
Chapter 4 DBuilder

Chapter Overview 4.1

DBuilder 4.1

Start Up

Menus

DBuilder View

Data Item

Resize Item

Move Item

Adding a Subdialog

Opening a Subdialog

Data Types 4.9

Alpha-Numeric

Numeric

Checkbox

Push Button

Radio Button

Overview

The following is a description of the data creation and assignment process. Since NCSA Mesher is designed to be completely independent of the computational code being used, the data types are not built into the program. Therefore, data handling is accomplished in two separate steps.

First, the data types are defined and formatted into dialog boxes. *When they are defined, the data types are also given default values.* This is done in a utility program called DBuilder. Data type definition need only be done once for each computational program.

Second, the data values are actually input and assigned to specific cells of a grid. This is accomplished in NCSA Mesher.

DBuilder

DBuilder is a utility program which comes as part of the NCSA Mesher package. Each computational program typically requires its own unique set of data types. DBuilder provides the user with a method of defining the types and formatting them within dialog boxes. The data types take the form of alpha-numeric text, numeric, push buttons, radio buttons, and checkboxes. Once defined, the dialogs are saved as an Attribute Set which can be accessed by NCSA Mesher or DBuilder.

Start Up

To start working with DBuilder, launch it from the finder by double-clicking on the application icon.

Menus

At startup time, the DBuilder menu bar contains the three options File, Edit, and SubDialog.

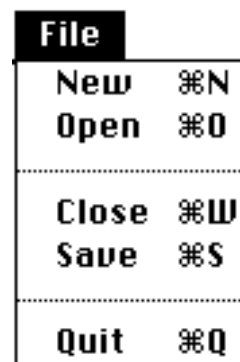
Figure 4.1
DBuilder Menu Bar



File Menu

The File menu contains the standard file menu options of New, Open, Close, Save, and Quit.

Figure 4.2
File Menu



New

The New option from the File menu creates a new document (also called an Attribute Set). The document appears as an empty

dialog box.

- Open** The Open option from the File menu allows you to open an existing DBuilder document. You are presented with the standard Macintosh file dialog from which to choose your desired file.
- Close** The Close option from the File menu closes and releases the document.
- Save** The Save option from the File menu saves the document to a file.
- Quit** The Quit option exits DBuilder and returns you to the Finder.

Edit Menu

The Edit menu contains the standard edit menu options of Undo, Cut, Copy, Paste, Clear, Select All, and Show Clipboard.

Figure 4.3
Edit Menu

Edit	
Undo	⌘Z
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Select All	⌘A
Show Clipboard	

- Undo** The Undo option allows you undo your last command. For example, if the last command was a cut, the Undo option will say **Undo Cut Control**. When selected, the cut will reappear as if it had never been removed.
- Cut** The Cut option allows you to remove the selected data item from the dialog box. This item is stored on the clipboard and is available for pasting. Cut is dimmed when no data item is selected.

- Copy** The Copy option allows you to make a copy of the selected data item on the clipboard. This copy can be added to a dialog using the Paste option in the Edit menu. Copy is dimmed when no data item is selected.
- Paste** The Paste option allows you to paste the item currently residing on the clipboard into the current dialog box. Paste is dimmed when no data item exists on the clipboard.
- Clear** The Clear option deletes the selected data item without placing it on the clipboard. A data item which is cleared can only be retrieved with an Undo command. Clear is dimmed when no data item is selected.
- Select All** Not available in this version.
- Show Clipboard** Not available in this version.

Input Types Menu

The Input Types menu appears when a document has been opened or created. It presents you with a set of control options named Alpha, Numeric, Button-Push, Button-Radio, and Checkbox.

Figure 4.4
Input Types Menu

Input Types	
Alpha	⌘1
Numeric	⌘2
<hr/>	
Button - Push	⌘3
Button - Radio	⌘4
Checkbox	⌘5

The items in the Input Types menu are basic Macintosh dialog controls. A data type is composed of a control and the various information about the data itself, such as name, maximum or minimum size, default value, etc. The information required for a data type varies according to the type of control you choose. See Data Types later in this chapter for more information about the controls.

