical scrollbar should be placed at the left or right of the **ScrolledWindow**. The default placement is at the right.

XtNcomputeGeometries

This resource is used to allow intelligent cooperation during the layout stage between the **ScrolledWindow** and its content widget. The content widget sets this resource to a pointer to a function which is to be called whenever the **ScrolledWindow** needs to layout its children. The function is called as:

```
typedef struct _OlSWGeometries {
    Widget          sw;
    Widget          vsb;
    Widget          hsb;
    Dimension       bb_border_width;
    Dimension       vsb_width;
    Dimension       vsb_min_height;
    Dimension       hsb_height;
    Dimension       hsb_min_width;
    Dimension       sw_view_width;
    Dimension       sw_view_height;
    Dimension       bbc_width;
    Dimension       bbc_height;
    Dimension            bbc_real_width;
    Dimension            bbc_real_height;
    Boolean              force_hsb;
    Boolean              force_vsb;
  } OlSWGeometries;
```

```
  (*function)(content widget id, geometries)
  Widget content widget id;
  OlSWGeometries * geometries;
```

The **ScrolledWindow** widget populates the values in this structure prior to the call and examines them after the call to perform the layout operation.

The callback function is responsible for populating the **bbc_width, bbc_height** elements of this structure with the desired size of its window; the **bbc_real_width, bbc_real_height** elements with the logical size of the data, and **force_hsb, force_vsb** flags to indicate which scrollbars the **Scrolled-Window** should include in the layout.

XtNcurrentPage

The value of this resource is passed through to the vertical scrollbar of the **ScrolledWindow.** See a **SCROLLBAR WIDGET**(3W) for more details.

XtNshowPage

These resources are directed to the vertical scrollbar in the **ScrolledWindow** widget. See **ScrollBar**(3W) for more detail.

XtNforceHorizontalSB
XtNforceVerticalSB

Range of Values:
TRUE
FALSE

When the child widget is created and positioned within the **ScrolledWindow,** its width and height are examined. If the entire child widget will fit within the width (length) of the **ScrolledWindow,** the horizontal (vertical) scrollbar will not be created, since there is no need to scroll in that direction. Setting these resources to TRUE disables this checking and will force a horizontal (vertical) scrollbar to be attached to the window regardless of the dimension of the child widget. If a scrollbar is forced but not needed because the Content fits within the View, the scrollbar is made insensitive.

XtNhAutoScroll
XtNvAutoScroll

This resource is used to set the scrolling mode in the horizontal (vertical) direction. When set to TRUE, the **ScrolledWindow** widget is responsible for all interaction with the scrollbar and the positioning of the content window within the view. When set to FALSE, the application is responsible for all scrollbar interaction and scrolling of the data within the content window.

XtNhInitialDelay
XtNvInitialDelay

These resources are used to specify the time in milliseconds of the initial repeat delay to be used when the scrolling arrows of the horizontal (vertical) scrollbar component of the **ScrolledWindow** are pressed.

XtNhMenuPane
XtNvMenuPane

These resources mimic the **XtNmenuPane** resources for the horizontal and vertical scrollbars, respectively. See **ScrollBar**(3W) for more details.

XtNhRepeatRate
XtNvRepeatRate

These resources are used to specify the time in milliseconds of the repeat delay to be used when the scrolling arrows of the horizontal (vertical) scrollbar component of the **ScrolledWindow** are pressed.

XtNhScrollbar
XtNvScrollbar

These resources provide the widget id's of the horizontal and vertical scrollbars. An application can use these values to set scrollbars' characteristics, such as coloration.

XtNhSliderMoved
XtNvSliderMoved

An application may track the position of the child within the **ScrolledWindow** by linking into these callbacks. They mimic the **XtNsliderMoved** resources of the horizontal and vertical scrollbars, respectively.

The **call_data** parameter for these callbacks is a pointer to an **OlScrollBar-Verify** structure, as in the **Scrollbar** widget. The application can validate a scroll attempt before the **ScrolledWindow** widget will reposition the View of the Content, and can update the page number and adjust the scrollbar elevator position. See **ScrollBar**(3W) for more details.

XtNhStepSize
XtNvStepSize

Range of Values:

```
0 < XtNhStepSize
0 < XtNStepSize
```

These resources are related to the **XtNgranularity** resource for the horizontal and vertical scrollbars, respectively, but have an important distinction: their values are the size in pixels of the minimum scrollable unit in the Content. For instance, to allow the end user to scroll a single pixel in either direction, these values would be 1. Or, to allow the end user to scroll a character at a time horizontally and a line at a time vertically, these values would be the width of a character and the height of a line, respectively. (Scrolling a character at a time requires a constant width font, of course.) The **ScrolledWindow** widget uses these values to calibrate the minimum scrolling step, **XtNgranularity**, of the scrollbars.

XtNinitialX
XtNinitialY

Range of Values:

```
XtNinitialX ≤ 0
XtNinitialY ≤ 0
```

The child widget is initially positioned at the upper left corner (x,y coordinates 0,0). This positioning can be changed by specifying a new x,y location. The scrollbars are adjusted to give a visual indication of the offset specified in these resources.

Note that the Content is positioned within the View of the Content, so as the View of the Content moves progressively further through the Content, the coordinates of the position become more *negative*. Thus the initial coordinates given in these resources should be zero or negative to assure proper operation of the scrolled window.

XtNrecomputeHeight
XtNrecomputeWidth

Range of Values:

```
TRUE
FALSE
```

These resources control how the **ScrolledWindow** widget should respond to requests to resize itself. Where one of these resources is TRUE, the **ScrolledWindow** shrinks the View of the Content in the corresponding direction to absorb the change in the **ScrolledWindow** widget's size. Where one of these resources is FALSE, the **ScrolledWindow** does not shrink the View in that direction.

These resources, together with the **XtNviewWidth** and **XtNviewHeight** resources, are typically used to set a preferred dimension in a direction that should not be scrolled.

XtNviewHeight
XtNviewWidth

Range of Values:

```
0 ≤ XtNviewHeight
0 ≤ XtNviewWidth
```

These resources define the preferred size of the View of the Content in pixels. For each, if a nonzero value is given, the corresponding **XtNheight** or **XtNwidth** resource is computed by adding the thickness of any scrollbar that appears. Any value in the **XtNheight** or **XtNwidth** resource is overwritten. If a zero value is given in the **XtNviewHeight** or **XtNviewWidth** resource, the corresponding **XtNheight** or **XtNwidth** resource is used instead.

Regardless of which resources identify the preferred height or width, the height or width of the View is never smaller than any scrollbar next to it.

These resources also represent the maximum size of the View. While the **ScrolledWindow** may resize the View smaller than indicated in these resources (cf. **XtNrecomputeHeight** and **XtNrecomputeWidth**), it will never resize the View larger than indicated.

NAME

`ScrollingList` – a pane containing a scrollable list of text items

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <ScrollingL.h>

static Widget scrollinglist, textfield;

Args args[1];

scrollinglist = XtCreateWidget(name, scrollingListWidgetClass, ...);
XtSetArg(args[0], XtNtextField, &textfield);
XtGetValues(scrollinglist, args, 1);
```

DESCRIPTION

ScrollingList Components

Each `ScrollingList` widget has the following parts:

— Border

— Current Item

— Current Item Border

— Items

— Scrollbar

— View

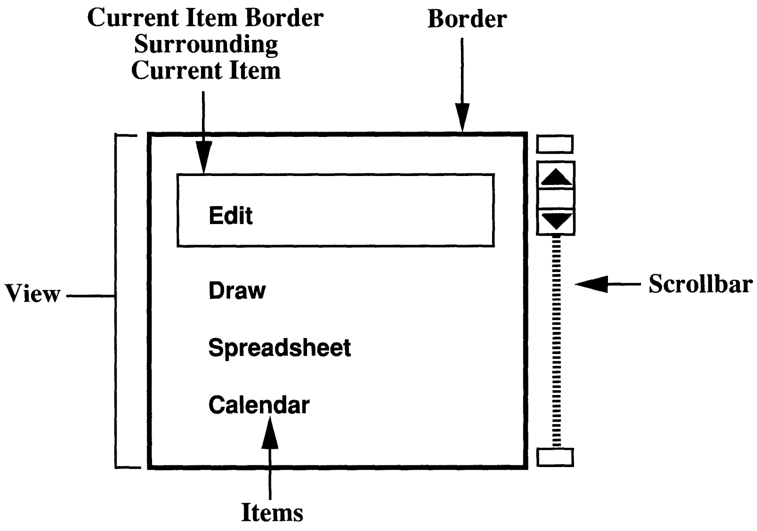


Figure 1. Common Scrolling List Components

If the application allows the list to be edited in place (in the View), the **ScrollingList** widget uses the following components:

— Editable Text Field

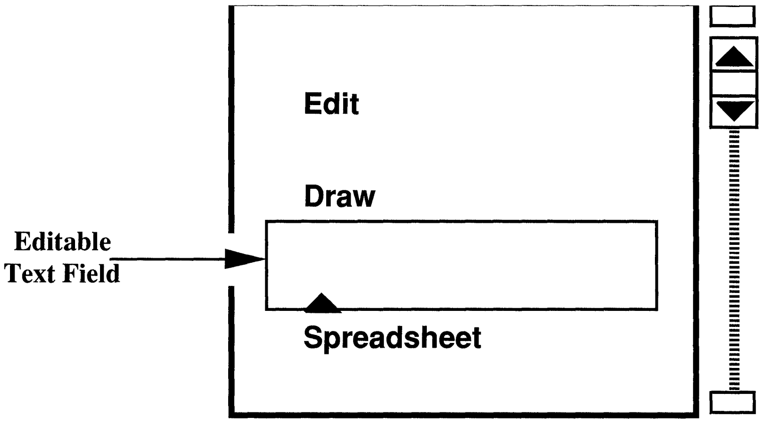


Figure 2. Editable Scrolling List Additional Components

Editable Scrolling List

The application can choose whether to allow the end user to add, change, and/or delete the items in a scrolling list. The Editable Text Field is the interface for entering, or changing the Item, and is described later. Other aspects of the user interface for editing are controlled by the application. For example, the application can attach a menu to the scrolling list to allow the end user to select where a new Item is to be inserted, and can employ pop-up windows to gather additional information about a new Item.

Editing Directly in the List—the Editable Text Field

The application can request that the **ScrollingList** widget manage part of the visual aspect of changing an existing Item in the View. The **ScrollingList** widget automatically creates a widget of class **TextField** that implements the Editable Text Field. The **ScrollingList** widget manages the Editable Text Field widget as follows:

- The application asks the **ScrollingList** widget to "open" and "close" the Editable Text Field. Opening the Editable Text Field widget maps it and positions it so that, as the end user types in the name of a new or changed Item, the name lines up with the existing Item names. Closing the Editable Text Field widget unmaps it. (As described below, there may be times when the widget is unmapped yet still open.) If an existing Item is being edited, the application requests the Editable Text Field to overlay the Item. If a new Item is being inserted, the application requests Items to be scrolled down in the View to accommodate the Editable Text Field.

- The `ScrollingList` widget maps and unmaps the Editable Text Field widget; the application does not.
- If the end user scrolls the list while the Editable Text Field is still open, the `ScrollingList` widget scrolls it with the rest of the Items. If it has to be scrolled out of the View, it is scrolled out entirely, causing it to be unmapped but not closed. The application should not try to remap the child since it will be remapped when the list is scrolled back again.
- If the end user attempts to make a selection or set a Current Item, the Editable Text Field is automatically closed.

The application is responsible for handling the verification callbacks of the Editable Text Field and for telling the `ScrollingList` widget to add a new Item or change an existing Item as a result of the user input.

Selectable Scrolling List

The application can choose whether to allow the end user to select Items from a scrolling list. If Items can be selected, they can be copied elsewhere as text, and may be deletable ("cut"); see below for details.

Deleting Selected Items

The end user can delete selected Items. The `ScrollingList` widget provides some deletion capabilities through the selection mechanisms (see the discussion under "Selecting and Operating on the Items" below), and the application can provide other capabilities, such as with a pop-up menu choice. The application verifies that each selected Item can be deleted; it is responsible for providing feedback to the end user for any Items it will not delete. The `ScrollingList` widget updates the View to remove any deleted Items.

Virtual List

The `ScrollingList` widget "virtualizes" the list to allow the application to use list data structures best suited to its needs. The `ScrollingList` widget provides routines the application uses to build and maintain a version of the list for the `ScrollingList` widget to use. With these routines, the application:

— adds new Items to the list;

— deletes Items from the list;

— edit items and mark them as changed;

— shifts the View to show a particular Item;

— and opens and closes the Editable Text Field for a new or changed Item.

The application is responsible for defining callbacks that the `ScrollingList` widgets invoke when the end user attempts to change a Current Item, or cuts Items from the list. Each Item is identified by the Item name that is shown in the View for the end user, a token assigned by the `ScrollingList` widget that uniquely identifies the Item, and an attributes *bit-vector* that identifies if the Item is a Current Item.

Order of Items in the Virtual List

The list is assumed to have an order defined by the application. As it adds Items, the application tells the `ScrollingList` widget where to insert them: either before or after an Item already in the list.

Changeable List

The application may change the content of a list at any time, including while it is displayed. The widget updates the View, if necessary, to reflect the changed list. To avoid unnecessary updates to the View when several changes need to be made, the application can tell the `ScrollingList` widget to avoid updates until the changes are finished.

Setting a Current Item

The end user can make one or more of the Items a Current Item, as determined by the application, by

— clicking or pressing SELECT over it,

— or moving the input focus inside the Border and typing the first letter of the Item's name.

Either of these actions causes a callback to the application, which can decide if the Item should be made a Current Item, remain a Current Item, or be changed to a regular Item, depending on the current state of the Item and the needs of the application. Thus, the application can make the scrolling list behave as a set of exclusive or nonexclusive Items.

Clicking or pressing SELECT also starts a selection, as described below.

Selecting and Operating on the Items

The `ScrollingList` widget allows selection operations on the Items. Items that are moved or copied from the View are treated as a newline-separated list of text items, in the order they appear in the scrolling list, with no leading or trailing blanks on any Item.

selecting a single Item

Clicking SELECT on an Item selects it and deselects any other active selection on the screen.

selecting other Items

Clicking ADJUST on an Item toggles its state, making an unselected Item selected and a selected Item unselected.

wipe-through selection, with SELECT

Pressing and dragging SELECT over Items selects them and deselects any other active selection on the screen. The selection starts with the Item where SELECT is pressed and extends to the Item where SELECT is released. If the pointer moves above or below the View, the View scrolls additional Items into the View, selecting them as well. The rate at which Items scroll into the View is the same as when pressing SELECT on the up or down arrows of the Scrollbar. The pointer can move out of the View to the left or right without interrupting the selection.

wipe-through selection, with ADJUST

Pressing and dragging ADJUST marks the bounds of a selection the same way as pressing and dragging SELECT, except that the Items covered are "toggled". (Previously selected Items are deselected and previously unselected Items are selected.)

copying Items

Pressing COPY copies any selected Items to the clipboard and deselects them.

cutting Items

Pressing CUT moves any selected Items to the clipboard and deletes them from the list. This operation is allowed only if the scrolling list is editable.

Coloration

On a monochrome display, the ScrollingList widget indicates that it has input focus by inverting foreground and background colors. When an editable Text Field has input focus, it shows that it has input focus by showing an active caret.

On color displays, the ScrollingList widget shows that the Current Item has input focus by filling the background of the Current Item with the input focus color set in the **XtNinputFocusColor** resource. When a selected item has input focus, the label is drawn with the input focus color. When an item is both Selected and Current, it shows that it has input focus by drawing the text of the label in the input focus color. When an editable Text Field has input focus, it shows that it has input focus by showing an active caret in the input focus color.

EXCEPTIONS:

If the input focus color is the same as either the background, foreground, or font color, then revert to the monochrome coloration scheme.

Figures 3 and 4 illustrate the resources that affect the coloration of the **ScrollingList** widget.

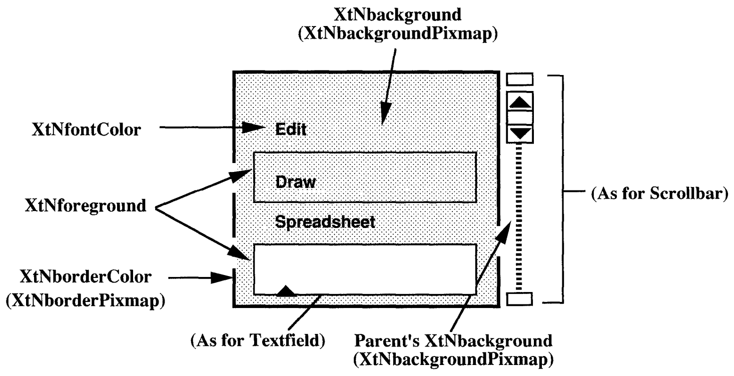


Figure 3. Scrolling List Coloration

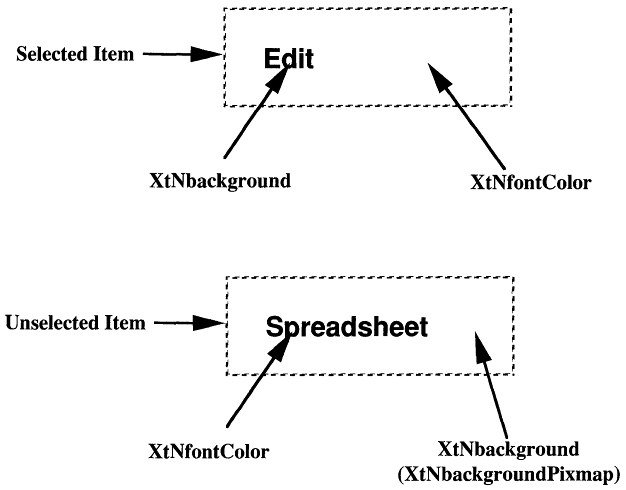


Figure 4. Selected Item and Unselected Item Coloration

Keyboard Traversal

The default value of the `XtNtraversalOn` resource is True.

The ScrollingList widget responds to the following keyboard navigation keys:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application
MOVEUP	moves the input focus up one line
MOVEDOWN	moves the input focus down one line
PANESTART	moves the input focus to the first item in the pane
PANEEND	moves the input focus to the last item in the pane
SCROLLUP	scrolls up one item in the list
SCROLLDOWN	scrolls down one item in the list

SCROLLTOP	scrolls to the first item in the list
SCROLLBOTTOM	scrolls to the last item in the list
PAGEUP	scrolls up one page so that the first item visible is the last item visible in the pane
PAGEDOWN	scrolls down one page so that the last item visible is the first item visible in the pane

When an Editable Text Field is in the ScrollingList, the keyboard traversal keys defined for **TextField** widgets apply.

The SELECTKEY selects the Current Item and unselects any other active selection on the screen. The ADJUSTKEY toggles the Current Item's state, making an unselected Item selected and a selected Item unselected.

Note that the scrolling keys of interest are defined with in the ScrollingList and traversal to the Scrollbar is not necessary to manipulate the ScrollingList.

Scrolling List Activation Types	
Activation Type	Expected Results
OL_MENUKEY	Popup scrolling List menu

Display of Keyboard Mnemonic

The **ScrollingList** widget displays the mnemonic accelerator for each item as part of its label. If the mnemonic character is in the label, then that character is displayed/highlighted according to the value of the application resource **XtNshowMneumonics**. If the mnemonic character is not in the label, it is displayed to the right of the label in parenthesis and highlighted according to the value of the application resource **XtNshowMneumonics**.

If truncation is necessary, the mnemonic displayed in parenthesis is truncated as a unit.

SUBSTRUCTURE

Scrollbar component

Name: scrollbar
Class: Scrollbar

Editable Text Field component

Name: textfield
Class: TextField

Application Resources				
Name	**Class**	**Type**	**Default**	**Access**
XtNfont	XtCFont	XFontStruct *	‡	SI
XtNfontColor	XtCFontColor	Pixel	‡	I
XtNforeground	XtCForeground	Pixel	‡	I
XtNmaximumSize	XtCLength	int	(none)	I
XtNstring	XtCString	String	NULL	I
XtNverification	XtCCallback	XtCallbackList	NULL	I

‡ The defaults are set to agree with the values of these resources for the `ScrollingList` widget itself.

RESOURCES

`ScrollingList` Resource Set				
Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNapplAddItem	XtCApplAddItem	OlListToken(*)()	(n/a)	G
XtNapplDeleteItem	XtCApplDeleteItem	void(*)()	(n/a)	G
XtNapplEditClose	XtCApplEditClose	void(*)()	(n/a)	G
XtNapplEditOpen	XtCApplEditClose	void(*)()	(n/a)	G
XtNapplTouchItem	XtCApplTouchItem	void(*)()	(n/a)	G
XtNapplUpdateView	XtCApplUpdateView	void(*)()	(n/a)	G
XtNapplViewItem	XtCApplViewItem	void(*)()	(n/a)	G
XtNbackground	XtCBackground	Pixel	XtDefaultbackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(n/a)	SGI†
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(n/a)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNfontGroup	XtCFontGroup	OlFontList	NULL	SGI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNrecomputeWidth	XtCRecomputeWidth	Boolean	TRUE	SGI

ScrollingList Resource Set (cont'd)				
Name	Class	Type	Default	Access
XtNreferenceName	XtCReferenceName	String	NULL	GI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	GI
XtNselectable	XtCSelectable	Boolean	TRUE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNtextField	XtCTextField	Widget	(none)	G
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNuserDeleteItems	XtCCallback	XtCallbackList	NULL	SI
XtNuserMakeCurrent	XtCCallback	XtCallbackList	NULL	SI
XtNviewHeight	XtCViewHeight	Cardinal	(none)	SI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

OlListItem Structure

Several of the resources defined below use the following **OlListItem** structure:

```
typedef struct _OlListItem {
                 OlDefine label_type;
                 XtPointer label;
                 XImage *glyph;
                 OlBitMask attr;
                 XtPointer user_data;
                 unsigned char mnemonic;
} OlListItem;
```

label_type
identifies the type of label to display for the Item in the View. It can have one of the values

OL_STRING
for a text label;

OL_IMAGE
for an image label.

Note:
Only text labels are supported in this version of the **ScrollingList** widget, so the only value allowed is **OL_STRING**. Any other legal values generate an error message that tells the application programmer that the value is not yet supported. Any illegal values generate a different error message.

label is what to display for the Item in the View. The type of the value of this member depends on the value of the **label_type** member:

OL_STRING
String

OL_IMAGE

  XImage*

glyph is currently unused.

attr defines attributes of the Item. It is a bit vector with the bit references:

OL_LIST_ATTR_APPL

for application use. This is a mask of 16 contiguous bits that can be subdivided as the application sees fit. These are the low 16 bits of the value, so no shifting is necessary to access the bits as an integer value.

OL_LIST_ATTR_CURRENT

if the Item is a Current Item.

Other bit values are undefined but should not be used by the application.

mnemonic

is a single character that is used as a mnemonic accelerator for keyboard traversal.

OlListToken Structure

The **ScrollingList** widget identifies each Item with a "token" of type **OlList-Token**. The **ScrollingList** widget assigns the token when an Item is added by the application, and the application uses the token in later references to the Item. A zero value is allowed in some contexts where an **OlListToken** is expected, as a way to refer to no Item.

As a convenience to the application, the function **OlListItemPointer(token)** converts an **OlListToken** value into a pointer to the corresponding **OlListItem**. The application can change the values of the **OlListItem** members, but should let the **ScrollingList** widget know that they have changed, using the **XtNapplTouchItem** routine. No checking is done for incorrect **OlListToken** arguments to the **OlListItemPointer()** function.

The **OlListToken** value can be coerced into the type **XtPointer** and back without loss of precision.

XtNapplAddItem

This resource gives a pointer to a routine the application can call when it adds a new Item to the list. This routine is also used to build the list from scratch.

Synopsis:

```
OlListToken (*applAddItem)(), token;

static Arg query[] = {
        { XtNapplAddItem, (XtArgVal)&applAddItem }
};
XtGetValues(widget, query, XtNumber(query));

token = (*applAddItem)(widget, parent, reference, item)
Widget widget;
OlListToken parent, reference;
OlListItem item;
```

widget identifies the **ScrollingList** widget instance.

parent should be set to 0, for compatibility with future changes.

reference
identifies an Item before which to insert the new Item. This value can be zero to append the new Item to the list.

item describes the new Item. The content of the **OlListItem** structure is copied by the **ScrollingList** widget into space that it maintains; however, the data pointed to by the **label** and **glyph** members are not copied. The application can access the copied data directly, using the **OlListItemPointer()** function to get a pointer to the **OlListItem** structure for the Item. If it changes the data, the application should use the **XtNapplTouchItem** routine to let the **ScrollingList** widget know the data has changed.

If mapped and if allowed by the application (see **XtNapplUpdateView**), the **ScrollingList** widget updates the View if the new Item will be in the View. The View is changed as little as possible: if the new Item is in the upper half of the View, the Items above it are scrolled up and the top Item is scrolled off; if the new Item is in the lower half of the View, the Items below it are scrolled down and the bottom Item is scrolled off.

XtNapplDeleteItem

This resource gives a pointer to a routine the application can call when it deletes an Item from the list.

Synopsis:

```
void (*applDeleteItem)();

static Arg query[] = {
        { XtNapplDeleteItem, (XtArgVal)&applDeleteItem }
};
XtGetValues(widget, query, XtNumber(query));

(*applDeleteItem)(widget, token)
Widget widget;
OlListToken token;
```

widget identifies the **ScrollingList** widget instance.

token identifies the deleted Item.

If mapped and if allowed by the application (see **XtNapplUpdateView**), the **ScrollingList** widget updates the View if the deleted Item was visible. The View is changed as little as possible: if the deleted Item was in the upper half of the View, Items above it are scrolled down and an Item is scrolled in from the top; if the deleted Item was in the lower half of the View, Items below it are scrolled up and an Item is scrolled in from the bottom. If the View is already at the top or bottom, the additional Item is scrolled in from the other end, if possible.

XtNapplEditClose

This resource gives a pointer to a routine the application can call when the user has finished editing an Item in the View.

Synopsis:

```
void (*applEditClose)();

static Arg query[] = {
        { XtNapplEditClose, (XtArgVal)&applEditClose }
};
XtGetValues(widget, query, XtNumber(query));

(*applEditClose)(widget)
Widget widget;
```

widget identifies the **ScrollingList** widget instance.

When this routine is called, the **ScrollingList** widget unmaps the Editable Text Field widget, scrolling up the Items below it if they had been scrolled down to allow an insert. The application is responsible for calling the **XtNapplAddItem** routine to add the new Item, or calling the **XtNapplTouchItem** routine to mark the Item as changed. To avoid unnecessary updates to the View, the application should add the new Item (**XtNapplAddItem**) or mark the changed Item (**XtNap-plTouchItem**) before closing the Editable Text Field.

A later call to the **XtNapplEditClose** routine without an intervening call to the **XtNapplEditOpen** routine is ignored.

If mapped, the **ScrollingList** widget updates the View, even if the application had halted updates (see **XtNapplUpdateView**). If the application had halted updates, they will continue to be halted afterwards.

XtNapplEditOpen

This resource gives a pointer to a routine the application can call when it wants to allow the end user to insert a new Item or change an existing Item in the View.

Synopsis:

```
void (*applEditOpen)();

static Arg query[] = {
        { XtNapplEditOpen, (XtArgVal)&applEditOpen }
};
XtGetValues(widget, query, XtNumber(query));

(*applEditOpen)(widget, insert, reference)
Widget widget;
Boolean insert;
OlListToken reference;
```

widget identifies the **ScrollingList** widget instance.

insert tells whether Items should be scrolled down to make room for inserting a new Item. A value of FALSE implies that an Item is being edited in place and no Items are to be scrolled.

reference
identifies an Item before which a new Item is to be inserted (**insert** is TRUE) or identifies the Item that is being changed (**insert** is FALSE). If **insert** is TRUE, this value can be zero to append a new Item at the end of the list. If **insert** is FALSE, this value must refer to an existing Item. The referenced Item does not have to be in the View—see below.

If a new Item is being inserted, the **ScrollingList** widget makes room for the Editable Text Field by scrolling down the referenced Item and any Items below it. If the referenced Item is not in the View, it is automatically made visible just as if the application had called the **XtNapplViewItem** routine first.

The **XtNapplEditOpen** routine can be called again before an intervening call to the **XtNapplEditClose** routine. The effect is as if the **XtNapplEditClose** routine was called, but without multiple updates to the View. For example, this allows the application to let the end user insert several new Items in succession: the Editable Text Field moves down as each Item is inserted, but is never removed from the View.

If mapped, the **ScrollingList** widget updates the View, even if the application had halted updates (see **XtNapplUpdateView**). If the application had halted updates, they will continue to be halted afterwards.

XtNapplTouchItem

This resource gives a pointer to a routine the application can call when it changes an Item in the list.

Synopsis:

```
void (*applTouchItem)();

static Arg query[] = {
        { XtNapplTouchItem, (XtArgVal)&applTouchItem }
};
XtGetValues(widget, query, XtNumber(query));

(*applTouchItem)(widget, token)
Widget widget;
OlListToken token;
```

widget identifies the **ScrollingList** widget instance.

token identifies the Item that has changed.

If mapped and if allowed by the application (see **XtNapplUpdateView**), the **ScrollingList** widget updates the View if the changed Item is visible.

XtNapplUpdateView

This resource gives a pointer to a routine the application can call to keep the **ScrollingList** widget from updating the View, or to let it update the View again.

Synopsis:

```
void (*applUpdateView)();

static Arg query[] = {
        { XtNapplUpdateView, (XtArgVal)&applUpdateView }
};
XtGetValues(widget, query, XtNumber(query));

(*applUpdateView)(widget, ok)
Widget widget;
Boolean ok;
```

`ok` is either TRUE or FALSE, depending on whether the **ScrollingList** can update the View as it changes, or not, respectively.

From the time the **XtNapplUpdateView** routine is called with a FALSE argument until it is called with a TRUE argument, the **ScrollingList** does not update the View in response to application-made changes, except:

— if the application opens or closes the Editable Text Field (cf **XtNapplEditOpen** and **XtNapplEditClose**);

— if the end user manipulates the list by scrolling it, selecting an Item, cutting, etc.

The **ScrollingList** widget updates the View once for each of these exceptions, each time an exception occurs.

An application should use this routine to bracket a set of changes to avoid spurious changes to the View. This routine is not needed if only one change is made to the list. The following example illustrates the use of the **XtNapplUpdateView** routine.

```
/*
 * Stop View updates.
 */
(*applUpdateView)(widget, FALSE);

/*
 * Make some changes.
 */
(*applDeleteItem)(widget, ...);
(*applDeleteItem)(widget, ...);
(*applDeleteItem)(widget, ...);
(*applAddItem)(widget, ...);
(*applTouchItem)(widget, ...);

/*
 * Allow the View to be updated again.
 */
(*applUpdateView)(widget, TRUE);
```

XtNapplViewItem

This resource gives a pointer to a routine the application can call when it wants a particular Item placed in the View.

Synopsis:

```
void (*applViewItem)();

static Arg query[] = {
```

```
                { XtNapplViewItem, (XtArgVal)&applViewItem }
        };
        XtGetValues(widget, query, XtNumber(query));

        (*applViewItem)(widget, token)
        Widget widget;
        OlListToken token;
```

widget identifies the **ScrollingList** widget instance.

token identifies the Item to move into the View.

The Item is moved into the View in a way that minimizes the change to the View. If the Item is currently in the View, nothing is changed. If scrolling the list up or down brings the Item into the View while keeping at least one previously viewed Item in the View, the list is scrolled. Otherwise, the Item is placed at the top of the View, or as close to the top as possible if there aren't enough Items in the current Level to fill the View below it.

If mapped and if allowed by the application (see **XtNapplUpdateView**), the **ScrollingList** widget updates the View.

XtNrecomputeWidth

Range of Values:

TRUE
FALSE

This resource controls how the **ScrollingList** widget should respond to requests to resize itself. If this resource is TRUE, the **ScrollingList** shrinks the View of the Content in the corresponding direction to absorb the change in the **ScrollingList** widget's size. If this resource is FALSE, the **ScrollingList** does not shrink the View in that direction.

This resource, together with the **XtNviewHeight** resource, are typically used to set a preferred dimension in a direction that should not be scrolled.

XtNselectable

Range of Values:

TRUE
FALSE

This resource controls whether the end user can select Items in the scrolling list. If set to TRUE, then Items can be selected with SELECT and ADJUST and copied with the COPY key. Items may be deleted with the CUT key, although the application can stop some or all selected Items from being deleted. If set to FALSE, then Items cannot be selected and the COPY and CUT keys have no effect.

XtNtextField

This is the widget ID of the Editable Text Field widget; its value is available once the **ScrollingList** widget has been created.

The **ScrollingList** widget resets the following values before returning from each invocation of the **XtNapplEditOpen** routine:

Editable Text Field Reset Values		
Name	Class	Value
XtNwidth	XtCWidth	(width available in View)
XtNstring	XtCString	(name of Item to be changed)

XtNtraversalOn

This resource specifies whether this widget is selectable during traversal.

XtNuserDeleteItems

This resource defines the callbacks issued when the end user tries to delete Items from the list. (Currently, the only way the **ScrollingList** widget handles deletions is through a cut operation.)

The **call_data** parameter points to a structure **OlListDelete** that looks like this:

```
typedef struct _OlListDelete {
        OlListToken *tokens
        Cardinal num_tokens;
} OlListDelete;
```

tokens is a list identifying the Items to be deleted. The application is expected to act on each Item separately, calling the **XtNapplDeleteItem** routine to delete each from the list. The application may refuse to delete some or all of the Items, and is responsible for providing any feedback to the end-user.

num_tokens
is the number of Items to delete.

XtNuserMakeCurrent

This resource defines the callbacks issued when the end user presses SELECT over an Item.

The **call_data** parameter is the **OlListToken** value that identifies the Item. The application is expected to decide if the Current Item status of this Item should change. The **attr** member of the **OlListItem** structure for this Item is not automatically changed by the **ScrollingList** widget.

XtNviewHeight

Range of Values:
  $0 \leq$ **XtNviewHeight**

This resource gives the preferred height of the View as the number of Items to show. If a nonzero value is given, the corresponding **XtNheight** resource is computed by converting this number to pixels and adding any padding or border thickness. In this case, any value given in the **XtNheight** resource is overwritten.

If a zero value is given in the **XtNviewHeight** resource, the **XtNheight** resource is used as an estimate. The View is sized to show an integral number of Items, such that the overall height of the **ScrollingList** widget is less than or equal to **XtNheight**, if possible. However, the View is always large enough to show at least one Item, and is no shorter than the minimum scrollbar size.

If neither the **XtNviewHeight** resource nor the **XtNheight** resource is set, or both are set to zero, the View is made as small as possible, limited as described above.

NAME

`Slider` – sets a numeric value and gives a visual indication of the setting range

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Slider.h>

widget = XtCreateWidget(name, sliderWidgetClass, ...)
```

DESCRIPTION

Slider Components

The `Slider` widget implements a simple control used to change a numeric value. It consists of the following elements:

— Top (Left) Anchor (optional)

— Bottom (Right) Anchor (optional)

— Drag Box

— Bar (typically)

— Shaded Bar (typically)

— Current Value (not visible)

— Minimum Value (not visible)

— Minimum Value Label (optional)

— Maximum Value (not visible)

— Maximum Value Label (optional)

— Tick Marks (optional)

The Current Value is the numeric value a user attempts to change with the `Slider` widget.

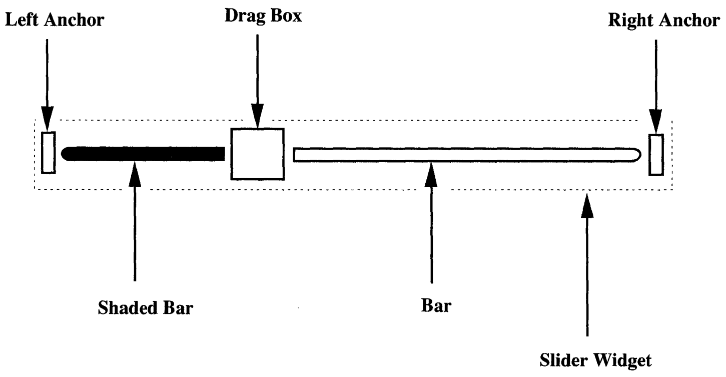


Figure 1. Horizontal Slider

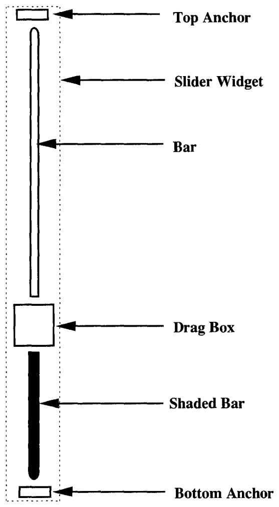


Figure 2. Vertical Slider

Drag Box Motion

As visual feedback to the user, the Drag Box moves up or down (or left or right) along the Bar as the Current Value changes.

