THE DATA EDITOR

INTRODUCTION

This chapter explains how to use the Data Editor which enables you to edit resources of any custom type whose structure can be described by a Resorcerer template ('TMPL') resource.

Although the next section explains templates briefly, you will want to become more familiar with 'TMPL' resources and how to create and edit them, as described in the "Template Editor" chapter in the "Technical Stuff" volume of this manual.

If you are not already familiar with general resource editing, you should read the "Editing Resources" chapter earlier in this manual.

TOPICS COVERED

- Resource templates
- Creating a new custom resource
- Opening a custom resource
- How field values are displayed
- Using the Data Editor
- Editing individual fields
- Cutting and pasting list items
- Viewing options
- Printing a custom resource
- Closing your custom resource

RESOURCE TEMPLATES

Along with all the standard Macintosh application resource types, your application may need to keep private resources of its own custom types. Typically, initialization values, tables of private data, configuration parameters, etc., can be kept as individual resources in the resource fork of your file.

Before you can create and edit a custom resource, you must design a description of its structure and place the description into a resource template, which is itself just a resource of type 'TMPL'.

A template is a sequence of declarations of data fields that describe a wide range of Macintosh data types (strings, words, bits, colors, rectangles, etc.). The collection of declarations describes the data in the resource, scanned from the beginning. The Data Editor reads the sequence of fields from the template, and uses them to create, parse, and display the data from your custom resource in the sequence read.

In order for Resorcerer to distinguish which 'TMPL' resource describes which resource type, you must set the first four characters of the 'TMPL's resource name to the four-character custom resource type you are designing.

When you ask to create or edit a custom resource, Resorcerer searches for a 'TMPL' resource whose name begins with the same type as your custom resource's. It first searches for a 'TMPL' in the same file as the one you are editing (see the Note below, however). If none is found there, Resorcerer looks for a template among all files (in no particular order) within the "Resorcerer® Templates" and "Private Templates" folders. It first looks for these folders in the same folder as the running copy of Resorcerer. If the template is not there, Resorcerer then looks for these folders in your System folder. If it still hasn't found a matching 'TMPL', Resorcerer looks in its own resource fork. If none of these possible places has a 'TMPL' resource whose name begins with the same four characters as your custom resource type, then Resorcerer skips the Data Editor and uses the Hex Editor instead.

Note: You can alter the above search order using the **Ignore 'TMPL's in open files** preference in the **File Open Preferences** section of Resorcerer's **Preferences...** command. When this preference is set, Resorcerer will always use a template found in one of the template folders, even if another one is in the same file as the resource you are opening.

Resorcerer's Template Editor lets you create and edit 'TMPL' resources, and the "Template Editor" chapter gives the full details on what individual field types are supported.

You can always tell whether a given resource has a template available by looking at the **Data** button in the File Window. If the button is enabled, Resorcerer has already found a template to use; otherwise none is available.

Note: For any given resource type, there should be only one 'TMPL' that describes it among the collection of templates in the collection of files in the "Resorcerer® Templates" and "Private Templates" folder. Resorcerer will warn you about any duplicates every time it scans or rescans the template folders.

Note: You cannot edit a custom resource if the 'TMPL' that describes it is already open and being edited with the Template Editor.

Sorcery: If you hold the Option key down while clicking in the File Window's **Open** or **New** buttons, or in the **New Resource** dialog's **Create** button, you force Resorcerer to bypass any dedicated editor for the resource type in question in favor of the Data Editor.

CREATING A NEW CUSTOM RESOURCE

To create a new custom resource whose 'TMPL' exists somewhere in Resorcerer's collection of templates, make the Types List of your file the Active List and click on the **New** button (or choose **New Resource** from the **Resource** menu). Or, if you already have resources in the file of the same custom type, make the Resources List that displays them the Active List and invoke the **New Resource** command. In the former case, Resorcerer will ask you to specify the resource ID, name, and attributes first; in the latter case, it will assign defaults.