SubDialogs Menu

The SubDialogs menu provides you with the tools to manage the subdialogs attached to various data items.

Figure 4.5
Subdialogs Menu

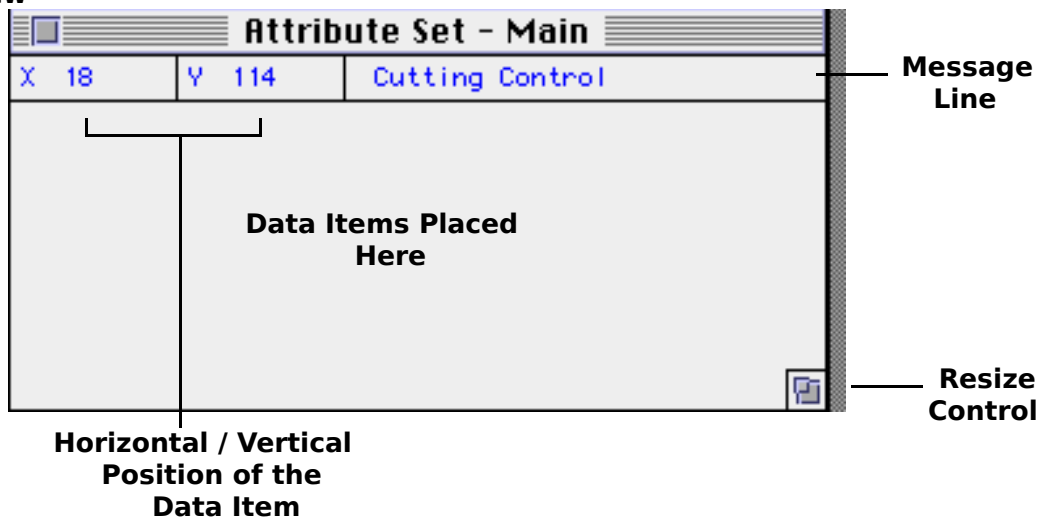


- New** New creates a new subdialog box and links it to the currently selected data item. A data item with a subdialog has an ellipsis (three red dots) located to the bottom right of the name.
- Open** Open displays the subdialog linked to the currently selected data item. The subdialog can also be opened by clicking on the ellipsis.
- Close** Close hides the subdialog.
- Delete** Delete unlinks the subdialog and releases the data items within it.

DBuilder View

The DBuilder View is made up of several components. The first line provides you with status information about your data item, current operation, and error messages.

Figure 4.6
DBuilder View



X and Y Boxes As a data item is placed or moved, the Horizontal and Vertical position is shown in the X and Y boxes respectively.

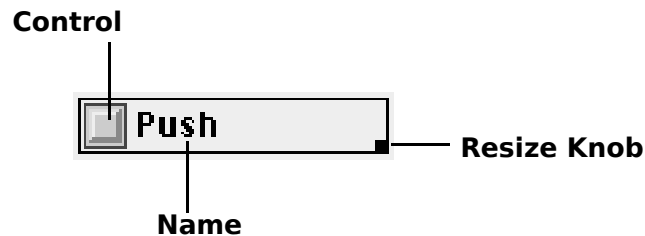
Message Line This details the current operation or errors.

Resize Control This is a standard Macintosh resize window control. Click on the box in the lower right corner, hold down the mouse button, and move the cursor to change the frame size.

Data Item

The anatomy of a Data Item is shown in Figure 4.6. It contains the options Control, Name, and Resize Knob.

Figure 4.7
Data Item Anatomy



To create a new data item:

1. Select the control type from the Input Types menu. Choose from Alpha, Numeric, Button-Push, Button-Radio, and Checkbox.
2. A hand appears, allowing you to drag the outline of the data item (see Figure 4.7).
3. Move the hand to the desired location.
4. Press the mouse button to release the data item (see Figure 4.8).