Dragging SELECT

The user can change the Current Value by dragging the Drag Box with SELECT. The pressing of SELECT must start with the pointer in the Drag Box, but the Drag Box (and the Current Value) track the pointer motion regardless of where it goes while SELECT is pressed. This means it is not possible for the user to change the Current Value by first pressing SELECT outside the Drag Box and then moving the pointer into it. Only the component of the pointer motion parallel to the Bar is tracked, and the motion of the Drag Box (and change in the Current Value) are limited by the length of the Bar.

Clicking SELECT

Clicking SELECT above the Drag Box for a vertical slider, or to the right for a horizontal slider, increases the Current Value by an application-specified amount, moves the Drag Box to correspond to the new Current Value, and moves the pointer to keep it on the Drag Box. Clicking SELECT to the other side of the Drag Box decreases the value by the same amount and moves the Drag Box and pointer accordingly. Pressing SELECT repeats this action.

Moving Drag Box to Limits

Clicking SELECT on one of the Bottom/Left or Top/Right Anchors causes the Current Value to take on the Minimum Value or Maximum Value, respectively, and moves the Drag Box to the limit in the direction of the Anchor. If the Drag Box is already at the limit, nothing happens.

Clicking SELECT on an Anchor highlights the Anchor while the Current Value is changed.

Application Notification

The application finds out about a change in the Current Value on the release of SELECT for either the drag or click. It is responsible for providing any feedback to the end user deemed appropriate, such as updating the Current Value in a text field.

Coloration

When the Slider widget receives the input focus through keyboard traversal, the background color of the widget changes to the input focus color, found in the resource **`XtNinputFocusColor`**. If the user traverses out of the Slider widget, the background of the widget shall revert to its original background color.

EXCEPTION:

If the input focus color is the same as either the foreground or background color, then the widget shows input focus by switching the background and foreground colors.

Figure 3 illustrates the resources that affect the coloration of the **`Slider`** widget.

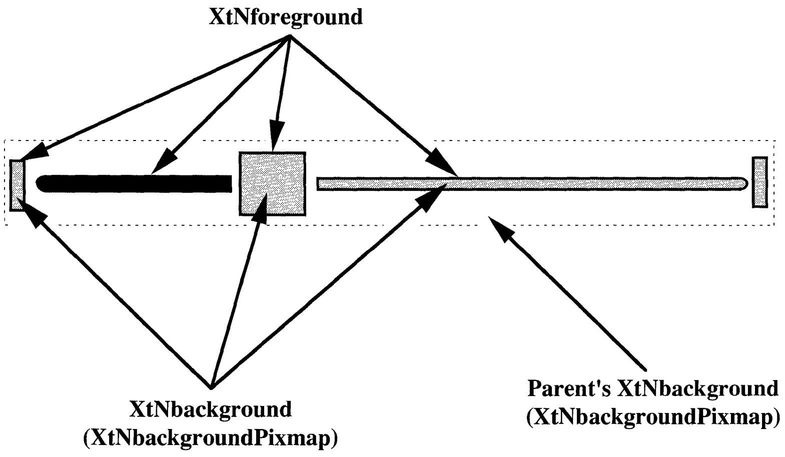


Figure 3. Slider Coloration

Keyboard Traversal

The **Slider**'s default values of the **XtNtraversalOn** resource is TRUE.

The user can operate the Slider by using the keyboard to move the Drag Box and access the Anchors. The following keys manipulate the Current Value:

— SCROLLUP and SCROLLRIGHT increase the Current Value by an application-specified amount, and moves the Drag Box to correspond to the new Current Value.

— SCROLLDOWN and SCROLLLEFT decrease the Current Value by an application-specified amount, and moves the Drag Box to correspond to the new Current Value.

— SCROLLTOP and SCROLLRIGHTEDGE cause the Current Value to take on the Maximum Value, and moves the Drag Box to a vertical slider's top anchor or a horizontal slider's right anchor. The anchor is briefly highlighted while the Current Value is changed and the Drag Box is moved.

— SCROLLBOTTOM and SCROLLLEFTEDGE cause the Current Value to take on the Minimum Value, and moves the Drag Box to a vertical slider's bottom anchor or a horizontal slider's left anchor. The anchor is briefly highlighted while the Current Value is changed and the Drag Box is moved.

Vertical Slider Activation Types	
Activation Type	Expected Results
OL_SCROLLUP	Drag Box moves up one Unit
OL_SCROLLDOWN	Drag Box moves down one Unit
OL_SCROLLTOP	Drag Box moves to top anchor
OL_SCROLLBOTTOM	Drag Box moves to bottom anchor

Horizontal Slider Activation Types	
Activation Type	Expected Results
OL_SCROLLRIGHT	Drag Box moves right one Unit
OL_SCROLLLEFT	Drag Box moves left one Unit
OL_SCROLLRIGHTEDGE	Drag Box moves to right anchor
OL_SCROLLLEFTEDGE	Drag Box moves to left anchor

The Slider widget responds to the following keyboard navigation keys:

— NEXT_FIELD, MOVEDOWN, and MOVERIGHT move to the next traversable widget in the window

— PREV_FIELD, MOVEUP, and MOVELEFT move to the previous traversable widget in the window

— NEXTWINDOW moves to the next window in the application

— PREVWINDOW moves to the previous window in the application

— NEXTAPP moves to the first window in the next application

— PREVAPP moves to the first window in the previous application

Display of Keyboard Mnemonic

The **Slider** does not display the mnemonic accelerator. If the **Slider** is the child of a **Caption** widget, the **Caption** widget will display the mnemonic as part of the label.

Display of Keyboard Accelerators

The **Slider** does not respond to a keyboard accelerator because clicking the SELECT button on a Slider activates depending on the pointer position. So, the **Slider** does not display a keyboard accelerator.

RESOURCES

Slider Resource Set				
Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultForeground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNdragCBType	XtCDragCBType	OlDefine	OL_CONTINUOUS	SGI
XtNendBoxes	XtCEndBoxes	Boolean	TRUE	SGI
XtNfont	XtCFont	FontStruct *	(OPEN LOOK default)	SGI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNgranularity	XtCGranularity	int	1	SGI
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinitialDelay	XtCInitialDelay	int	500	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNminLabel	XtCLabel	String	NULL	SGI
XtNmaxLabel	XtCLabel	String	NULL	SGI
XtNorientation	XtCOrientation	OlDefine	OL_VERTICAL	GI
XtNrecomputeSize	XtCRecomputeSize	Boolean	FALSE	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNrepeatRate	XtCRepeatRate	int	100	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNsliderMax	XtCSliderMax	int	100	SGI
XtNsliderMin	XtCSliderMax	int	0	SGI
XtNsliderMoved	XtCCallback	XtCallbackList	NULL	SI
XtNsliderValue	XtCSliderValue	int	0	SGI
XtNspan	XtCSpan	Dimension	OL_IGNORE	SGI
XtNstopPosition	XtCStopPosition	OlDefine	OL_ALL	SGI

Slider Resource Set (cont'd)				
Name	Class	Type	Default	Access
XtNticks	XtCTicks	int	0	SGI
XtNtickUnit	XtCTickUnit	OlDefine	OL_NONE	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNendBoxes

This resource selects the display of the end boxes.

XtNgranularity

Range of Values:

`1 ≤ XtNgranularity ≤ (XtNsliderMax - XtNsliderMin)`

Clicking SELECT on the Bar or Shaded Bar attempts to change the Current Value by the amount given in this resource. Dragging the Drag Box with SELECT changes the Current Value by this amount before the **XtNsliderMoved** callbacks are issued.

XtNinitialDelay

Range of Values:

`0 < XtNinitialDelay`

This resource gives the time, in milliseconds, before the first action occurs when SELECT is pressed on the Bar or Shaded Bar. Note that millisecond timing precision may not be possible for all implementations, so the value may be rounded up to the nearest available unit by the toolkit.

XtNminLabel

This is the label to be placed next to the maximum value position. For a vertical slider, the label is placed to the right of the minimum value position. If there is not enough space for the entire label and **XtNrecomputeSize** is FALSE, the label will be truncated from the end. If there is not enough space for the entire label and **XtNrecomputeSize** is TRUE, then the widget will request for more space to show the entire label.

For an horizontal slider, the label is placed centered and below the minimum value position. If there is not enough room to center the label and **XtNrecompu-teSize** is set to FALSE, the beginning of the label will be aligned with the left anchor and is drawn to the right. If this label collides with the max label, some part of the labels will overlap. If there is not enough room to center the label and **XtNrecomputeSize** is set to TRUE, the widget will request for more space to center the label below the minimum value position.

XtNmaxLabel

This is the label to be placed next to the maximum value position. For a vertical slider, the label is placed to the right of the minimum value position. If there is not enough space for the entire label and **XtNrecomputeSize** is FALSE, the label will be truncated from the end. If there is not enough space for the entire label and **XtNrecomputeSize** is TRUE, then the widget will request for more space to show the entire label.

For an horizontal slider, the label is placed centered and below the maximum value position. If there is not enough room to center the label and XtNrecomputeSize is set to FALSE, the end of the label will be aligned with the left anchor. If this label collides with the min label, some part of the labels will overlap. If there is not enough room to center the label and **XtNrecomputeSize** is set to TRUE, the widget will request for more space to center the label below the maximum value position.

XtNorientation

Range of Values:

OL_HORIZONTAL/"horizontal"
OL_VERTICAL/"vertical"

This resource defines the direction for the visual presentation of the widget.

XtNrepeatRate

Range of Values:

0 < XtNrepeatRate

This resource gives the time, in milliseconds, between repeated actions when SELECT is pressed on the Bar or Shaded Bar. Note that millisecond timing precision may not be possible for all implementations, so the value may be rounded up to the nearest available unit by the toolkit.

XtNsliderMax
XtNsliderMin

Range of Values:

XtNsliderMin < XtNsliderMax

These two resources give the range of values tracked by the **Slider** widget. Mathematically, the range is open on the right; that is, the range is the following subset of the set of integers:

XtNsliderMin ≤ range ≤ **XtNsliderMax**

This is independent of the Drag Box displayed in the **Slider** widget. The **Slider** widget is responsible for taking into account the size of the Drag Box when relating the physical range of movement to the range of values.

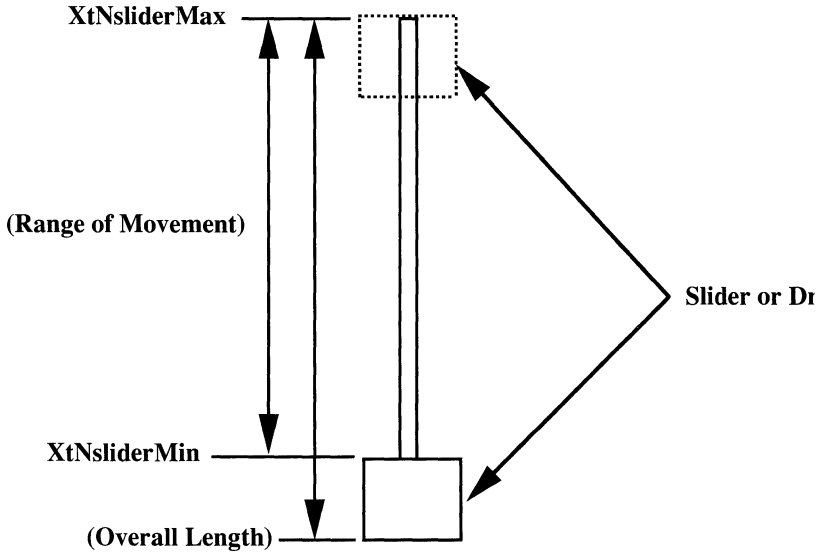


Figure 4. Drag Box Range of Movement

XtNsliderMoved

This resource defines the callback list used when the **Slider** widget is manipulated. The **call_data** parameter is a pointer to the Current Value; an **XtGetValue()** inside the callback will return the previous value.

XtNsliderValue

Range of Values:

XtNsliderMin ≤ **XtNsliderValue** ≤ **XtNsliderMax**

This resource gives the current position of the Drag Box, in the range **[XtNsliderMin, XtNsliderMax]**. The **Slider** widget keeps this resource up to date.

XtNticks

This is the interval between tick marks. The unit of the interval value is determined by **XtNtickUnit**.

XtNtickUnit

Range of values:

OL_NONE/"none"
OL_SLIDERVALUE/"slidervalue"
OL_PERCENT/"percent"

This resource can have one of the values: OL_NONE, OL_SLIDERVALUE, and OL_PERCENT. If it is OL_NONE, then no tick marks will be displayed and **XtNticks** is ignored. If it is OL_PERCENT, then **XtNticks** is interpreted as the percent of the slider value range. If it is OL_SLIDERVALUE, the **XtNticks** is interpreted as the same unit as slider value.

XtNdragCBType

Range of values:

OL_CONTINUOUS/"continuous"
OL_GRANULARITY/"granularity"
OL_RELEASE/"release"

This resource determines the frequency of issuing **XtNsliderMoved** callbacks during a drag operation. If set to OL_CONTINUOUS, callbacks will be issued continuously. If set to OL_GRANULARITY, callbacks will only be issued when the drag box crosses any granularity positions. If set to OL_RELEASE, callback will only be issued once when the SELECT button is released.

XtNstopPosition

Range of values:

OL_ALL/"all"
OL_TICKMARK/"tickmark"
OL_GRANULARITY/"granularity"

This resource determines the behavior of the drag box at the end of an drag operation. If set to OL_ALL, upon the release of the SELECT button in a drag operation, the drag box will be positioned at where it stops. If set to OL_TICKMARK, the drag box will snap to the nearest tickmark position. If set to OL_GRANULARITY, the drag box will snap to the nearest granularity position.

XtNrecomputeSize

This resource, if set to TRUE, allows the slider widget to resize itself whenever needed, to compensate for the space needed to show the tick marks and the labels. The slider widget uses the **XtNspan**, the sizes of the labels, and **XtNtickUnit** to determine the preferred size.

XtNfont

This resource specifies the font used to draw the labels. It defaults to the OPEN LOOK standard font.

XtNfontcolor

This resource specifies the color used to draw the labels. It defaults to the foreground color of the slider widget.

XtNspan

If **XtNrecomputeSize** is set to TRUE, then **XtNspan** should be set to reflect the preferred length of the slider, not counting the space needed for the labels. The slider widget uses the span value, the sizes of the labels, and **XtNtickUnit** to determine the preferred size.

NAME

`StaticText` – displays read-only text

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <StaticText.h>

widget = XtCreateWidget(name, staticTextWidgetClass, ...);
```

DESCRIPTION

The **StaticText** widget provides a way to present an uneditable block of text using a few simple layout controls.

Word Wrapping

If the text is too long to fit in the width provided by the **StaticText** widget, the text may be "wrapped" if the application requests it. The wrapping occurs at a space between words, if possible, leaving as many words on a line as will fit. If a word is too long for the width, it is wrapped between characters. An embedded newline will always cause a wrap.

Text Clipping—In Width

If the text is not wrapped, it will be truncated if it cannot fit in the width of the **StaticText** widget. The application can choose whether the truncation occurs on the left, right, or evenly on both sides of each line of the text.

Text Clipping—In Height

If the text is too large to fit in the height provided by the **StaticText** widget, the text is clipped on the bottom. The clipping falls on a pixel boundary, not between lines, so that it is possible that only the upper part of the last line of text may be visible.

Stripping of Spaces

The application can choose to have leading spaces, trailing spaces, or both leading and trailing space stripped from the text before display, or can choose to have no stripping done.

Selecting and Operating on the Text

The **StaticText** widget allows text to be selected in several ways and then copied. See **Text Selection** earlier in this manual for the description of these operations.

Coloration

Figure 1 illustrates the resources that affect the coloration of the **StaticText** widget.

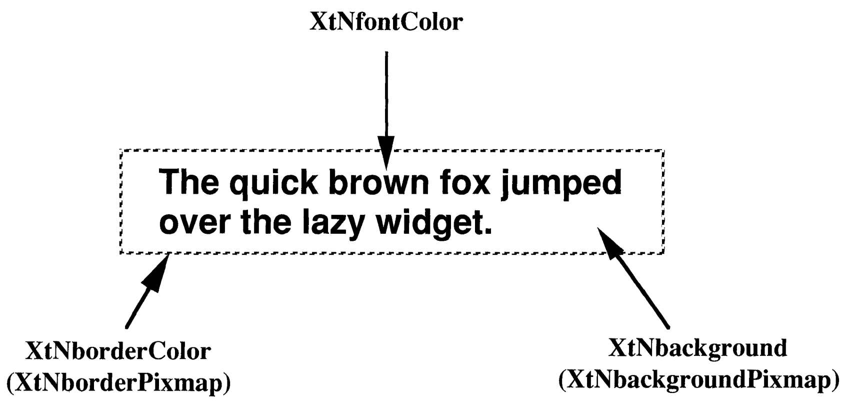

XtNfontColor
The quick brown fox jumped over the lazy widget.
XtNborderColor (XtNborderPixmap)
XtNbackground (XtNbackgroundPixmap)

Figure 1. Static Text Coloration

Keyboard Traversal

The default value of the `XtNtraversalOn` resource is False.

The widget responds to the following keyboard navigation keys:

NEXT_FIELD	moves to the next traversable widget in the window
PREV_FIELD	moves to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application

Display of Keyboard Mnemonic And Accelerator

The `StaticText` does not have keyboard mnemonic or keyboard accelerator capabilities.

RESOURCES

StaticText Resource Set

Name	Class	Type	Default	Access
XtNalignment	XtCAlignment	OlDefine	OL_LEFT	SGI
XtNancestorSensitive	XtCSenstitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNfontGroup	XtCFontGrouG			
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNgravity	XtCGravity	int	CenterGravity	SGI
XtNheight	XtCHeight	OlDefine	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNlineSpace	XtCLineSpace	int	0	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNrecomputeSize	XtCRecomputeSize	Boolean	TRUE	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNstatusWidget	XtCstatusWidget	Widget	NULL	I
XtNstring	XtCString	String	NULL	SGI
XtNstrip	XtCStrip	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNwrap	XtCWrap	Boolean	TRUE	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNalignment

Range of Values:

OL_LEFT/"left"
OL_CENTER/"center"
OL_RIGHT/"right"

This specifies the alignment to be applied when drawing the text, as described below:

OL_LEFT	causes the left sides of the lines to be vertically aligned
OL_CENTER	causes the centers of the lines to be vertically aligned
OL_RIGHT	causes the right sides of the lines to be vertically aligned

XtNgravity

Range of Values:

`CenterGravity`
`NorthGravity`
`SouthGravity`
`EastGravity`
`WestGravity`
`NorthWestGravity`
`NorthEastGravity`
`SouthWestGravity`
`SouthEastGravity`

The application can set a width and height to the **`StaticText`** widget that exceeds the size needed to display the string. This resource controls the use of any extra space with the **`StaticText`** widget:

`CenterGravity`
The string is centered vertically and horizontally in the extra space.

`NorthGravity`
The top edge of the string is aligned with the top edge of the space and centered horizontally.

`SouthGravity`
The bottom edge of the string is aligned with the bottom edge of the space and centered horizontally.

`EastGravity`
The right edge of the string is aligned with the right edge of the space and centered vertically.

`WestGravity`
The left edge of the string is aligned with the left edge of the space and centered vertically.

`NorthWestGravity`
The top and left edges of the string are aligned with the top and left edges of the space.

`NorthEastGravity`
The top and right edges of the string are aligned with the top and right edges of the space.

`SouthWestGravity`
The bottom and left edges of the string are aligned with the bottom and left edges of the space.

`SouthEastGravity`
The bottom and right edges of the string are aligned with the bottom and right edges of the space.

XtNlineSpace

Range of Values:

`-100 ≤ XtNlineSpace`

This resource controls the amount of space between lines of text. It is specified as a percentage of the font height, and is the distance between the baseline of one text line and the top of the next font line. Thus, the distance between successive text baselines, in percentage of the font height, is

`XtNlineSpace+100`

XtNrecomputeSize

Range of Values:

TRUE
FALSE

This resource indicates whether the **StaticText** widget should calculate its size and automatically set the **XtNheight** and **XtNwidth** resources. If set to TRUE, the **StaticText** widget will do normal size calculations that may cause its geometry to change. If set to FALSE, the **StaticText** widget will leave its size alone; this may cause truncation of the visible image being shown by the **StaticText** widget if the fixed size is too small, or may cause centering if the fixed size is too large.

XtNstatusWidget

This resource allows an internationalized application to specify an area in order to create a status window via Input Method.

XtNstring

This resource is the string that will be drawn. The string must be null terminated.

XtNstrip

Range of Values:

TRUE
FALSE

This resource controls the stripping of leading and trailing spaces during the layout of the text string.

XtNstrip	XtNalignment	Spaces stripped
TRUE	**OL_LEFT**	Leading spaces stripped.
	OL_RIGHT	Trailing spaces stripped.
	OL_CENTER	Both leading and trailing spaces stripped.
FALSE	(any)	None.

XtNwrap

Range of Values:

TRUE
FALSE

This resource controls the wrapping of lines that are too long to fit in the width of the **StaticText** widget.

XtNwrap	XtNalignment	Wrap action
FALSE	**OL_LEFT**	Clipped on the right
	OL_RIGHT	Clipped on the left
	OL_CENTER	Clipped equally on both left and right
TRUE	(any)	Long text is broken at spaces between words so that each line of the displayed text has as many words as can fit.

NAME

Stub – used for widget prototyping

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Stub.h>

Widget parent, stub;

stub = XtCreateWidget(name, stubWidgetClass, ...);
```