Resorcerer looks up the matching 'TMPL' resource (see the previous section on how it searches for the match), checks to make sure the 'TMPL' doesn't have any errors in it, and then asks the Data Editor to create the custom resource's new data.

The Editor creates the data by assigning default values for each data field described in the 'TMPL'. The default value assigned to each data field is usually whatever is required to make the field *empty*. For example,

numerical fields are set to zero, but the count value for a zero-based list count field ('LSTZ') is set to -1, since this value implies the list is empty. 'CHAR' fields are set to a single space character, whereas 'DBYT' fields are set to 0. 'TNAM' fields are set to '????'.

However, if a field has one or more 'CASE' fields describing important values, then the Editor takes the value of the first 'CASE' as the default. This lets you avoid errors where the standard hard-wired default is not a legal value for your resource field. For instance, many resources begin with a version word that is typically non-zero. Using a 'CASE' definition for this non-zero value, the Editor can set the new field automatically for you.

Once the new data is created, the Editor opens it as described below.

OPENING A CUSTOM RESOURCE

To open an existing custom resource whose 'TMPL' can be found somewhere in Resorcerer's collection of templates, select the resource in the Resources List and click on the **Data** button. Or if the resource would not normally be edited with one of Resorcerer's dedicated Editors, use the usual **Open** button or double-click on the resource entry directly.

Resorcerer looks up the matching 'TMPL' resource, checks to make sure the 'TMPL' doesn't have any errors in it, and then asks the Data Editor to parse the custom resource's data into the fields specified by the template. The Data Editor then creates a standard Resorcerer list in which each entry corresponds to a field from the template.

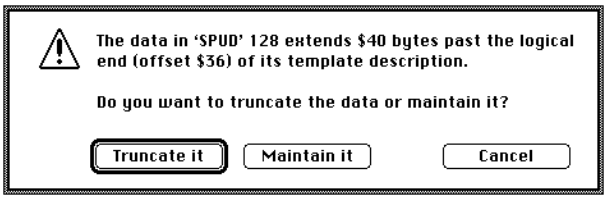
Note: If the 'TMPL' contains the special 'FLTR' field, the Data Editor will pre- and post-process the resource data using the filter ('FLTR') resource associated with this 'TMPL'. For more on filtered templates, see the "Designing Filters" section in the "Template Editor" chapter.

TOO MUCH DATA

Sometimes a resource will contain more data than is described by the template the Editor is using. This can happen when the template has been changed but the data hasn't, or when the resource data is corrupted in some way.

In this case, the Editor will inform you where the logical end of the

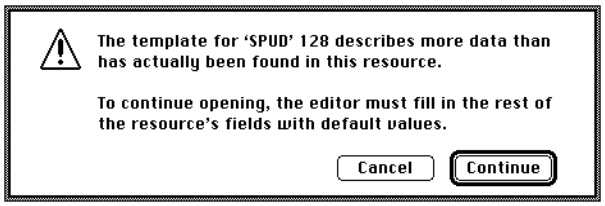
resource data is, how much extra data was found, and ask you whether you want to keep the extra bytes while editing the defined fields, or throw the extra data out in order to conform the resource to its description.



Note: You will get this alert often when opening resources in your Macintosh ROM (the "System ROM Resources" file) with a template. As of this writing (System 7.1), a bug in the Resource Manager causes it to deliver most resources from the ROM with extra data appended past their logical ends.

TOO LITTLE DATA

It is also possible for the Editor to reach the end of the resource data before hitting the end of the template fields describing the resource. Usually this is because the resource data is corrupted, or because you have added a field to a template, or the resource has been compressed with a third-party utility. Whatever the reason, the Editor will alert you to the problem. You can either **Cancel** or **Continue** opening. If you continue opening, the Editor fills in all missing fields at the end of the resource with default values, as if the fields were being created as part of a new resource. The fields are marked as having been changed, so you can tell exactly where the created (missing) data began.