Figure 4.8
Placing a Data Item

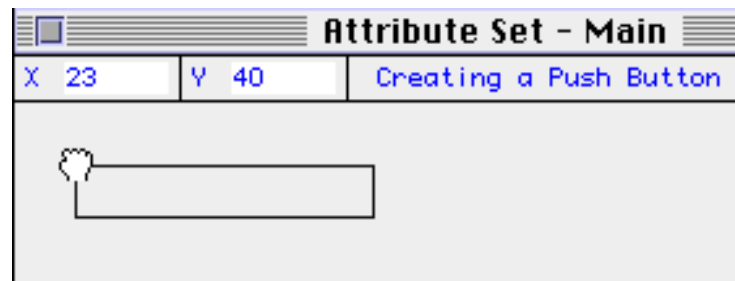
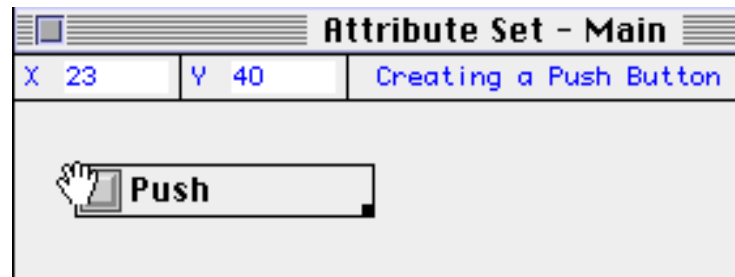


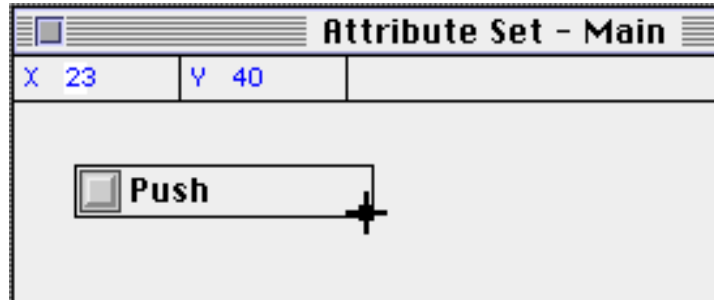
Figure 4.9
Dropping the Data Item



Resize Item

To resize the data item, place the cursor over the Resize Knob. The cursor will change shape, becoming a crossbox, as shown in Figure 4.9.

Figure 4.10
Resize the Data Item



To resize a data item:

1. Place the cursor over the Resize Knob.
2. Press the mouse button and hold it down.
3. Move the mouse. The outline box for the data item will change size as the mouse moves.
4. Release the mouse button when the box is the desired size.

Move Item

To move the data item, place the cursor over the control. The cursor will change shape, becoming a hand, as shown in Figure 4.8.

To move a data item with the mouse:

1. Place the cursor over the control.
2. Press the mouse button and hold it down.
3. Move the mouse. The outline box for the data item will move as the mouse moves.
4. Release the mouse button when the box reaches the desired location.

To move a data item with the keyboard:

1. Double-click on the control to open the data item edit dialog.
2. In the edit dialog, find the box titled Location containing a field for X and a field for Y.
3. Enter the appropriate values in the X and Y fields.
4. Press Set to move the item (the Set button is dimmed until a new value is entered in either the X or the Y fields).
5. To cancel the move and reset the X and Y values, press Cancel.