DESCRIPTION

The **Stub** widget is essentially a method-driven widget that allows the application to specify procedures at creation and/or **XtSetValues()** time which normally are restricted to a widget's class part. Most class part procedures have been attached to the instance part. For example, with the stub widget, it's possible to set the procedure that's called whenever an exposure occurs. It's also possible to set the SetValues and Initialize procedures.

Build Unique Widgets within an application

By allowing the application to specify procedures outside the widget class structure, applications can use the stub widget to build local widgets without having to go through the formal steps. For example, suppose an application wanted to create a menu separator widget that inherits its parent's background color at creation time. It would be wasteful to create a new widget to perform these trivial tasks. Instead, the application would use a stub widget and specify an Initialize procedure for it.

Graphics Applications

The stub widget also implements graphics applications. Since the application has direct access to the widget's internal expose procedure, the application can take advantage of the exposure compression provided with the **region** argument. This field is not accessible if the application used an Event Handler to trap exposures. Also, since the application has access to the SetValues and SetValuesHook procedures, the application can programmatically modify graphic-related resources of the stub widget.

Inheriting Procedures from Existing Widgets

Once a stub widget is created, other stub widgets can inherit its methods without the application having to specify them again. All the application has to do is specify a reference stub widget in the creation Arg list and the new stub widget will inherit all instance methods from the referenced stub widget.

Wrapping Widgets around an existing Window

The Stub widget also allows the application to give widget functionality to existing X windows. For example, if the application wanted to track button presses on the root window, the application would create a stub widget using the RootWindow id as the XtNwindow resource. Once this has been done, the application can monitor events on the root window by attaching event handlers to the stub widget.

Keyboard Traversal

The **Stub** is a Primitive widget and it inherits the translations for traversal actions from the Primitive class. The user of a Stub widget should add translations for dealing with the navigation events listed in the section of **VIRTUAL KEYS/BUTTONS** that apply to the particular use of the Stub.

Display of Keyboard Mnemonic

The **Stub** does not display the mnemonic accelerator. If the **Stub** is the child of a **Caption** widget, the **Caption** widget can be used to display the **Stub**'s mnemonic.

Display of Keyboard Accelerators

The **Stub** does not display the keyboard accelerator. If the **Stub** is the child of a **Caption** widget, the **Caption** widget can be used to display the **Stub**'s accelerator as part of the label.

Coloration

The Stub widget should display a state which indicates that it has input focus. The general heuristic used for this display in widgets is that the background color is replaced with the input focus color found in the resource **XtNinputFocusColor**.

RESOURCES

The following table lists the resources available to the stub widget.

Stub Resource Set

Name	Class	Type	Default	Access
XtNacceptFocusFunc	XtCAcceptFocus	XtRFunction	NULL	SGI
XtNaccelerator	XtCAccelerator	String	NULL	SGI
XtNacceleratorText	XtCAcceleratorText	String	(calculated)	SGI
XtNactivatefunc	XtCActivateFunc	Function	NULL	SGI
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI
XtNbackgroundPixmap	XtCBackgroundPixmap	Pixmap	(none)	SGI
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNdepth	XtCDepth	Cardinal	(parent's)	GI
XtNdestroy	XtCDestroy	Function	NULL	SGI
XtNdestroyCallback	XtCDestroyCallback	XtCallbackList	NULL	I
XtNexpose	XtCExpose	Function	NULL	SGI
XtNgetValuesHook	XtCGetValuesHook	Function	NULL	SGI
XtNhighlightHandlerProc	XtCHighlightHandler	XtRFunction	NULL	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNheight	XtCHeight	Dimension	0	SGI
XtNinitialize	XtCInitialize	Function	(private)	GI
XtNinitializeHook	XtCInitializeHook	Function	NULL	GI

Stub Resource Set				
Name	Class	Type	Default	Access
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmnemonic	XtCMnemonic	unsigned char	NULL	SGI
XtNqueryGeometry	XtCQueryGeometry	Function	NULL	SGI
XtNrealize	XtCRealize	Function	(private)	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceStub	XtCReferenceStub	Widget	NULL	GI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNregisterFocusFunc	XtCRegisterFocus	XtRFunction	Null	SGI
XtNresize	XtCResize	Function	NULL	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI
XtNsetValues	XtCSetValues	Function	NULL	SGI
XtNsetValuesAlmost	XtCSetValuesAlmost	Function	(superclass)	SGI
XtNsetValuesHook	XtCSetValuesHook	Function	NULL	SGI
XtNtraversalHandlerFunc	XtCTraversalHandlerFunc	Function	NULL	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	FALSE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNwidth	XtCWidth	Dimension	0	SGI
XtNwindow	XtCWindow	Window	NULL	GI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNacceptFocusFunc

This procedure has the same semantics as the XtAcceptFocusFunc Core Widget Class procedure and it's called by the Stub Widget Class's accept focus class procedure. Applications that want to override the default accept focus procedure should use this function. When overriding the default accept focus procedure, the convenience routine **OlCanAcceptFocus()** can be used to check the widget's focus-taking eligibility. **OlSetInputFocus** should be used instead of **XSetInputFocus** when explicitly setting focus to a window. (See the section "Input Focus" for more on setting and accepting focus.)

XtNactivateFunc

```
void activateProc(w, activation_type, data)
        Widget        w;
        OlVirtualName activation_type;
        XtPointer     data;
```

This procedure is called whenever **OlActivateWidget()** is called with the stub widget id for which this routine was assigned. The procedure has the following declaration:

```
    Boolean (*OlActivateFunc)(w, activation_type, data)
        Widget        w;
        OlVirtualName activation_type;
        XtPointer     data;
```

If the **activation_type** is valid, the routine should take the appropriate action and return TRUE; otherwise, the routine should return FALSE.

XtNdestroy

```
void destroy(w)
        Widget w;
```

Specifies the procedure called when this stub instance is destroyed.

XtNexpose

```
void expose(w, xevent, region)
        Widget   w;
        XEvent * xevent;
        Region   region;
```

Procedure called whenever the a stub instance receives an exposure event. Since the Stub Widget class has requested exposure compression, the region field is valid.

XtNgetValuesHook

```
void getValuesHook(w, args, num_args)
        Widget     w;
        ArgList    args;
        Cardinal * num_args;
```

Procedure called whenever the application does an **XtGetValues()** call on a stub widget instance.

XtNhighlightHandlerProc

This procedure has the same semantics as the **OlHighlightProc** class procedure and it is called by the Stub Widget Class's **HighlightProc** class procedure. Applications that have Stub widgets which accept focus should set this routine so that the Stub widget can display an appropriate visual whenever it gains or loses focus.

XtNinitialize

```
void initialize(request, new)
        Widget  request;
        Widget  new;
```

Procedure called by **XtCreateWidget()** for a stub widget instance. The default initialize procedure knows how to deal with the **XtNwindow** resource (see the section on **XtNwindow**). If the application supplies its own initialize procedure, it's the application's responsibility to deal with the **XtNwindow** resource.

When the **XtNwindow** resource is non-NULL, the default initialize procedure fills in **XtNx, XtNy, XtNwidth** and **XtNheight** with the attributes specified by the **XtNwindow** id.

XtNinitializeHook

```
void initializeHook(w, args, num_args)
        Widget     w;
        ArgList    args;
        Cardinal * num_args;
```

This procedure is called by **XtCreateWidget()** for a stub widget instance after the *initialize* procedure has been called. The application can access the creation arg list through this routine. The widget specified with the **w** argument is the **new** widget from the *initialize* procedure.

XtNqueryGeometry

```
XtGeometryResult queryGeometry(w, request, preferred_return)
          Widget          w;
          XtWidgetGeometry * request;
          XtWidgetGeometry * preferred_return;
```

Procedure called whenever the application does an **XtQueryGeometry()** request on a stub widget instance.

XtNrealize

```
void realize(w, value_mask, attributes)
          Widget                 w;
          XtValueMask *          value_mask;
          XSetWindowAttributes * attributes;
```

Procedure called to realize a stub widget instance. The default realize procedure knows how to deal with the **XtNwindow** resource (see the section on **XtNwindow**). If the application supplies its own realize procedure, it's the application's responsibility to deal with the **XtNwindow** resource.

When **XtNwindow** is non-NULL, the realize procedure uses this window for the widget instance instead of creating a new window. The default realize procedure gives an error message if another widget in its process space is referencing the window already. Note, the default realize procedure does not reparent the specified window, if one is supplied.

XtNreferenceStub

This is a pointer to an existing Stub widget. If this pointer is non-NULL, the new Stub will inherit all instance methods from the referenced stub widget. An **XtSetValues** request on the new Stub widget should be used to change any inherited methods.

XtNresize

```
void resize(w)
          Widget w;
```

Procedure called whenever a stub widget instance is resized.

XtNregisterFocusFunc

This is a Stub Widget resource that points to a function of type

```
void (*OlRegisterFocusFunc)(w)
          Widget  w;
```

Whenever a stub widget gains focus this procedure is called and the stub's shell sets the "current focus widget" (See OlGetCurrentFocusWidget) to the value returned by it. If this function is NULL or returns NULL, the stub widget is set to the current focus widget. This is the typical case. If this procedure returns a widget id other than the stub widget's, that id is used to update the current focus widget so that a subsequent call to OlGetCurrentFocusWidget would return it.

Note, returning a widget id other than the stub widget's will not move the focus away from the stub widget.

XtNsetValues

```
Boolean setValues(current, request, new)
        Widget  current;
        Widget  request;
        Widget  new;
```

Procedure called whenever the application does an **XtSetValues()** call on a stub widget instance.

XtNsetValuesAlmost

```
void setValuesAlmost(w, new_widget, request, reply)
        Widget              w;
        Widget              new_widget;
        XtWidgetGeometry *  request;
        XtWidgetGeometry *  reply;
```

This procedure is called when the application attempts to set a stub widget's geometry via an **XtSetValues()** call and the stub widget's parent did not accept the requested geometry. The default **setValuesAlmost** procedure simply accepts the suggested compromise.

XtNsetValuesHook

```
Boolean setValuesHook(w, args, num_args)
        Widget     w;
        ArgList    args;
        Cardinal * num_args;
```

This procedure is called whenever the application does an **XtSetValues()** on a stub widget instance. Since this procedure is called after the *setValues* procedure, the widget specified by the **w** argument is the **new** widget from the *setValues* procedure.

XtNtraversalHandlerFunc

If an application wants the stub widget to process traversal commands whenever the stub widget has focus, this resource is used to supply the traversal routine. An example of a case when this is desirable is when a stub widget is used to implement a spread-sheet. In this case the stub widget would trap the OL_MOVERIGHT, OL_MOVELEFT, etc. commands to move focus between the cells in the spread-sheet. The traversal handling routine has the following declaration:

```
    Widget (*OlTraversalFunc)(w, start, direction, time)
        Widget         w;        /* Stub widget id */
        Widget         start;    /* Stub widget id */
        OlVirtualName  direction;
        Time           time;
```

If the traversal routine can process the traversal command, it returns the id of the widget which now has focus. (Note: the widget id returned can be the stub widget's id. This is the case when the traveral command was processed, but focus did not leave the stub widget.) If the traversal routine cannot process the given command, it should return NULL. (See the section "Input Focus" for a discussion on valid **direction** values and focus movement.)

XtNwindow

This resource specifies a window id that the Stub widget should associate with its instance data at realization time. The **XtNwindow** resource can be specified at initialization time only. If a window id is supplied, that stub widget instance will trap events on the given window. After the stub widget instance is realized, the function **XtWindow()** will return this window id.

If the stub widget is managed by its parent widget, the supplied window will be included in geometry calculations even though the stub widget (by default) does not reparent the supplied window to be a child of the parent widget's window.

Explicit calls to **XtMoveWidget**, **XtResizeWidget**, **XtConfigureWidget**, or **XtSetValues** can be used to modify the window's attributes.

Note: When the stub widget instance is destroyed, the window will be destroyed along with it.

If the **Stub** widget is managed, the window ID supplied with **XtNwindow** will be included in the geometry calculation causing undesireable reconfiguration. This is an anomoly that exists only with this resource.

XtNwidth
XtNheight

If **XtNwindow** has a NULL value, the application must insure that the dimensions of **XtNwidth** and **XtNheight** are non-NULL. The application can specify the width and height with an Arg list or specify an *initialize* procedure that sets them with non-NULL values. If either of these dimensions are NULL when the application attempts to realize the stub widget, an error will result.

EXAMPLE

The following example illustrates how an application can use the stub widget to perform some particular type of exposure handling. Since an *initialize* procedure was not specified and the **XtNwindow** resource was not used, the initial Arg list includes non-NULL values for the widget's width and height.

```
static void
Redisplay(w, xevent, region)
        Widget    w;
        XEvent *  xevent;
        Region    region;
{
        /*
         * do something interesting here
         */
} /* END OF Redisplay() */

main(...)
{
       Widget     base;
       Widget     stub;
       static Arg args[] = {
```

```
                { XtNexpose,    (XtArgVal) Redisplay },
                { XtNwidth,     (XtArgVal) 1         },
                { XtNheight,    (XtArgVal) 1         }
        };

        base = OlInitialize(...);

        stub = XtCreateManagedWidget("graphics pane", stubWidgetClass,
                        base, args, XtNumber(args));

        .......

    } /* END OF main() */
```

SEE ALSO

Input Focus for a discussion on keyboard focus manipulation

NAME

TextEdit – provides multiple line editing

SYNOPSIS

```
#include <stdio.h>
#include <buffutil.h>
#include <textbuff.h>
#include <Intrinsic.h>
#include <OpenLook.h>
#include <TextEdit.h>

widget = XtCreateWidget(name, textEditWidgetClass, . . .);
```

DESCRIPTION

The **TextEdit** widget provides an n-line text editing facility that has both a customizable user interface and a programmatic interface. It can be used for single line string entry as well as full-window editing. It provides a consistent editing paradigm for textual data.

The **TextEdit** widget provides three text wrap modes: wrapoff, wrapany, and wrapwhitespace.

The **TextEdit** widget provides several distinct callback lists used to monitor the state of the textual data: insertion cursor movement, modification of the text, and post modification notification. Each of these callbacks provide information to the application regarding the intended action. The application can simply examine this information to maintain its current state or can disallow the action and perform any of the programmatic manipulations instead.

The **TextEdit** widget also provides distinct callback lists for user input: mouse button down and key press. The call data for these callbacks decodes the input for the application. The application can examine the input and either consume the action, and perform any of the programmatic manipulations, or allow the widget to act upon it.

The **TextEdit** widget also provides the application with a callback list used when the widget is redisplayed. With this callback the application can add callbacks which can be used to display information in the margins of the **TextEdit** such as line numbers or update marks.

Editing Capabilities

The **TextEdit** widget provides editing capabilities to move the insert point, select text, delete text, scroll the display, perform cut, copy, paste, and undo operations, and refresh the text display. All of these capabilities are bound to global resources stored in the X server. Many of these settings can be changed using the property windows available in the OPEN LOOK Workspace Manager. All of these settings *dynamically* change immediately after new settings are stored in the server. The following table lists all of the key bindings used by the **TextEdit** widget:

Hierarchical Text

Text is considered to be hierarchically composed of white space, spans, lines, paragraphs, within a document. *Whitespace* is defined as any non-empty sequence of the ASCII characters space, tab, linefeed, or carriage return (decimal values 32, 9, 10, 13; respectively); a *span* is any non-empty sequence of characters bounded by whitespace. A *source line* is any (possibly empty) sequence of characters bounded by newline characters; a *display line* is any (possibly empty) sequence of characters appearing on a single screen display line. A *paragraph* is any sequence of characters bounded by sets of two or more adjacent newline characters. A *document* is the entire content of the text.