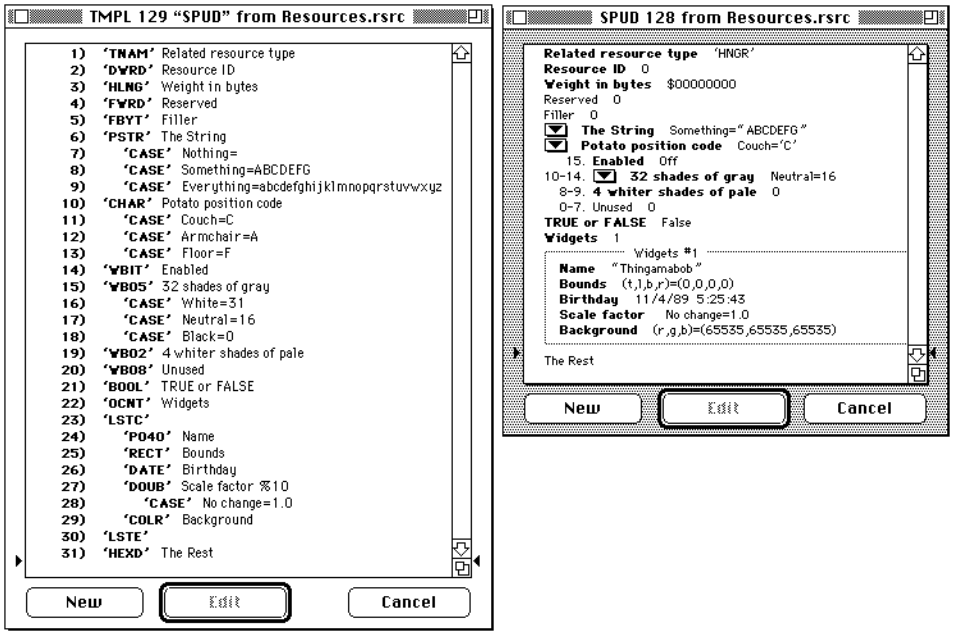


Sorcery: The **Select...Changed** command in the **Edit** menu scrolls you directly to the first appended fields.

HOW FIELD VALUES ARE DISPLAYED

The Data Editor scans the template for your custom resource (shown below on the left) and displays the fields from your custom resource in a standard scrollable Resorcerer list (shown below on the right). The Grow Box in the list's lower right corner lets you change its size; the Zoom Box in the list's drag bar zooms the window on the screen on which it finds itself.

Any field in the Editor list is selectable and in general corresponds to one field value from the template. The label string (taken from the 'TMPL' data) is printed in boldface if it is associated with a value that you can change.



This helps draw your eye to those fields that are most worth attending to. Currently, field types that can't be edited include 'FBYT', 'FWRD', 'FLNG', 'AWRD', 'ALNG', 'HEXD'; any bit field whose title is "Reserved", "Unused", or "Filler"; any 'SKIP' offset type field; any 'DVDR' field; and any of the list delimiting fields 'LSTB', 'LSTC', 'LSTZ', and 'LSTE'.

Following the label is the value of the field, decoded according to the field type. The field type is normally not displayed (although see the "Viewing Options" section later in this chapter). If the field value corresponds to one of a field's symbolic 'CASE' values, then the symbolic case string is

displayed, along with the value it matches, separated by an '=' sign.

Decimal number values are displayed as is; hex numbers are zero-padded according to the size of the field in bytes (i.e. 2, 4, or 8 bytes) preceded by a '$' sign; single characters and four-character types are displayed in single quotes; character strings are displayed surrounded by double quotes.

Bits and bit fields precede the label string with the actual bit number(s) representing the field (most significant bits are displayed first); the value of single bits is displayed as either "On" or "Off"; the value of a 'BOOL' field is displayed as either "True" or "False".

Single, double, and extended 80- and 96-bit precision floating point numbers are displayed according to the number of significant digits specified in any format escape sequence that is appended to the label string (for more on this, see the "Template Editor" chapter). `Fixed` and `Fract` numbers are displayed in decimal fixed point.