Adding a Subdialog

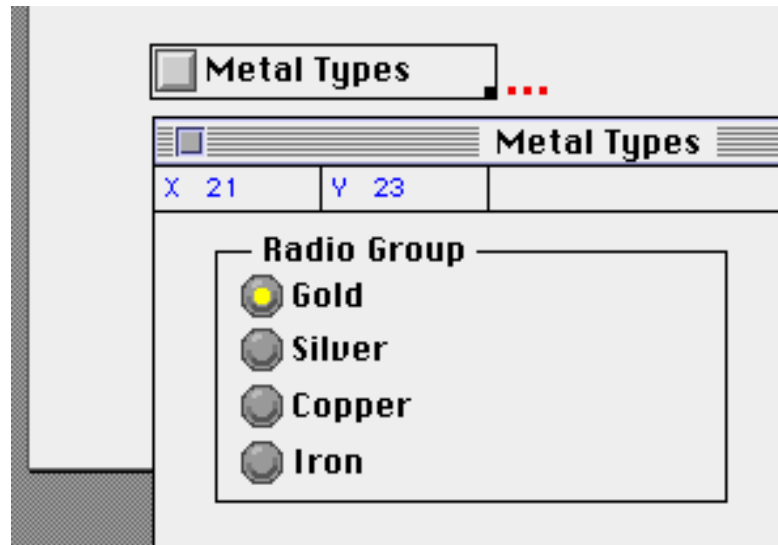
Data items can have subdialog boxes attached to them. An attached subdialog is denoted by an ellipsis (three red dots) to the right of the data item.

To add a subdialog to a data item:

1. Select the desired data item by clicking on the item (the data item will become highlighted with a bounding box).
2. Choose New from the Subdialogs menu (an ellipsis will be attached to the right of the data item).

Subdialogs allow you to design a flexible hierarchical data set. For example, at dialog level 1 you may create a checkbox data item for metal types. At level 2, the dialog may contain a radio cluster with a number of metals, such as gold, silver, copper, and iron. The window title for a subdialog is the same as a prompt of the item to which it is attached (see Figure 4.10).

Figure 4.11
Subdialogs



Opening a Subdialog

A subdialog box may be opened either using the menu or the ellipsis.

To open a subdialog using the menu:

1. Select the desired data item by clicking on the item (the data item will become highlighted with a bounding box).
2. Choose Open from the Subdialogs menu (the subdialog will appear on the screen or be brought forward if it is already shown).

To open a subdialog using the ellipsis:

1. Select the desired data item by clicking on the item (the data item will become highlighted with a bounding box).
2. Click on the attached ellipsis (the subdialog will appear on the screen or be brought forward if it is already shown).

Data Types

Alpha-Numeric

For data fields where text is required as input, the Alpha-Numeric data item is used. To create a new Alpha-Numeric item, select Alpha from the Input Types menu. The three parts of an Alpha-Numeric item are the item prompt (shown as Alpha Text in Figure 4.11), the field (the blank box to the right of Alpha Text in Figure 4.11), and the resize knob (the small black box off the lower right corner of the field). The item is edited by double-clicking on the item prompt. Then the dialog box shown in Figure 4.12 appears.

Figure 4.12
Alpha-Numeric Anatomy

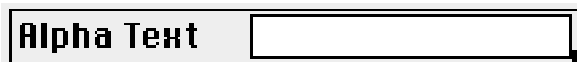


Figure 4.13
Alpha-Numeric Edit Dialog

Prompt

This is the title displayed to the left of the field box. Change the prompt by highlighting the text currently in the field box and entering new text.

Defaults The default is the recommended value currently displayed. To enter a different value, use the mouse to place the cursor in the field box and enter the text.

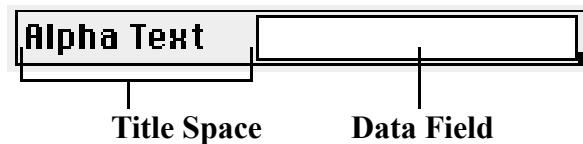
Location This the current X/Y coordinates of the Alpha-Numeric data item in the DBuilder View. The Set button is dimmed until a new value is entered in either the X or the Y coordinate fields. To move the data item, enter a new value in the X/Y fields and press the Set button. Pressing the Cancel button reverts the X/Y fields back to their original values.

Data Location The two parts to the data location information are the fixed/justified radio buttons and the X/Y coordinates. Both calculate the size of the Title Space (see Figure 4.13), which is the amount of space between the left edge of the box and the left edge of the data field. If the Title Space is not wide enough to display the whole title, the title will wrap to the next line.

Fixed/Justified: Setting the radio button on Fixed forces the title space to be a specific size. Setting it on Justified adjusts the size of the Title Space according to the length of the title. Justified is the default for an Alpha-Numeric data item.