In all cases, the beginning or end of the edit text is an acceptable bounding element in the previous definitions.

Sizing the Display

When making display decisions, the **TextEdit** widget first will use either the application specified width and height or, if these values are not specified, calculate width and height by applying the values of the **XtNcharsVisible** and **XtNlinesVisible** resources. Once the width and height are determined the - **TextEdit** widget will request an appropriate size from its parent (considering the margins). If the request is denied or only partially satisfied, no future growth requests will be made unless there is an intervening resize operation externally imposed.

Once the size of the display is settled, the **TextEdit** widget calculates the display lines based on this size, the various margins, the font, tab table, and wrap mode.

Wrapping

If the wrap mode is OL_WRAP_ANY, as many characters from the source line as will entirely fit before the right margin are written to the current display line, then the next character starts at the left margin of the next display line, and so on. If the wrap mode is OL_WRAP_WHITE_SPACE, the line wrap occurs at the first whitespace character that follows the last full word that does fit on the current display line. If, however, under OL_WRAP_WHITE_SPACE, the first full word that does not fit is the first word on the display line, the wrap is made as if OL_WRAP_ANY were selected. If the wrap mode is OL_WRAP_OFF the lines are not wrapped but are clipped at the right margin. In this mode the text is horizontally scrollable.

ScrolledWindow

The application can place the **TextEdit** widget within a **ScrolledWindow** widget. When this arrangement is used, the text is easily scrollable using the Scrollbars provided by the **ScrolledWindow**.

The proportion indicators on the scrollbars show relatively how much of the text is currently in the display.

As the user enters text, the view automatically scrolls when the insert point moves beyond a margin boundary (right or bottom) to keep the insert point in view.

Application Access

The **`TextEdit`** widget provides complete programmatic control of the text and its display.

Keyboard Traversal

The default value of the **`XtNtraversalOn`** resource is True.

The widget responds to the following keyboard navigation keys:

NEXT_FIELD	moves to the first control in the next group
PREV_FIELD	moves to the first control in the previous group
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application
ROWUP	moves the caret up one line in the current column
ROWDOWN	moves the caret down one line in the current column
CHARBAK	moves the caret backward one character
CHARFWD	moves the caret forward one character
WORDFWD	moves the caret forward one word
WORDBAK	moves the caret back one word
LINESTART	moves the caret to the beginning of the line
LINEEND	moves the caret to the end of the line
PANESTART	moves the caret to the first row and column on the display
PANEEND	moves the caret to the last row and column on the display
DOCSTART	moves the caret to the beginning of the document
DOCEND	moves the caret to the end of the document

Note: It is expected that the user will use the alternate bindings for NEXT_FIELD and PREV_FIELD because the primary binding, TAB and SHIFT Tab, are valid characters in a Text pane.

The TextEdit widget responds to the following selection keys:

SELCHARFWD	adjusts the selection one character forward
SELWORDFWD	adjusts the selection to the end of the current (or next) word
SELLINEFWD	adjusts the selection to the end of the current (or next) line
SELCHARBAK	adjusts the selection one character backward

SELWORDBAK	adjusts the selection to the beginning of the current (or previous) word
SELLINEBAK	adjusts the selection to the beginning of the current (or previous) line
SELLINE	adjusts the selection to include the entire current line
SELFLIPENDS	reverses the "anchor" and cursor position of the selection

The TextEdit widget responds to the following scrolling keys:

SCROLLUP	scroll the view up one screen line
SCROLLDOWN	scroll the view down one screen line
PAGEUP	scroll to the next page up
PAGEDOWN	scroll to the next page down
PAGERIGHT	scroll to the next page to the right
PAGELEFT	scroll to the next page to the left
SCROLLLEFT	scroll the view one screen to the left
SCROLLRIGHT	scroll the view one screen to the right
SCROLLTOP	scroll to the beginning of the document
SCROLLBOTTOM	scroll to the end of the document
SCROLLLEFTEDGE	scroll to the left edge of the document
SCROLLRIGHTEDGE	scroll to the right edge of the document

The TextEdit widget responds to the following edit keys:

DELCHARFWD	deletes the character to the right of the caret
DELCHARBAK	deletes the character to the left of the caret
DELWORDFWD	deletes the word to the right of the caret
DELWORDBAK	deletes the word to the left of the caret
DELLINEFWD	deletes to the end of the line from the caret
DELLINEBAK	deletes from the beginning of the line to the caret
DELLINE	deletes the line containing the caret
UNDO	undoes the previous edit operation

Coloration

When this widget receives the input focus, it changes the text caret in the text field to the active caret and the color specified in **`XtNinputFocusColor`**.

Display of Keyboard Mnemonic

The **`TextEdit`** widget does not display the mnemonic. If the **`TextEdit`** widget is the child of a **`Caption`** widget, the **`Caption`** widget can be used to display the mnemonic.

RESOURCES

TextEdit Resource Set

Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI
XtNbackgroundPixmap	XtCPixmap	Pixmap	Unspecified	SGI
XtNblinkRate	XtCBlinkRate	Int	1000	SGI
XtNborderColor	XtCBorderColor	Pixel	XtDefaultForeground	SGI
XtNborderPixmap	XtCPixmap	Pixmap	Unspecified	SGI
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNbottomMargin	XtCMargin	Dimension	4	SGI
XtNcharsVisible	XtCCharsVisible	Int	50	GI
XtNcolormap	XtCColormap	Pointer	DYNAMIC	G
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNcursorPosition	XtCTextPosition	Int	0	SGI
XtNdepth	XtCDepth	Int	DYNAMIC	GI
XtNdisplayPosition	XtCTextPosition	Int	0	SGI
XtNeditType	XtCEditType	OlEditType	OL_TEXT_EDIT	SGI
XtNfont	XtCFont	FontStruct	NULL	SGI
XtNfontColor	XtCFontColor	Pixel	XtDefaultForeground	SGI
XtNfontGroup	XtCFontGroup			
XtNheight	XtCHeight	Dimension	0	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNinsertTab	XtCInsertTab	Boolean	TRUE	SGI
XtNleftMargin	XtCMargin	Dimension	4	SGI
XtNlinesVisible	XtCLinesVisible	Int	16	GI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmargin	XtCCallback	XtCallbackList	NULL	SGI
XtNmodifyVerification	XtCCallback	XtCallbackList	NULL	SGI
XtNmotionVerification	XtCCallback	XtCallbackList	NULL	SGI
XtNpostModifyNotification	XtCCallback	XtCallbackList	NULL	SGI
XtNreferenceName	XtCReferenceName	String	NULL	SGI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	SGI
XtNrightMargin	XtCMargin	Dimension	4	SGI
XtNselectEnd	XtCTextPosition	Int	0	SGI
XtNselectStart	XtCTextPosition	Int	0	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI
XtNsource	XtCSource	String	NULL	SGI
XtNsourceType	XtCSourceType	OlSourceType	OL_STRING_SOURCE	SGI
XtNtabTable	XtCTabTable	Pointer	NULL	SGI
XtNtopMargin	XtCMargin	Dimension	4	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	Pointer	NULL	SGI

TextEdit Resource Set				
Name	Class	Type	Default	Access
XtNwidth	XtCWidth	Dimension	0	SGI
XtNwrapMode	XtCWrapMode	OlWrapMode	OL_WRAP_WHITE_SPACE	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNblinkRate

This resource is used to specify the rate that the *active* input caret blinks. The value of this resource is interpreted as the number of milliseconds between blinks. Setting this value to zero (0) turns the blink effect off.

XtNbottomMargin

`Range of Values:`
`1 <= XtNbottomMargin <= height - XtNtopMargin - font_height`

This resource specifies the number of pixels used for the bottom margin. Note: the range is relative to the top margin value.

XtNcharsVisible

This resource is used to specify the *initial* width of the text in terms of characters. It overrides the **`XtNwidth`** resource setting. The **`XtNwidth`** is recalculated to be the value of **`XtNcharsVisible`** multiplied by the width of the 'n' (en) character in the font plus the values for the left and right margins. The value of this resource changes to reflect the effects of geometry changes imposed by the widget tree and the user. SetValues for this resource is ignored.

XtNcursorPosition

`Range of Values: 0 <= cursorPosition < size of buffer`

This resource is used to specify the relative character position in the text source of the insert cursor. Changing the value of this resource may affect the **`XtNdisplayPosition`** resource if the **`cursorPosition`** is not visible in the pane.

XtNdisplayPosition

Range of Values:
`0 <= displayPosition < size of buffer`

This resource contains the position in the text source that will be displayed at the top of the pane. A value of 0 indicates the beginning of the text source. When the position is near the end of the buffer, this position is recalculated to ensure that the last line in the buffer appears as the last line in the pane.

`XtNeditType`

Range of Values:
`OL_TEXT_READ/"textread"`
`OL_TEXT_EDIT/"textedit"`

This resource controls the edit state of the source:

OL_TEXT_READ
The source is read-only; the end-user cannot edit it.

OL_TEXT_EDIT
The source is fully editable.

XtNinputFocusColor

Range of Values:
`(Valid Pixel value for the display)/(Valid color name)`

This resource specifies the color of the input caret. Normally, this color is derived from the value of the **XtNinputFocusColor** resource and is dynamically maintained. This dynamic behavior is abandoned if the application explicitly sets this resource either at initialization or through a SetValues.

XtNinsertTab

If this resource is set to FALSE, a TAB character is not insertable. Setting this resource to FALSE makes traversal of the controls easier if the TAB key is bound as OL_NEXT_FIELD; if set to TRUE, a TAB character is insertable.

XtNmargin

This is the NULL terminated callback list of **XtCallbackList** used when the pane is redisplayed. The **call_data** parameter is a pointer to an **OlTextMarginCallData** structure:

```
 typedef enum {
   OL_MARGIN_EXPOSED,
   OL_MARGIN_CALCULATED,
}  OlTextMarginHint;

 typedef struct {
    OlTextMarginHint  hint;
    XRectangle *      rect;
}  OlTextMarginCallData, *OlTextMarginCallDataPointer;
```

The **OlTextMarginHint** indicates whether the area to be redrawn was explicitly known because of an exposure event (OL_MARGIN_EXPOSED) or if the rectangle was calculated relative to the textual display (OL_MARGIN_CALCULATED). The margin callback should respond to the OL_MARGIN_EXPOSED hint by repainting the area defined by the XRectangle **rect**. The margin callback may wish to calculate its own rectangle in the OL_MARGIN_CALCULATED case. It can freely use the rectangle structure passed in with the call data for this purpose.

This callback can be used to repair the margins for the text.

For example, this callback may be used to display line numbers for the text in the left margin.

XtNmodifyVerification

This is the NULL terminated callback list of type **XtCallbackList** used when a modification of the buffer is attempted. The **call_data** parameter is a pointer to an **OlTextModifyCallData** structure:

```
typedef struct {
   Boolean          ok;
   TextPosition     current_cursor;
   TextPosition     select_start;
   TextPosition     select_end;
   TextPosition     new_cursor;
   TextPosition     new_select_start;
   TextPosition     new_select_end;
   char *           text;
   int              text_length;
} OlTextModifyCallData, *OlTextModifyCallDataPointer;
```

All of the fields in this structure, with the exception of the **ok** flag, are treated as read-only information. The application can return without changing the value of the **ok** flag, in which case the update will occur. The application can also set the **ok** flag to FALSE, perform any other operations it desires, and return, in which case the update will not be performed.

XtNmotionVerification

This NULL terminated callback list of type **XtCallbackList** is used whenever the cursor position moves within the widget. The **call_data** parameter is a pointer to an **OlTextMotionCallData** structure:

```
typedef struct {
   Boolean          ok;
   TextPosition     current_cursor;
   TextPosition     new_cursor;
   TextPosition     select_start;
   TextPosition     select_end;
} OlTextMotionCallData, *OlTextMotionCallDataPointer;
```

This callback list is used whenever the cursor position changes due to cursor movement operations or by modification of the text.

The application can distinguish between a simple cursor movement and a modify operation by comparing the **current_cursor** and **new_cursor** values.

When these values are equal the callback is the result of a modify operation. In this case the **ok** field is ignored and the application should not attempt to perform updates to the text or its display during this callback.

If the values of **current_cursor** and **new_cursor** are different, the application is guaranteed that the operation is the result of a cursor movement. In this mode all of the fields in this structure, with the exception of the **ok** flag, are treated as read-only information. The application can return without changing the value of the **ok** flag, in which case the movement will occur. The application can also set the **ok** flag to FALSE, perform any other operations it desires, and return, in which case the movement will not be performed.

XtNpostModifyNotification

This is the NULL terminated callback list of type **XtCallbackList** used after a buffer update has completed. The **call_data** parameter is a pointer to an **OlTextFocusCallData** structure:

```
typedef struct {
    Boolean          requestor;
    TextPosition     new_cursor;
    TextPosition     new_select_start;
    TextPosition     new_select_end;
    char *           inserted;
    char *           deleted;
    TextLocation     delete_start;
    TextLocation     delete_end;
    TextLocation     insert_start;
    TextLocation     insert_end;
    TextLocation     cursor_position;
}  OlTextFocusCallData, *OlTextFocusCallDataPointer;
```

This callback is used to synchronize the application with the text once a modify operation is completed. For example, the application may record successful edit operations in an undo buffer to provide multi-level undo functionality. The data provided in this callback is considered read-only and volatile (for example, the application should copy what it needs from this structure before returning).

XtNrightMargin

Range of Values:

```
1 <= XtNrightMargin <= width - XtNleftMargin - font_width
```

This resource specifies the number of pixels used for the right margin. Note: the range is relative to the left margin value.

XtNselectEnd

This resource is used to specify the last character position selected in the text. It is used along with the **XtNselectStart** and **XtNcursorPosition** resources to specify a selection. To be effective, the **XtNselectStart** value must be less than or equal to **XtNselectEnd** and the **XtNcursorPosition** must be equal to either **XtNselectStart** or **XtNselectEnd**. If either of these tests fails then **XtNselectStart and XtNselectEnd** are set equal to the value of the **XtNcursorPosition**.

XtNselectStart

This resource is used to specify the first character position selected in the text. It is used along with the **XtNselectEnd** and **XtNcursorPosition** resources to specify a selection. To be effective, the **XtNselectStart** value must be less than or equal to **XtNselectEnd** and the **XtNcursorPosition** must be equal to either **XtNselectStart** or **XtNselectEnd**. If either of these tests fails then **XtNselectStart** and **XtNselectEnd** are set equal to the value of the **XtNcursorPosition**.

XtNsource

Range of Values:

```
<string> for OL_STRING_SOURCE
<name of file> for OL_DISK_SOURCE
<pointer to an existing TextBuffer> for OL_TEXT_BUFFER_SOURCE
```

This resource is used in tandem with the **XtNsourceType** resource to specify the source. See the **XtNsourceType** resource for a full description of these resources.

XtNsourceType

Range of Values:

```
OL_STRING_SOURCE/"stringsource"
OL_DISK_SOURCE/"disksource"
OL_TEXT_BUFFER_SOURCE/NA
```

This resource controls the interpretation of the **XtNsource** resource value. When set to OL_STRING_SOURCE the **XtNsource** value is interpreted as the string to be used as the source, when set to OL_DISK_SOURCE the **XtNsource** value is interpreted as the name of the file containing the source, when set to OL_TEXT_BUFFER_SOURCE the **XtNsource** value is interpreted as a pointer to a previously initialized **TextBuffer** (see the **TextBuffer Utilities** manual page for a description of TextBuffers).

XtNtabTable

This resource is used to specify a pointer to an array of tab *Positions*. These tab positions are specified in terms of pixels and must be terminated by a zero (0) entry. The widget calculates tabs by finding the next tab table entry that exceeds the current x offset for the line. If no such entry exists in the table or if the pointer to the tab table is NULL, the tab is set to the next greater multiple of eight (8) times the size of the 'n' (en) character in the font.

XtNtopMargin

Range of Values:

```
1 <= XtNtopMargin <= height - XtNbottomMargin - font_height
```

This resource specifies the number of pixels used for the top margin. Note: the range is relative to the bottom margin value.

XtNwrapMode

Range of Values:

```
OL_WRAP_WHITE_SPACE/"wrapwhitespace"
OL_WRAP_ANY/"wrapany"
OL_WRAP_OFF/"wrapoff"
```

This resource is used to control how the source is wrapped in the pane. When OL_WRAP_ANY, lines are wrapped at the last character before the right margin; when set to OL_WRAP_WHITE_SPACE, lines are wrapped at the last white space before the right margin or as in OL_WRAP_ANY if the line does not contain any white space; when OL_WRAP_OFF, lines are not wrapped and the pane may horizontally scroll.