X/Y: The X/Y coordinates are only necessary for a fixed size Title Space. The X/Y are the coordinates for the upper left corner of the data field box. To change the width of the Title Space, edit the X coordinate to move the left edge of the data field, thereby making the data field smaller. The Set and Cancel buttons inside the Data Location box activate the changes to the X/Y coordinates.

Figure 4.14
Title Space



Numeric

For data fields where a numeric value is required as input, the Numeric data item is used. To create a numeric item, select Numeric from the Input Types menu. Numeric data items function similar to Alpha-Numeric data items (see Alpha-Numeric for more information). The three parts of a Numeric item are the item prompt (shown as Numeric Text in Figure 4.14), the field (the blank box to the right of Alpha Text in Figure 4.14), and the resize knob (the small black box off the lower right corner of the field). The item is edited by double-clicking on the item prompt. Then the dialog box shown in Figure 4.15 appears.

Figure 4.15
Numeric Anatomy



Figure 4.16
Numeric Edit Dialog

The fields in the Numeric Edit Dialog are the same as in the Alpha-Numeric Edit Dialog with a few exceptions. Those that differ will be discussed below. For further information on the fields which are similar, see the discussion on the Alpha-Numeric Edit Dialog.

- | | |
|-----------------|--|
| Defaults | This is the recommended value currently displayed. To enter a value, use the mouse to place the cursor in the box and enter the new number. The fields for Minimum, Maximum, Integer, and Real are enforced in the Defaults entry field. |
| Minimum | This is the smallest number that can be entered in this data item. |

Maximum This is the largest number that can be entered in this data item.

Integer / Real The data item can be defined as an integer or a real number. The default state is Integer. To change the state, use the mouse to click on the desired radio button.

Checkbox

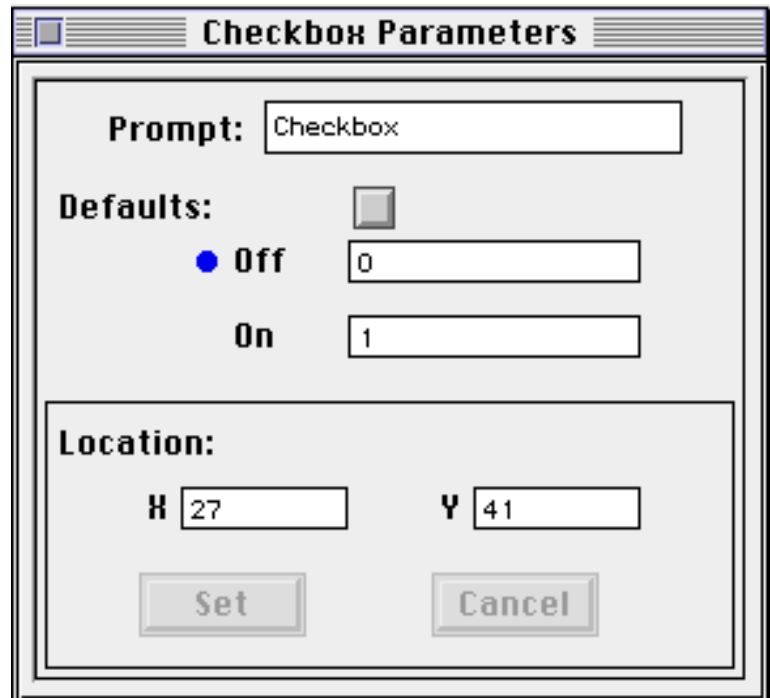
For data fields where an on/off value is required as input, the Checkbox data item should be used. To create a new Checkbox, select Checkbox from the Input Types menu.

The parts of a Checkbox data item are the item prompt (listed as Checkbox in Figure 4.16), the control (the square button to the left of Checkbox), and the resize knob (the small black box in the lower right corner). The item can be edited by double-clicking on the control. The dialog box shown in Figure 4.17 then appears.

Figure 4.17
Checkbox Anatomy



Figure 4.18
Checkbox Edit Dialog



Prompt This is the title displayed to the right of the control. Change the prompt by highlighting the text currently in the box and entering new text.

Defaults

This is the recommended value that is currently displayed. The Defaults button is a toggle. Click once to turn Defaults on, and click again to turn Defaults off. The Off/On status of Defaults is shown by the location of a dot and the presence of an X in the Defaults button. When Defaults is set to Off, a dot is displayed to the left of the Off field and the Defaults button is empty (as it is in Figure 4.17). When Defaults is set to On, the dot is displayed to the left of the On field and an X is placed in the Defaults button (as it is in Figure 4.18).

Figure 4.19
Checkbox Defaults

Prompt:

Defaults:

Off

On

Off/On

The numeric value assigned to a cell is defined by the on and off fields. When you assign this data item to a cell and set it to Off, the value in the Off box is added to the cell. Conversely, when you assign this data item to a cell and set it to On, the value in the On box is added to the cell.

Location

This the current X/Y coordinates of the Checkbox data item in the DBuilder View. The Set button is dimmed until a new value is entered in either the X or the Y coordinate fields. To move the data item, enter a new value in the X/Y fields and press the Set button. Pressing the Cancel button reverts the X/Y fields back to their original values.

Push Button

For data fields where an on/off value is required as input, the Push Button data item is used. Push Button data items function similar to Checkbox data items (see Checkbox for more information). The primary difference between them is the appearance. To create a new Push Button, select Button - Push from the Input Types menu. The three parts of a Push Button item are the item prompt (shown as Push in Figure 4.19), the control (the square button to the left of Push in Figure 4.19), and the resize knob (the small black box in the lower right corner of the item prompt). The item is edited by double-clicking on the control. Then the dialog box shown in Figure 4.20 appears.

Figure 4.20
Numeric Anatomy



Figure 4.21
Push Button Edit Dialog

A dialog box titled "Push Button Attribute". It contains several fields and controls:

- Prompt:** A text field containing "Push Button".
- Defaults:** A section with a small square button. Below it are two radio buttons: "Off" (selected with a blue dot) and "On". To the right of each radio button is a text field: "0" for Off and "1" for On.
- Location:** A section with two text fields: "X" containing "34" and "Y" containing "35".
- At the bottom are two buttons: "Set" and "Cancel".

The fields in the Push Button Edit Dialog are the same as in the Checkbox Edit Dialog with a one exception (explained below). For further information on the fields which are similar, see the discussion on the Checkbox Edit Dialog.

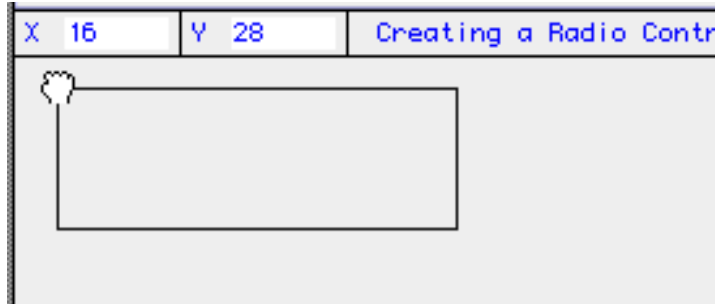
Defaults This is the recommended value currently displayed. The Defaults push button is a toggle. Click once on the button to turn Defaults on, and click again to turn Defaults off. The Off/On status of Defaults is shown by the location of a dot and the appearance of the push button. When Defaults is set to Off, a dot is displayed to the left of the Off field and the push button appears in the out position (as it is in Figure 4.20). When Defaults is set to On, the dot is displayed to the left of the On field and the push button is shown depressed.

Button - Radio

For data fields where the user needs to choose one item from a series of options, a radio button cluster is used. Radio buttons are grouped in clusters. To create a new cluster or a new radio button (for an existing cluster), select Button - Radio from the Input Types menu.