NAME

`TextField` – provides a one-line editable text field

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <TextField.h>

widget = XtCreateWidget(name, textFieldWidgetClass,...);
```

DESCRIPTION

TextField Components

The **TextField** widget is a one-line input field for text data that contains the following elements:

— Input Caret

— Input Field

— Left Arrow (conditional)

— Right Arrow (conditional)

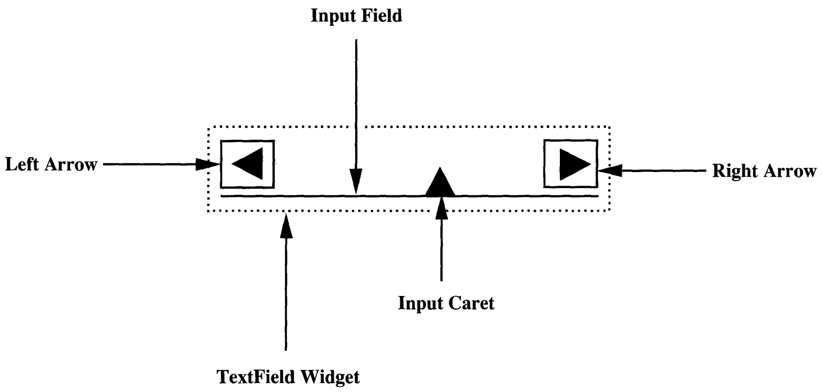


Figure 1. One-Line Text Field

Keyboard Input

Once the input focus has been moved to the Input Field, keyboard entry is allowed. The **TextField** widget does not validate the input, leaving that up to the application.

Keyboard Traversal

The default value of the **XtNtraversalOn** resource is TRUE.

The TextField widget responds to the following keyboard navigation keys:

NEXT_FIELD and DOWN	move to the next traversable widget in the window
PREV_FIELD and UP	move to the previous traversable widget in the window
NEXTWINDOW	moves to the next window in the application
PREVWINDOW	moves to the previous window in the application
NEXTAPP	moves to the first window in the next application
PREVAPP	moves to the first window in the previous application
CHARBAK	moves the caret backward one character
CHARFWD	moves the caret forward one character
WORDFWD	moves the caret forward one word
WORDBAK	moves the caret back one word
LINESTART	moves the caret to the beginning of the display
LINEEND	moves the caret to the end of the display

The MENUKEY posts the menu attached to the TextField.

The TextField widget responds to the following selection keys:

SELCHARFWD	adjusts the selection one character forward
SELWORDFWD	adjusts the selection to the end of the current (or next) word
SELLINEFWD	adjusts the selection to the end of the current (or next) line
SELCHARBAK	adjusts the selection one character backward
SELWORDBAK	adjusts the selection to the beginning of the current (or previous) word
SELLINEBAK	adjusts the selection to the beginning of the current (or previous) line
SELLINE	adjusts the selection to include the entire current line
SELFLIPENDS	reverses the "anchor" and cursor position of the selection

The **TextField** widget responds to the following scrolling keys:

SCROLLLEFT	scroll the view one screen to the left
SCROLLRIGHT	scroll the view one screen to the right

SCROLLLEFTEDGE	scroll to the left edge of the textfield
SCROLLRIGHTEDGE	scroll to the right edge of the textfield

The **TextField** widget responds to the following edit keys:

DELCHARFWD	deletes the character to the right of the caret
DELCHARBAK	deletes the character to the left of the caret
DELWORDFWD	deletes the word to the right of the caret
DELWORDBAK	deletes the word to the left of the caret
DELLINEFWD	deletes to the end of the line from the caret
DELLINEBAK	deletes from the beginning of the line to the caret
DELLINE	deletes the line containing the caret
UNDO	undoes the last edit

Display of Keyboard Mnemonic

The **TextField** does not display the mnemonic. If the **TextField** is the child of a **Caption** widget, the **Caption** widget can be used to display the mnemonic.

Display of Keyboard Accelerators

The **TextField** does not respond to a keyboard accelerator because clicking the SELECT button on a TextField activates depending on the pointer position. So, the **TextField** does not display a keyboard accelerator.

Scrolling Long Text Input

If an input value exceeds the length of the Input Field, the Left Arrow and/or Right Arrow appear and the input value is visually truncated on the left and/or the right to show only as many characters as can fit in the Input Field. The truncation is at a character boundary. Since the Arrows take up space that would otherwise be used for the input, the truncation is more severe than would be necessary if they were not visible. An Arrow is present only if characters are hidden in the direction expressed by the arrow.

The user can scroll to show the hidden parts of the input by clicking or pressing SELECT on the Left or Right Arrow. Clicking SELECT on the Left Arrow scrolls the input one character to the right to show the next character that was hidden to the left. Clicking SELECT on the Right Arrow scrolls the input one character to the left to show the next character that was hidden to the right. Pressing SELECT scrolls continuously, with a user-adjustable wait between changes.

The text does not scroll beyond its limits, so that the left-most character never moves beyond the right edge of the **TextField** widget and the right-most character never moves beyond the left edge. If the user attempts to scroll beyond the limits by clicking SELECT, the system beeps. If the user is pressing SELECT when the limit is reached, the text stops scrolling but the system does not beep. If the user releases SELECT and then presses SELECT again to exceed the scrolling limit, the system beeps once regardless of how long SELECT is pressed.

Input Validation

A validation callback list can be used to perform *limited* per-field validation. This callback is used when the end-user hits the RETURN, PREV_FIELD, or NEXT_FIELD. It is *not* called if the user mouses the focus to another input area.

Position of the Input Caret

As characters are entered from the keyboard, the Input Caret moves to the right until it reaches the right end of the Input Field. As additional characters are typed the text scrolls to the left (the Left Arrow appears as discussed above) and the Input Caret moves relative to the text but remains stationary on the screen.

Selecting and Operating on the Input Field

The **TextField** widget allows text to be copied or moved to and from the Input Field. See **TEXT SELECTION**(3W) earlier in this manual for the description of these operations.

Coloration

When this widget receives the input focus, it changes the text caret in the text field to the active caret.

Figure 2 illustrates the resources that affect the coloration of the **TextField** widget.

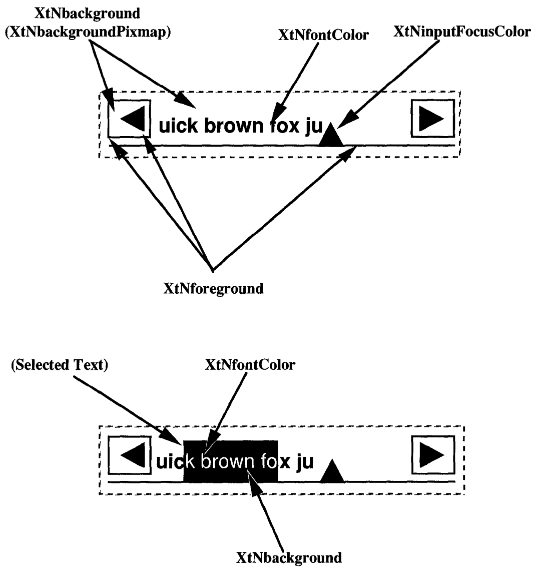


Figure 2. Text Field Coloration

SUBSTRUCTURE

TextEdit component

Name: Textedit
Class: TextEdit

TextField Initialize Resources Passed from TextField Widget to TextEdit Widget

At creation time, the following resources are passed from the textfield to the text-edit widget:

Name	Value
`XtNbackground`	`(textfield XtNbackground)`
`XtNbottomMargin`	`3`
`XtNcharsVisible`	`(depends on size of textfield)`
`XtNfont`	`(textfield font)`
`XtNinsertTab`	`(textfield XtNinsertTab)`
`XtNleftMargin`	`1`
`XtNlinesVisible`	`1`
`XtNregisterFocusFunc`	`(textfield private routine EditsRegisterFocus())`
`XtNrightMargin`	`1`
`XtNtopMargin`	`1`
`XtNwidth`	`(width of textfield)`
`XtNwrapMode`	`OL_WRAP_OFF`

TextField SetValues Resources Passed from TextField Widget to TextEdit Widget

At **`SetValues`** time, **`XtNstring`** is passed to the TextEdit widget as **`XtNsource`** and the following resources are set:

Name	Value
`XtNbackground`	`(TextField XtNbackground)`
`XtNcursorPosition`	`0`
`XtNinsertTab`	`(TextField XtNinsertTab)`
`XtNselectStart`	`0`
`XtNselectEnd`	`0`
`XtNsourceType`	`OL_STRING_SOURCE`

RESOURCES

TextField Resource Set

Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	XtDefaultBackground	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNcharsVisible	XtCCharsVisible	int	0	GI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SG
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNforeground	XtCForeground	Pixel	XtDefaultForeground	SGI†
XtNheight	XtCHeight	Dimension	(calculated)	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Red	SGI
XtNinitialDelay	XtCInitialDelay	int	500	SGI
XtNinsertTab	XtCInsertTab	Boolean	FALSE	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmaximumSize	XtCMaximumSize	int	0	SGI
XtNreferenceName	XtCReferenceName	String	NULL	GI
XtNreferenceWidget	XtCReferenceWidget	Widget	NULL	GI
XtNrepeatRate	XtCRepeatRate	int	100	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	GI*
XtNstring	XtCString	String	NULL	SGI
XtNtextEditWidget	XtCTextEditWidget	Widget	NULL	G
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNverification	XtCCallback	XtCallbackList	NULL	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNcharsVisible

This resource is used to specify the *initial* width of the list in terms of characters. It overrides the **XtNwidth** resource setting. The **XtNwidth** is recalculated to be the value of **XtNcharsVisible** multiplied by the width of the 'n' (en) character in the font plus the values for the internal left and right margins. The value of this resource changes to reflect the effects of geometry changes imposed by the widget tree and the user. SetValues for this resource is ignored.

XtNinitialDelay

Range of Values:

```
        0 < XtNinitialDelay
```

This resource gives the time, in milliseconds, before the first action occurs when SELECT is pressed on an Arrow. Note that millisecond timing precision may not be possible for all implementations, so the value may be rounded up to the nearest available unit by the toolkit.

XtNinitialDelay

This resource is used to specify the time in milliseconds of the initial repeat delay to be used when the scrolling arrows are pressed.

XtNinsertTab

If this resource is set to FALSE, a TAB character is not insertable; Setting this resource to FALSE makes traversal of controls easier if the TAB key is bound as OL_NEXT_FIELD. If set to TRUE, a TAB character is insertable.

XtNmaximumSize

Range of Values:

`0 ≤ XtNmaximumSize`

This resource is the maximum number of characters that can be entered into the internal buffer. If this value is not set or is zero, the internal buffer will increase its size as needed limited only by the space limitations of the process.

XtNreferenceWidget

This resource specifies a position for inserting the current widget in its managing ancestor's traversal list. If the reference widget is non-null and exists in the managing ancestor's traversal list, the current widget will be inserted in front of it. Otherwise, the current widget will be inserted at the end of the list.

`XtNrepeatRate`

This resource is used to specify the time in milliseconds of the repeat delay to be used when the scrolling arrows are pressed.

`XtNstring`

This is the content of the Input Field. On being set a copy of the value is made in an internal buffer. Using **`XtGetValues`**() on this resource gets a new copy that the application is responsible for freeing when no longer needed.

XtNtextEditWidget

This resource is used to retrieve the TextEdit widget associated with the TextField. This value can be used to directly access the underlying TextEdit widget (and its TextBuffer) used to manage the textual display.

XtNtraversalOn

Range of Values:

`TRUE`
`FALSE`

This resource specifies whether this widget is selectable during traversal.

XtNverification

This is the callback list used when the end-user hits the RETURN, PREV_FIELD, or NEXT_FIELD. The **`call_data`** parameter is a pointer to an **`OlTextFieldVerify`** structure:

```
typedef enum {
   OlTextFieldReturn,
   OlTextFieldPrevious,
   OlTextFieldNext
}  OlTextVerifyReason;

typedef struct {
   OlTextVerifyReason reason;
   String             string;
   Boolean            ok;
   OlTextVerifyReason reason;
}  OlTextFieldVerify, *OlTextFieldVerifyPointer;
```

This callback list can be used to perform per-field validation. Note: the callback is called only when a key is used to traverse from the field; it is *not* called when the user mouses the focus to another input area, therefore applications will still need to perform per-form validation.

D Manual Pages: Obsolete Routines

Introduction to the Obsolete Routines

The routines included in this section have been made obsolete for various reasons. Usually they have been replaced with more updated versions. The documentation for these routines has been made available to you for three reasons:

- We wish to remain consistent with Intrinsics documentation from other sources including the XConsortium.
- You are given an opportunity to remove these obsolete routines from your application program conveniently.
- You have the opportunity to compare the description of the old routine with its replacement.

List of Obsolete Routines and Widgets

The obsolete routines and widgets for this release are as follows:

```
Abbrevstack Widget
Buttonstack Widget
LookupOlInputEvent()
OlDetermineMouseAction()
OlGetApplicationResources()
OlReplayBtnEvent()
Text Widget
Virtual Key/Button
```

NAME

AbbrevStack – no longer used

The **AbbreviatedButtonStack** Widget is no longer an Xol toolkit widget, but it will be supported for compatibility reasons. Since it has the exact functionality and resources as the **AbbreviatedMenuButton** widget, refer to the **AbbreviatedMenuButton**(3W) manual page for a discussion of its use.

NAME

ButtonStack – no longer used

The **ButtonStack** widget is no longer an Xol toolkit widget, but it will be supported for compatibility reasons. Since it has the exact functionality and resources as the **MenuButton** widget, refer to the **MenuButton**(3W) manual page for a discussion of its use.

Dynamic Settings

NAME

`LookupOlInputEvent`

SYNOPSIS

```
#include <Dynamic.h>
 ...
extern OlInputEvent LookupOlInputEvent(w, event, keysym, buffer, length)
Widget   w;
XEvent * event;
KeySym * keysym;
char **  buffer;
```

DESCRIPTION

The **`LookupOlInputEvent`** function is used to decode the *event* for widget *w* to an **`OlInputEvent`**. The event passed should be a ButtonPress, ButtonRelease, or KeyPress event. The function attempts to decode this event based on the settings of the OPEN LOOK defined dynamic mouse and keyboard settings.

If the event is a KeyPress, the function may return the **`keysym`**, *buffer*, and/or *length* of the buffer returned from a call to XLookupString(3X). It returns these values if non-NULL values are provided by the caller.

SEE ALSO

`LookupOlColors`(3W)
`OlReplayBtnEvent`(3W)
`OlDetermineMouseAction`(3W)

Dynamic Settings

NAME

`OlDetermineMouseAction`

SYNOPSIS

```
#include <OpenLook.h>
#include <Dynamic.h>
  ...
extern ButtonAction OlDetermineMouseAction(w, event)
Widget   w;
XEvent * event;
```

DESCRIPTION

The `OlDetermineMouseAction` function is used to determine the kind of mouse gesture that is being attempted: MOUSE_CLICK, MOUSE_MULTI_CLICK, or MOUSE_MOVE. This function is normally called immediately upon receipt of a mouse button press event. It uses the current settings for mouseDampingFactor and multiClickTimeout to determine the kind of gesture being made.

SEE ALSO

`OlDragAndDrop`(3W)
`OlGrabDragPointer`(3W)
`OlUngrabDragPointer`(3W)

NOTES

This function performs an active pointer grab. This grab is released for the CLICK type actions but not for MOUSE_MOVE. It is the responsibility of the caller to ungrab the pointer if the action is MOUSE_MOVE.

EXAMPLE

```
static void ButtonConsumeCB (w, client_data, call_data)
widget      w;
XtPointer   client_data;
XtPointer   call_data;
{
Window   drop_window;
Position x;
Position y;
OlVirtualEvent ve;

ve = (OlVirtualEvent) call_data

switch (ve -> virtual_name)
  {
 case OL_SELECT:~
    switch(OlDetermineMouseAction(widget, event))
```

```
        {
        {
         case MOUSE_MOVE:~
           OlGrabDragPointer(widget, OlGetMoveCursor(XtScreen(widget),
                                  None);
           OlDragAndDrop(widget, &drop_window, &x, &y);
           DropOn(widget, drop_window, x, y, ....);
           OlUngrabDragPointer(widget);
           break;
        case MOUSE_CLICK:~
           ClickSelect(widget, ....);
           break;
        case MOUSE_MULTI_CLICK:~
           MultiClickSelect(widget,  ....);
           break;
        default:~
           Panic(widget, ....);
           break;
        }
       break;
     default:~
       OlReplayBtnEvent(widget, NULL, event);
       break;
    }
  }
```

Dynamic Settings

NAME

`OlReplayBtnEvent`

SYNOPSIS

```
 ...
extern void OlReplayBtnEvent(w, client_data, event)
Widget   w;
caddr_t  client_data;
XEvent * event;
```

DESCRIPTION

The **`OlReplayBtnEvent`** procedure is used to replay a button press event to the next window (towards the root) that is interested in button events. This provides a means of propagating events up a window tree.

SEE ALSO

`LookupOlInputEvent`(3W)

NAME

Virtual_Key/Button: OlConvertVirtualTranslation – takes a virtual translation string as input and returns a Standard X Toolkit translation string

Note: this routine is obsolete since translation tables cannot support dynamic rebinding of keys and buttons. *OlLookupInputEvent* should be used instead.

SYNOPSIS