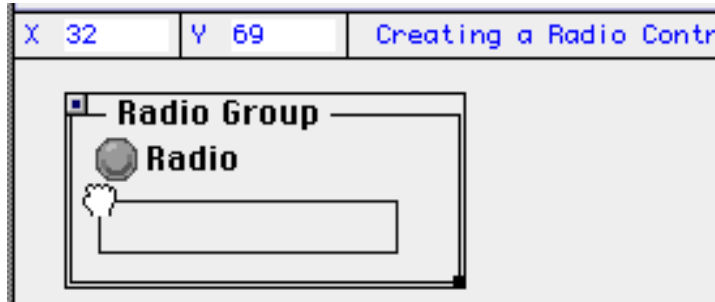
The drag box will appear attached to the cursor (which appears as a hand). If the cursor is not over a radio cluster, the box appears large (the shape of a new cluster). To create a new cluster, release the drag box (by clicking the mouse) *outside* of any existing radio clusters.

Figure 4.22
Dropping a Radio Cluster



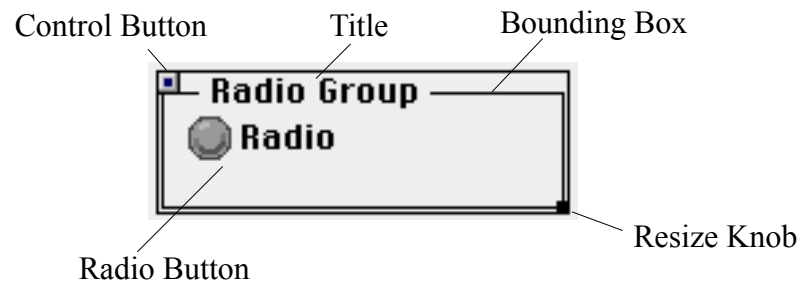
If the cursor is over an existing radio cluster, the box appears small (the shape of a new radio button). To create a new radio button, release the drag box *inside* an existing radio cluster.

Figure 4.23
Dropping a Radio Button



Radio Cluster A radio cluster has several components not present in other types of the data items. Each cluster has a title and a control button. In addition, it serves as a container for a series of radio buttons. When first created, the cluster contains only a single radio button. In order for a radio cluster to be useful, it should have more than one radio button.

Figure 4.24
Radio Button Cluster



To edit the cluster information, double click on the Control Button. The Control Button is only visible when the radio group is highlighted. Select the cluster by clicking *inside* the box that surrounds it.

Figure 4.25
Cluster Edit Dialog



Radio Group Title This field allows you to specify the title for the radio cluster. To edit the title, highlight the current title and enter your new text.

Show Cluster Title This checkbox determines whether or not the title specified in Radio Group Title is displayed. If the checkbox is On, an X appears and the title and the bounding box are displayed for that data item. If the checkbox is Off, no X appears in the box and the title and bounding box are hidden.

Radio Button To edit the radio button information, double click on the control button. Then the dialog shown in Figure 4.25 appears.

Figure 4.26
Cluster Edit Dialog

The image shows a dialog box titled "Radio Button Attribute". It contains several fields and controls:

- Prompt:** A text box containing "Radio Button".
- Defaults:** A text box containing "1".
- Initially On:** A checkbox that is currently unchecked.
- Location:** Two text boxes labeled "X" and "Y" containing "10" and "15" respectively.
- Buttons:** "Set" and "Cancel" buttons are located to the right of the location fields.

- Prompt** This is the text displayed to the right of the control. Change the prompt by highlighting the text currently in the box and entering new text.
- Defaults** A cluster is considered to be a single piece of information. It contains a series of radio buttons. Radio buttons are exclusive in that only one can be on at a time. When you assign a cluster to a cell, you are also recording which radio button is turned on at that time. The actual value that is added to the cell is the information stored in the Defaults box for the On radio button. This information can be either alpha-text or numeric.
- Initially On** Initially On is a checkbox which indicates whether the button is on or off when the dialog is first opened. Since only one radio button in a cluster can be on at any given time, only one button may be checked as Initially On.
- Location** This is the current X/Y coordinates of the radio button within the cluster.