```
#include <Intrinsic.h>
#include <OpenLook.h>

char *OlConvertVirtualTranslation(virtual_translation)
char *virtual_translation;
```

DESCRIPTION

Converts Virtual Translations into Standard Translations

OlConvertVirtualTranslation takes a virtual translation string as input and returns a standard X Toolkit Intrinsic's translation string. The function parses the input string replacing any virtual key or button expressions with their real representation(s). A virtual translation string has the same format as a standard X Toolkit Intrinsics translation string, except that virtual expressions can appear as modifiers or event types. (However, a virtual expression cannot appear as an event type detail.)

Reference: See "Appendix A" in the *X Toolkit Intrinsics—C Language Interface, X Window System, X Version 11,*, for more information on the translation string.

Virtual Expressions

Virtual expressions are key or mouse button names that are independent of any physical mapping of the keyboard or mouse buttons. For instance, MENU (which in this document refers to the mouse button used to pop up menus) has the virtual expression **menuBtn** in a virtual translation. If the end user has assigned mouse button three to be MENU, then the **OlConvertVirtualTranslation** routine would convert a virtual translation that contains the expression **menuBtn** into a standard translation containing the expression **Button3**.

The following is the list of virtual expressions for the various keys and mouse buttons defined in the OPEN LOOK user interface. The left column gives the name used in this document.

Name	Virtual Expression	Virtual Event
ADJUST	adjustBtn	OL_ADJUST
ADJUSTKEY	adjustKey	OL_ADJUSTKEY
CANCEL	cancelKey	OL_CANCEL
CHARBACK	charBakKey	OL_CHARBAK
CHARFWD	charFwdKey	OL_CHARFWD
CONSTRAIN	constrainBtn	OL_CONSTRAIN
COPY	copyKey	OL_COPY

Name	Virtual Expression	Virtual Event
CUT	cutKey	OL_CUT
DEFAULTACTION	defaultActionKey	OL_DEFAULTACTION
DELCHARBACK	delCharBakKey	OL_DELCHARBAK
DELCHARFWD	delCharFwdKey	OL_DELCHARFWD
DELLINE	delLineKey	OL_DELLINE
DELLINEBACK	delLineBakKey	OL_DELLINEBAK
DELLINEFWD	delLineFwdKey	OL_DELLINEFWD
DELWORDBACK	delWordBakKey	OL_DELWORDBAK
DELWORDFWD	delWordFwdKey	OL_DELWORDFWD
DOCEND	docEndKey	OL_DOCEND
DOCSTART	docStartKey	OL_DOCSTART
DOWN	downKey	OL_DOWN
DRAG	dragKey	OL_DRAG
DROP	dropKey	OL_DROP
DUPLICATE	duplicateBtn	OL_DUPLICATE
DUPLICATEKEY	duplicateKey	OL_DUPLICATEKEY
HELP	helpKey	OL_HELP
HORIZSBMENU	horizSDMenuKey	OL_HSBMENU
LEFT	leftKey	OL_LEFT
LINEEND	lineEndKey	OL_LINEEND
LINESTART	lineStartKey	OL_LINESTART
MENU	menuBtn	OL_MENU
MENUKEY	menuKey	OL_MENUKEY
MENUDEFAULT	menuDefaultBtn	OL_MENUDEFAULT
MENUDEFAULTKEY	menuDefaultKey	OL_MENUDEFAULTKEY
NEXTAPP	nextAppKey	OL_NEXTAPP
NEXTFIELD	nextFieldKey	OL_NEXT
NEXTWINDOW	nextWinKey	OL_NEXTWINDOW
PAGEDOWN	pageDownKey	OL_PAGEDOWN
PAGELEFT	pageLeftKey	OL_PAGELEFT
PAGERIGHT	pageRightKey	OL_PAGERIGHT
PAGEUP	pageUpKey	OL_PAGEUP
PAN	panBtn	OL_PAN
PANEEND	paneEndKey	OL_PANEEND
PANESTART	paneStartKey	OL_PANESTART
PASTE	pasteKey	OL_PASTE
PREVAPP	prevAppKey	OL_PREVAPP
PREVFIELD	prevFieldKey	OL_PREV
PREVWINDOW	prevWinKey	OL_PREVWINDOW
PROPERTY	propertiesKey	OL_PROPERTY
RIGHT	rightKey	OL_RIGHT
ROWDOWN	rowDownKey	OL_ROWDOWN

Name	Virtual Expression	Virtual Event
ROWUP	rowUpKey	OL_ROWUP
SCROLLBOTTOM	scrollBottomKey	OL_SCROLLBOTTOM
SCROLLDOWN	scrollDownKey	OL_SCROLLDOWN
SCROLLLEFT	scrollLeftKey	OL_SCROLLLEFT
SCROLLLEFTEDGE	scrollLeftEdgeKey	OL_SCROLLLEFTEDGE
SCROLLRIGHT	scrollRightKey	OL_SCROLLRIGHT
SCROLLRIGHTEDGE	scrollRightEdgeKey	OL_SCROLLRIGHTEDGE
SCROLLTOP	scrollTopKey	OL_SCROLLTOP
SCROLLUP	scrollUpKey	OL_SCROLLUP
SELECT	selectBtn	OL_SELECT
SELECTKEY	selectKey	OL_SELECTKEY
SELECTCHARBACK	selCharBakKey	OL_SELCHARBAK
SELECTFLIPENDS	selFlipEndsKey	OL_SELFLIPENDS
SELECTLINE	selLineKey	OL_SELLINE
SELECTLINEBACK	selLineBakKey	OL_SELLINEBAK
SELECTWORDBACK	selWordBakKey	OL_SELWORKBAK
SELECTCHARFWD	selCharFwdKey	OL_SELCHARFWD
SELECTLINEFWD	selLineFwdKey	OL_SELLINEFWD
SELECTWORDFWD	selWordFwdKey	OL_SELWORDFWD
STOP	stopKey	OL_STOP
TOGGLEPUSHPIN	togglePushpinKey	OL_TOGGLEPUSHPIN
UNDO	undoKey	OL_UNDO
UP	upKey	OL_UP
VERTSBMENU	vertSBMenuKey	OL_VSBMENU
WINDOWMENU	windowMenuKey	OL_WINDOWMENU
WORDBACK	wordBakKey	OL_WORDBAK
WORDFWD	wordFwdKey	OL_WORDFWD
WORKSPACEMENU	workspaceMenuKey	OL_WORKSPACEMENU

The following example illustrates a virtual translation that contains three productions. (The **Message** production does not involve any virtual translations but is included for illustration.)

```
" ! selectBtn <selectBtnUp>:    notify() \n
    <Message>:                  checkClientMessage() \n
  ! <copyKeyDown>:              copyToClipboard()"
```

Space Allocated Only If Necessary

If the input string does not contain any virtual expressions, the original string is returned. If the input string contains at least one valid virtual production, the function allocates memory for the returned string. The application is responsible for checking this difference and freeing the allocated memory, if appropriate.

Invalid Productions Dropped

If the input string contains a valid virtual production, any invalid virtual productions are not included in the returned string. If the input string contains no virtual productions, error checking is not done.

SEE ALSO

`OlLookupInputEvent`(3W)

NAME

`Text` – provides an interface for the end-user to enter and edit text

Note: The `Text` widget is obsolete -- use the `TextEdit` widget instead.

SYNOPSIS

```
#include <Intrinsic.h>
#include <StringDefs.h>
#include <OpenLook.h>
#include <Text.h>

widget = XtCreateWidget(name, textWidgetClass, ...);
```

DESCRIPTION

The `Text` widget provides a single and multi-line text editor that has both a customizable user interface and a programmatic interface. It can be used for single-line string entry, forms entry with verification procedures, multiple-page document viewing, and full-window editing. It provides an application with a consistent editing paradigm for entry of textual data.

The display of the textual data on the screen can be adjusted to scroll, wrap, or grow automatically as the user reaches the edge of the view of the text.

The `Text` widget provides separate callback lists to verify insertion cursor movement, modification of the text, and leaving the `Text` widget. Each of these callbacks provides the verification function with the widget instance, the event that caused the callback, and a data structure specific to the verification type. From this information, the function can verify if the application considers this to be a legitimate state change and signal the widget whether to continue with the action. The verification function can also manipulate the widget through the class methods defined by the `Text` widget class. The verification callback lists are explained in detail below.

Editing Capabilities

The `Text` widget provides the editing capabilities listed in the following table.

Name	Editing Action
CHARFWD	Move the caret forward one character
CHARBAK	Move the caret back one character
ROWDOWN	Move the caret down one line in the current column
ROWUP	Move the caret up one line in the current column
WORDFWD	Move the caret forward one word
WORDBAK	Move the caret back one word
LINESTART	Move the caret to the beginning of the current display line
LINEEND	Move the caret to the end of the current display line
DOCSTART	Move the caret to the beginning of the source
DOCEND	Move the caret to the end of the source
DELCHARFWD	Delete the character to the right of the caret
DELCHARBAK	Delete the character to the left of the caret

Name	Editing Action
DELWORDFWD	Delete the word to the right of the caret
DELWORDBAK	Delete the word to the left of the caret
DELLINEFWD	Delete to the end of the current display line from the caret
DELLINEBAK	Delete to the beginning of the current display line from the caret

This second table displays the virtual expressions and keyboard equivalents for the editing functions. See **VIRTUAL KEY/BUTTON(3W)** earlier in this guide for more information on virtual expressions.

Name	**Virtual Expression**	**Keyboard Equivalents**
CHARFWD	charFwdKey	CTRL-F, →
CHARBAK	charBakKey	CTRL-B, ←
ROWDOWN	rowDownKey	CTRL-N, ↓
ROWUP	rowUpKey	CTRL-P, ↑
WORDFWD	wordFwdKey	ALT-F, ALT- →
WORDBAK	wordBakKey	ALT-B, ALT- ←
LINESTART	lineStartKey	CTRL-A, CTRL- ←
LINEEND	lineEndKey	CTRL-E, CTRL- →
DOCSTART	docStartKey	ALT-↑, ALT- <
DOCEND	docEndKey	ALT-↓, ALT- >
DELCHARFWD	delCharFwdKey	CTRL-D, DELETE
DELCHARBAK	delCharBakKey	CTRL-H, BACKSPACE
DELWRDFWD	delWordFwdKey	ALT-D
DELWORDBAK	delWordBakKey	ALT-H
DELLINEFWD	delLineFwdKey	CTRL-K
DELLINEBAK	delLineBakKey	ALT-K

Hierarchical Text

Text is considered to be hierarchically composed of white space, words, lines and paragraphs. White space is defined as any non-empty sequence of the ASCII characters space, tab, linefeed or carriage return (decimal values of 32, 9, 10, 13, respectively); a word is any non-empty sequence of characters bounded on both sides by *whitespace*. A source line is any (possibly empty) sequence of characters bounded by newline characters; a display line is any (possibly empty) sequence of characters appearing on a single screen display line. A source paragraph is any sequence of characters bounded by sets of two or more adjacent newline characters. A display paragraph is any (possibly empty) sequence of characters bounded by newline characters (Note: This is identical to the definition of a source line.)

In all cases, the beginning or end of the edit text is an acceptable bounding element in the previous definitions.

Sizing the Display

When making display decisions, the **Text** widget first determines whether all the text will fit in the current display. If it does not, and growing is enabled, the widget will request a resize from its parent. If the request is denied or only partially satisfied, no future growth requests will be made unless there is an intervening resize operation externally imposed.

If any source line is still too long to fit in the display after growing is attempted, wrapping is checked. If wrapping is disabled, one display line is drawn for each source line. If a source line is too long for the display, it is truncated at the right margin after the last full character that fits. If wrapping is enabled, a new display line will be started with the first word that does not fit on the current line. If the wrap break option is **OL_WRAP_ANY**, as many characters from that word as will fit before the right margin are written to the current display line, then the next character starts at the left margin of the next display line. If the wrap break option is **OL_WRAP_WHITE_SPACE**, the line break is instead made after the first whitespace character that follows the last full word that does fit on the current display line. If, however, under white space break, the first full word that does not fit is also the first word on the line, the wrap break is made as if **OL_WRAP_ANY** were selected.

Scrolled Window

The application can decide if the **Text** widget can have a scrollbar at the side. With a scrollbar, the end user can move through the text easily. Without a scrollbar, the **Text** widget either grows its window, if possible, to show the complete content, or wraps a long line onto another line.

The proportion indicators on the scrollbar show how much of the text the user can see at once, compared with the entire text buffer or file.

As the user enters text, the view will automatically scroll left to keep the insert point in view, unless the **Text** widget is operating in a wrap or grow mode.

Application Callbacks

Three types of verification callbacks are supported by the **Text** widget:

— one for motion operations, to verify a new insert position;

— one for modifying operations, to verify insertion, deletion or replacement of text; and

— one for widget exit, to verify state consistency on loss of focus by the widget. The **call_data** value is a pointer to an **OlTextVerifyCD** structure. The C data types used here are:

```
typedef enum {
        motionVerify,
        modVerify,
        leaveVerify
} OlVerifyOpType;

typedef struct {
        int               firstPos;
        int               length;
        unsigned char     *ptr;
} OlTextBlock, *OlTextBlockPtr;

typedef struct {
        XEvent            *xevent;
        OlVerifyOpType    operation;
        Boolean           doit;
        OlTextPosition    currInsert, newInsert;
        OlTextPosition    startPos, endPos;
        OlTextBlock       *text;
} OlTextVerifyCD, *OlTextVerifyPtr;
```

The elements of an **OlTextBlock** structure are as follows:

firstPos	the offset of the starting character in the text block.
length	the size of the text block.
ptr	a pointer to the text block.

Before the verification callbacks are issued for any given operation, a structure of type **OlTextVerifyCD** is initialized. The initial values are:

xevent	for a leave operation, the current event pointer.
operation	element of **OlVerifyOpType** signifying the type of verification operation.
doit	TRUE.
currInsert	current position of the insert point.
newInsert	for a motion operation, the position the user is attempting to move the insert point to; otherwise, the same value as **currInsert**.
startPos	for a modify operation, the beginning position in the current source of the text about to be deleted or replaced, or where new text will be inserted. If not a modify operation, it will have the same value as **currInsert**
endPos	for a modify operation, the ending position in the current source of the text about to be deleted or replaced. If no text is being removed, it will have the same value as **startPos**. If not a modify operation, the same value as currInsert.

text for a modify operation with new text to be inserted, a pointer to a structure of type **OlTextBlock**, that references the text to be inserted. Otherwise, NULL.

It is possible for the client to register more than one callback procedure for any of these callback types. Since there can be more than one callback, each verification procedure should first check the **doit** field.

On return from the last callback, the **Text** widget will look at the **doit** member of the **OlTextVerifyCD** structure. If it is false, a callback has already rejected the operation, so there is no need for further evaluation. If it is still true, the **Text** widget will proceed with the operation; otherwise, it will not. Any user feedback for the rejected operation is the responsibility of the verification procedure.

Verification callbacks are permitted to modify some of the data in the **OlTextVer-ifyCD** structure. The **Text** widget will only look at certain fields on return, though, according to the operation type:

— For a motion operation, only the **newInsert** position will be looked at.

— For a modify operation, only **startPos**, **endPos**, and **text** will be examined for changes.

— For a leave operation, no fields will be examined.

There is no mechanism for preventing a verification callback from making other changes to the editing state through the documented interface, but the results of such behind-the-back actions are undefined.

Application Access to Text

The **Text** has several resources that identify entry points that the application can use to access the internal buffer that the **Text** widget manages. For example, if the widget is being used to enter a string, the program can get a copy of the string (that is, the internal buffer) with the function under the resources **XtNtextCopyBuffer** or **XtNtextReadSubString**.

Selecting and Copying the Text

Text can be moved or copied to and from the **Text** widget. See **TEXT SELECTION**(3W) earlier in this manual for the description of these operations.

Coloration

When this widget receives the input focus, it changes the text caret in the text field to the active caret.

Figure 1 illustrates the resources that affect the coloration of the **Text** widget.

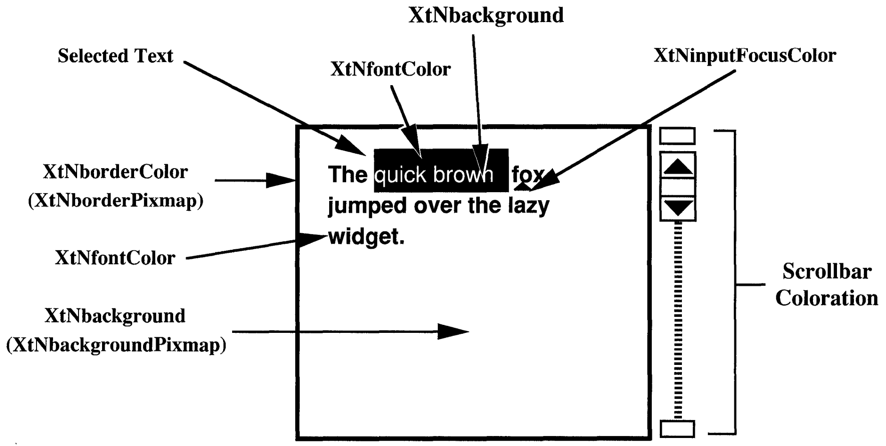


Figure 1. Text Coloration

SUBSTRUCTURE

`Vertical Scrollbar component`

Names: verticalscrollbar
Class: Scrollbar

See the regular resource list for alternate names used for some key **`Scrollbar`** resources.

RESOURCES

`Text` Resource Set				
Name	Class	Type	Default	Access
XtNancestorSensitive	XtCSensitive	Boolean	TRUE	G*
XtNbackground	XtCBackground	Pixel	White	SGI†
XtNbackgroundPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderColor	XtCBorderColor	Pixel	Black	SGI†
XtNborderPixmap	XtCPixmap	Pixmap	(none)	SGI†
XtNborderWidth	XtCBorderWidth	Dimension	0	SGI
XtNbottomMargin	XtCMargin	Dimension	0	SGI
XtNconsumeEvent	XtCConsumeEvent	XtCallbackList	NULL	SGI
XtNcursorPosition	XtCTextPosition	OlTextPosition	0	SGI
XtNcurrentPage	XtCCurrentPage	int	1	SGI

Text Resource Set				
Name	Class	Type	Default	Access
XtNdepth	XtCDepth	int	(parent's)	GI
XtNdestroyCallback	XtCCallback	XtCallbackList	NULL	SI
XtNdisplayPosition	XtCTextPosition	OlTextPosition	0	SGI
XtNeditType	XtCEditType	OlDefine	OL_TEXT_EDIT	SGI
XtNfile	XtCFile	String	NULL	SGI
XtNfont	XtCFont	XFontStruct *	(OPEN LOOK font)	SI
XtNfontColor	XtCFontColor	Pixel	Black*	SGI
XtNforeground	XtCForeground	Pixel	Black	SGI†
XtNgrow	XtCGrow	OlDefine	OL_GROW_OFF	SGI
XtNhorizontalSB	XtCHorizontalSB	Boolean	FALSE	SGI
XtNinputFocusColor	XtCInputFocusColor	Pixel	Black	SGI
XtNleaveVerification	XtCCallback	XtCallbackList	NULL	SI
XtNleftMargin	XtCMargin	Dimension	0	SGI
XtNmappedWhenManaged	XtCMappedWhenManaged	Boolean	TRUE	SGI
XtNmaximumSize	XtCLength	int	(none)	SGI
XtNmodifyVerification	XtCCallback	XtCallbackList	NULL	SI
XtNmotionVerification	XtCCallback	XtCallbackList	NULL	SI
XtNrecomputeSize	XtCRecomputeSize	Boolean	TRUE	SGI
XtNrightMargin	XtCMargin	Dimension	0	SGI
XtNsensitive	XtCSensitive	Boolean	TRUE	SGI
XtNshowPage	XtCShowPage	OlDefine	OL_NONE	SGI
XtNsourceType	XtCSourceType	OlDefine	OL_STRING_SRC	SGI
XtNstring	XtCString	String	NULL	SGI
XtNtextClearBuffer	XtCTextClearBuffer	void(*)()	(n/a)	G
XtNtextCopyBuffer	XtCTextCopyBuffer	unsigned char(*)()	(n/a)	G
XtNtextGetInsertPoint	XtCTextGetInsertPoint	OlTextPosition(*)()	(n/a)	G
XtNtextGetLastPos	XtCTextGetLastPos	OlTextPosition(*)()	(n/a)	G
XtNtextInsert	XtCTextInsert	void(*)()	(n/a)	G
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNtextReadSubStr	XtCTextReadSubStr	int(*)()	(n/a)	G
XtNtextRedraw	XtCTextRedraw	void(*)()	(n/a)	G
XtNtextReplace	XtCTextReplace	int	(n/a)	G
XtNtextSetInsertPoint	XtCTextSetInsertPoint	void(*)()	(n/a)	G
XtNtextUpdate	XtCTextUpdate	void(*)()	(n/a)	G
XtNtopMargin	XtCMargin	Dimension	0	SGI
XtNtraversalOn	XtCTraversalOn	Boolean	TRUE	SGI
XtNuserData	XtCUserData	XtPointer	NULL	SGI
XtNverticalSB	XtCVerticalSB	Boolean	FALSE	SGI
XtNviewHeight	XtCViewHeight	Dimension	(calculated)	SGI
XtNwidth	XtCWidth	Dimension	(calculated)	SGI
XtNwrap	XtCWrap	Boolean	TRUE	SGI

Text Resource Set				
Name	Class	Type	Default	Access
XtNwrapBreak	XtCWrapBreak	OlDefine	OL_WRAP_WHITE_SPACE	SGI
XtNx	XtCPosition	Position	0	SGI
XtNy	XtCPosition	Position	0	SGI

XtNbottomMargin

Range of Values:

0 ≤ **XtNbottomMargin**

This resource is the number of pixels used for the bottom margin.

XtNcursorPosition

Range of Values:

0 ≤ **XtNcursorPosition** < (current size of the text)

This resource is the position in the text source of the insert cursor.

XtNdisplayPosition

Range of Values:

0 ≤ **XtNdisplayPosition**

This resource contains the position in the text source that will be displayed at the top of the screen. A value of 0 indicates the start of the text source.

Note:
The specified position must correspond to the first character position of a source line (that is, it must be 0, or it must be a position immediately following a new-line character). Otherwise, correct behavior is not guaranteed.

XtNeditType

Range of Values:

OL_TEXT_READ/"read"
OL_TEXT_EDIT/"edit"

This resource controls the edit state of the source:

OL_TEXT_READ The source is read-only; the end user cannot edit it.

OL_TEXT_EDIT The source is fully editable.

Note:
This option is available for text buffers only; text files cannot be edited.

XtNfile

This resource is used only if the **XtNsourceType** resource has the value **OL_DISK_SOURCE**. It is the absolute pathname of a disk file to be viewed.

XtNfont

Range of Values:

(any valid return from **XLoadQueryFont()**)

Default:

(chosen to match the scale and screen resolution)

This resource identifies the font to be used to display the text.

The default value points to a cached font structure; an application should not expect to get this value with a call to **XtGetValues**() and use it reliably thereafter.

XtNfontColor

Range of Values:

(any **Pixel** value valid for the current display)/(any name from the **rgb.txt** file)

This resource specifies the color for the font. If not set, the color from the **XtNforeground** resource, if available, is used for the font.

See the note about the interaction of this resource with other color resources under the description of the **XtNbackground** resource in **CORE**(3W).

XtNforeground

This resource defines the foreground color for the widget.

See the note about the interaction of this resource with other color resources under the description of the **XtNbackground** resource in **CORE**(3W).

XtNgrow

Range of Values:

OL_GROW_OFF/"off"
OL_GROW_HORIZONTAL/"horizontal"
OL_GROW_VERTICAL/"vertical"
OL_GROW_BOTH/"both"

This resource controls if the widget will try to resize its window when it needs more height or width to display the text:

OL_GROW_OFF It will not resize itself.

OL_GROW_HORIZONTAL
It will attempt to change its width when lines are too long for the current screen width.

OL_GROW_VERTICAL
it will attempt to resize its height when the number of text lines is greater than can be displayed with the current screen height.

OL_GROW_BOTH It will attempt resizes in both dimensions.

XtNverticalSB

Range of Values:

TRUE
FALSE

These resources determine if the **Text** widget will have a scrollbar along the side.

XtNleaveVerification

This is the callback list used when the input focus leaves the **Text** widget. The **call_data** parameter is a pointer to an **OlTextVerifyCD** structure described earlier in **TEXT**.

XtNleftMargin

Range of Values:

`0 ≤ XtNleftMargin`

This resource is the number of pixels used for the left margin.

XtNmaximumSize

Range of Values:

`0 ≤ XtNmaximumSize`

This resource is used only if the **XtNsourceType** resource has the value **OL_STRING_SOURCE**. It is the maximum number of characters that can be entered into the internal buffer. If this value is not set, then the internal buffer will increase its size as needed, limited only by the space limitations of the process.

XtNmodifyVerification

This callback list is called before text is deleted from or inserted into the text source. The **call_data** parameter is a pointer to an **OlTextVerifyCD** structure described earlier.

XtNmotionVerification

This callback list is called before the insertion cursor is moved to a new position. The **call_data** parameter is a pointer to an **OlTextVerifyCD** structure described earlier in **TEXT**.

XtNrecomputeSize

Range of Values:

TRUE
FALSE

This resource indicates whether the **Text** widget should calculate its size and automatically set the **XtNheight** and **XtNwidth** resources. If set to TRUE, the **Text** widget will do normal size calculations that may cause its geometry to change. If set to FALSE, the **Text** widget will leave its size alone.

This resource is ignored for each dimension that has an associated scrollbar.

XtNrightMargin

Range of Values:

`0 ≤ XtNrightMargin`

This resource is the number of pixels used for the right margin.

XtNshowPage

This resource is directed to the vertical scrollbar in the **Text** widget. See **SCROLLBAR** for more detail.

XtNsourceType

Range of Values:

OL_STRING_SOURCE/"stringsrc"
OL_DISK_SOURCE/"disksrc"

This resource defines the type of the text source.

XtNstring

This resource is used only if the **XtNsourceType** resource has the value **OL_STRING_SOURCE**. This is the string to be viewed and/or edited. A copy is made into an internal buffer allocated by the **Text** widget. A call to **XtGetValues**() on this resource will return a copy of the internal buffer. The application program is responsible for freeing the space allocated by this copy.

XtNtextClearBuffer

Synopsis:

```
void (*textClearBuffer)();

static Arg query[] = {
        { XtNtextClearBuffer,(XtArgVal)&textClearBuffer }
};
XtGetValues(widget, query, XtNumber(query));

(*textClearBuffer)(w)
Widget w;
```

This function clears the internal buffer. After this call, all characters in the buffer have been removed.

XtNtextCopyBuffer

Synopsis:

```
unsigned char *(*textCopyBuffer)(), *buf;

static Arg query[] = {
        { XtNtextCopyBuffer, (XtArgVal)&textCopyBuffer }
};
XtGetValues(widget, query, XtNumber(query));

buf = (*textCopyBuffer)(w)
Widget w;
```

This function uses **XtMalloc**() to create space for copying the internal buffer and returns the pointer to that copy. The application is responsible for freeing the space.

XtNtextGetInsertPoint

Synopsis:

```
OlTextPosition (*textGetInsertPoint)(), pos;

static Arg query[] = {
        { XtNtextGetInsertPoint,(XtArgVal)&textGetInsertPoint }
};
XtGetValues(widget, query, XtNumber(query));

pos = (*textGetInsertPoint)(w)
Widget w;
```

This function returns the insertion position.

XtNtextGetLastPos

Synopsis:

```
OlTextPosition (*textGetLastPos)(), pos;

static Arg query[] = {
        { XtNtextGetLastPos, (XtArgVal)&textGetLastPos }
};
XtGetValues(widget, query, XtNumber(query));

pos = (*textGetLastPos)(w, lastPos)
Widget w;
OltextPosition lastPos;
```

This function returns the last character position in the buffer.

XtNtextInsert

Synopsis:

```
void (*textInsert)();

static Arg query[] = {
        { XtNtextInsert, (XtArgVal)&textInsert }
};
XtGetValues(widget, query, XtNumber(query));

(*textInsert)(w, string)
Widget w;
unsigned char *string;
```

This function inserts the string at the current insertion position and advances the insertion position to the end of the string.

XtNtextReadSubString

Synopsis:

```
int (*textReadSubString)();

static Arg query[] = {
        { XtNtextReadSubString,(XtArgVal)&textReadSubString }
};
XtGetValues(widget, query, XtNumber(query));

(*textReadSubString)(w,startpos,endpos,target,tsize,tused)
Widget w;
OltextPosition startpos, endpos;
unsigned char *target;
int tsize, *tused;
```

This function will move characters from the buffer into the caller's space. The caller must provide the space to copy into and its size in bytes. The routine will return the number of positions moved. The value of **tused** returns the number of bytes used in the target string by the move.

XtNtextRedraw

Synopsis:

```
void (*textRedraw)();

static Arg query[] = {
        { XtNtextRedraw, (XtArgVal)&textRedraw }
};
XtGetValues(widget, query, XtNumber(query));

(*textRedraw)(w);
Widget w;
```

This function refreshes the widget's window.

XtNtextReplace

Synopsis:

```
OlEditResult (*textReplace)(), result;

static Arg query[] = {
        { XtNtextReplace, (XtArgVal)&textReplace }
};
XtGetValues(widget, query, XtNumber(query));

result = (*textReplace)(w, startPos, endPos, text)
Widget w;
OltextPosition startPos, endPos;
unsigned char *text;
```

This function removes text in the source from **startPos** to **endPos** and inserts the string **text** starting at **startPos**. If **startPos** and **endPos** are the same, the action is an insertion. If **text** is the empty string, the action is a deletion.

XtNtextSetInsertPoint

Synopsis:

```
void (*textSetInsertPoint)();

static Arg query[] = {
        { XtNtextSetInsertPoint, (XtArgVal)&textSetInsertPoint }
};
XtGetValues(widget, query, XtNumber(query));

(*textSetInsertPoint)(w, position)
Widget w;
OltextPosition position;
```

This function sets the insertion point.

XtNtextUpdate

Synopsis:

```
void (*textUpdate)();

static Arg query[] = {
        { XtNtextUpdate, (XtArgVal)&textUpdate }
};
XtGetValues(widget, query, XtNumber(query));

(*textUpdate)(w, status)
Widget w;
Boolean status;
```

This function turns the widget's screen updating function on and off. If the application needs to make a sequence of source change calls, a call to `OlTextUpdate(FALSE)` will prevent screen flash. After the sequence of calls the application calls `OlTextUpdate(TRUE)` to update the window and resume normal updating. Note that it is not necessary to turn off updating for functions that only get values from the widget, nor is it necessary to turn it off if the application only makes one call that changes the widget.

XtNtopMargin

Range of Values:

$0 \leq$ `XtNtopMargin`

This resource is the number of pixels used for the top margin.

XtNviewHeight

Range of Values:

$0 \leq$ `XtNviewHeight`

This resource gives the preferred height, in lines, of the text pane. If a nonzero value is given, the corresponding **`XtNheight`** resource is computed by converting this number to pixels and adding the thickness of any scrollbar and border that appears. In this case, any value in the **`XtNheight`** resource is overwritten.

If a zero value is given in the **`XtNviewHeight`** resource, the **`XtNheight`** resource is used as an estimate. The text pane is sized to show an integral number of lines, such that the overall height of the **`Text`** widget is less than or equal to **`XtNheight`**, if possible. However, the text pane is always large enough to show at least one line and is no shorter than the minimum scroll bar size.

If neither the **`XtNviewHeight`** resource nor the **`XtNheight`** resource is set, or both are set to zero, the text pane is made as small as possible, limited as described above.

XtNtraversalOn

Range of Values:

`TRUE`
`FALSE`

This resource specifies whether this widget is selectable during traversal.

XtNwrap

Range of Values:

TRUE
FALSE

This resource specifies how the widget displays lines longer than the screen width. When set to FALSE, the lines may extend off screen to the right. When set to TRUE, the lines will be wrapped at the right margin, with the position determined by the resource **XtNwrapBreak**.

XtNwrapBreak

Range of Values:

OL_WRAP_ANY/"wrapany"
OL_WRAP_WHITE_SPACE/"wrapwhitespace"

This resource specifies how the wrap position is determined. When set to **OL_WRAP_ANY**, the wrap will happen at the character position closest to the right margin. When set to **OL_WRAP_WHITE_SPACE**, the wrap will happen at the last white space before the right margin. If the line does not have white space, it will be wrapped as **OL_WRAP_ANY**.

SEE ALSO

TextEdit(3W)

G Glossary

Glossary

The italicized words refer to entries within this glossary.

ADJUST	The mouse button or keyboard equivalent used to adjust a selection (cf. SELECT); usually the middle button on a right hand mouse.
anchor	Either end of a **Scrollbar** widget or a **Slider** widget. The part of the widget that remains fixed while the *elevator* or *drag box* moves along.
button	Generic term for any of several widgets, specifically **RectButton** widgets and **OblongButton** widgets. The RectButtons are implicitly defined in *flattened widgets,* as well. A button, when pressed usually initiates certain actions, like popping up a menu or executing an application routine.
cable	In a **Scrollbar** widget, the cable is the "line" on which the *elevator* moves. One end of the cable is connected to the *anchor* and the other is connected to the *elevator.*
callback	A callback routine is a routine written by an application programmer and associated with a specific widget *resource.* The callback routine is invoked as a result of a specific activity associated with that widget (that is, the widget calls back the program via that routine). For example, the **XtNselect** *resource* contains the name of the callback routine that is entered when a *button* is pushed or when a **CheckBox** is selected; the **XtNverification** resource contains the name of the callback routine to invoke when a **TextField** widget is exited. The act of associating the name of a callback routine with a widget resource is called *registration.*
click	The act of pressing and releasing a mouse button without moving the mouse *pointer* more than a few pixels.
click-move-click	A method of user interaction with a set of objects where the user clicks MENU to display the objects, moves the pointer over the one of interest, then clicks MENU or SELECT to select or activate the object.

composite widget	See *widget*. A widget that is a parent of other widgets, that physically contains other widgets.
container	A widget that defines a region that holds zero or more sub-objects of a given type.
control area	The area located directly under the header of a *window*. It is used to display "command buttons," if the application in the window provides them.
dimmed	A visual effect on an object. A control, such as a *button*, is dimmed if its visible manifestation represents the state of just one of several objects that are in inconsistent states. When such a control is manipulated (for example, by clicking SELECT over the button), it is no longer dimmed because the manipulation sets the state for all the objects.
double click	To press and release a mouse button twice in succession.
drag area	In a **Scrollbar** widget, the drag area is the center portion of the *elevator* that is moved by the mouse.
drag box	In a **Slider** widget, the drag box is the portion of the slider that is moved by the mouse.
dragging	The act of moving the *pointer* while a mouse button or keyboard equivalent is pressed.
elevator	The center portion of a **Scrollbar** widget; that part which moves along the *cable*.
flat widget	See *widget*. A single widget that maintains a collection of similar user-interface components that together give the appearance and behavior of many widgets.
flattened widget	Same as *flat widget*.
focus	To specify a particular area of the screen. (See *input focus* and *keyboard focus*).
gadget	A windowless object; an object that could be defined as a widget but, instead, is defined as having its parent's window resources.

grab	To position the mouse pointer on a *resize corner* and take hold of it for the purpose of resizing the window.
HELP	The mouse button or keyboard equivalent used to bring up an OPEN LOOK Help window.
highlighted	A visual indication that an object is in a special state. For two-color (''monochrome'') objects, the colors are exchanged. Multi-color objects cannot be highlighted.
icon	The state where an application base window and all its pop ups are removed from the *screen* and replaced with a single, small figure that represents the application. *Icon* also refers to this small figure.
input focus	To have the cursor on a particular field, designating that field as ''next.''
instance	A specific *realization* of a widget; one particular widget as opposed to a class of widgets.
keyboard focus	The area of the *screen* that will accept the next input from the keyboard.
MENU	The mouse button or keyboard equivalent used to display (*pop up*) a menu.
menu	When unqualified, any of the three states of an OPEN LOOK menu: *popup menu, stay-up menu,* or *pinned menu.*
pane	The rectangular area within a window where an application displays text or graphics.
pinned menu	An OPEN LOOK menu that has a *pushpin* that is ''in.'' This menu behaves much like a control area in a pinned command window.
pixel	An addressable point on the *screen.*
pixmap	A bitmap of an area of the screen stored within the program. A ''pixmap'' is also a defined data type in the Xt Intrinsics.

pointer	The *screen* representation of the location of the mouse or equivalent.
pop up	As a noun, *pop up* is a generic term referring to an OPEN LOOK window other than the base window. As a verb, this phrase is the act of making a menu or OPEN LOOK popup window visible. As an adjective, it is used to refer to a window that can be popped up and is spelled with or without a dash, as in "popup menu" or "pop-up menu."
popup menu	An OPEN LOOK menu that was brought up by pressing MENU. While MENU remains pressed, the menu remains a popup menu and operates in a *press-drag-release* mode.
press	The act of pressing a mouse button or keyboard key. This is distinct from the act of releasing the button or key, so that both can be discussed separately. Thus "press SELECT" means to press, but not release, the SELECT mouse button or keyboard equivalent key.
press-drag-release	A method of user interaction with a set of objects where the user presses MENU to display the objects, *drags* the pointer over the objects until it is over the one of interest, then releases MENU to select or activate the object.
primitive widget	See *widget*. A widget that does not have any child widgets; one that either performs a specific action, allows input or allows output.
push a button	The act of moving the *pointer* to a *button widget* and then *selecting* the button.
pushpin	A *screen* object that is part of a *popup menu*. It can be pointed to and selected. When it is first selected, it is "pushed in" and causes the menu to stay up after the user moves out of it. When it is again selected, it is pulled out and the menu pops down.

realized	In the context of the X Toolkit Intrinsics, the point at which all the data structures of a widget have been allocated. Windows and other information are not created when the widget is created with the **XtCreateWidget** routine, but are created in a later call to **XtRealizeWidget** on the widget itself or on an ancestor widget.
register, registration	To make a routine name known to the API. When the application programmer develops a *callback* routine, that routine needs to be registered when the widget is created so that it can be properly invoked.
release	The act of releasing a pressed button or keyboard key, as in "release MENU."
resize corners	Hollow, L-shaped symbols located on all four corners of a *window* which, when *grabbed,* are used to change the size of the *window.*
resource	An attribute of a widget or a widget class. A resource is a named data value in the defining structure of a widget.
screen	The surface on your computer monitor where information is displayed.
select	To move the *pointer* to an object and press the *SELECT* mouse button. The result is to initiate either an application action or a change in the window content or structure.
SELECT	The mouse button or keyboard equivalent used to select and move an object, manipulate an OPEN LOOK control, or set the input focus.
stay-up menu	An OPEN LOOK menu that was brought up and made to stay on the screen for one round of use. The controls in this menu behave like controls in an unpinned command window, except that the menu is removed from the screen even if nothing is selected from the menu.

sub-object	A sub-object is the equivalent of a *primitive widget* contained in a *flattened widget*. In a Flat Exclusives or F NonExclusives widget, the sub-objects are the equivalents of **`RectButtons`**. In a Flat CheckBox, the sub-objects are the equivalents of **`CheckBox`** widgets.
toggle	This is an action performed on an object with two states; it is the switching from one state to the other.
whitespace	Typically any characters that have no visible form. For this toolkit, these characters are space, tab, newline, and carriage return.
widget	A specific example or realization of a *widget class*.
widget class	A collection of code and data structures that provides a generic implementation of a part of a look-and-feel.
window	A work area on the screen that you use to run and display an application.

Index

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