Points, RGB colors, and rectangles are displayed as a parenthesized list of two, three, and four values, respectively, preceded by a label that keeps you from having to remember which value in the list is which. For example, the value of a 'RECT' field is displayed as "(t,l,b,r)=(100,60,148,460)", where "(t,l,b,r)" stands for "(top,left, bottom,right)". RGB color fields are also displayed graphically on color displays.

System date fields are converted from their internal long word integer form and displayed as a date and time string.

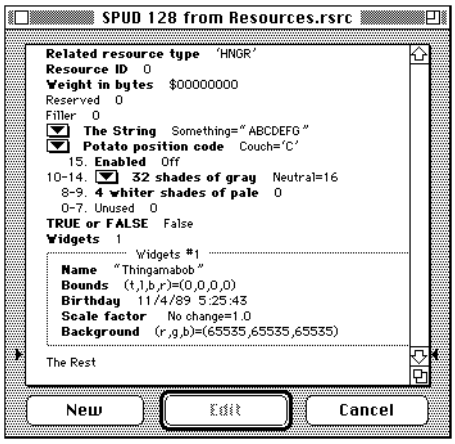
Sometimes the template indicates that the resource should consist of a list of *items* (in our 'SPUD' example on the previous page, there is a counted list consisting of 1 "widget" item). In this case, the Editor indents and encloses the set of fields comprising each item with gray (blue on color systems) lines bordering the top, left, and bottom, and extending as far to the right as necessary. Each item is labeled with its index along the top horizontal line; if the template list is empty, then the label "No Items" is displayed.

The values of skip offset fields ('BSKP', 'SKIP', and 'LSKP') are not shown unless you have the **Show Offsets** viewing option turned on.

USING THE DATA EDITOR

Like other Resorcerer lists, you can click on any field to select it, Shift-click to extend the selection, and ⌘-click to toggle the selection status of any cell without changing any others.

On either side of the list are two triangular handles that let you position the list insertion caret. If no list entries are selected, the list caret will blink horizontally between these two handles. You can scroll the list by dragging a handle above or below the list boundary.



Underneath the field list are three buttons labeled **Edit**, **New**, and **Cancel.**

The **Edit** button opens an editing window for every selected field that supports an editing window. Fields whose labels are not in boldface are ignored, as are certain other fields (such as 'OCNT' and 'ZCNT' fields, which you never need to edit because they are updated automatically). For more on editing fields, see the next section, "Editing Individual Fields". As with other Resorcerer Editors, if the field was selected as the result of a **Find All...** text search, the first instance of matching text in the field will be automatically selected when you open it.

Double-clicking on a cell opens it for editing in the same way as when you use the **Edit** button. As you make changes, they are immediately reflected in the list entry. When you finish editing a field, click in the **OK** button or the window's GoAway box. Changed fields are marked on the left with a small dot to let you know which fields you've worked on.

The **New** button lets you create and insert a new template list item. The button is only enabled when the list insertion caret is directly below a horizontal divider line that represents the top of a repeated item. Choosing **New Item** from the **Custom** menu is equivalent to using the **New** button. When the new item is created, its horizontal divider line is marked as changed to indicate that the whole item is new.

Alternate keyed items are bounded by solid black lines; repeated list items are bounded by gray (or blue) lines. These lines help you see the structure and nesting level of more complicated resources.

Popup boxes on the left side of any field let you choose from among a collection of important values, as defined in 'CASE' fields in the template. If the field is a key field, then choosing different key values with the popup causes the structure of the following keyed item to change accordingly. After changing either a normal field or a key and its keyed structure, you can choose **Undo** to restore the old value(s).

The **Cancel** button lets you discard any of the changes you may have made since opening.

Sorcery: Double-clicking on a list insertion caret handle is the same as clicking the **New** button to create a new template list item at the position of the horizontal item divider directly above the insertion caret line.

Select All selects all fields in the resource, or if one of an item's fields is already selected, it selects all fields in that item.

Option-double-clicking on a 'RSID' field opens the referenced resource whose type is found in the field label, or in the closest previous 'TNAM' field at the same or previous nesting level.

Option-double-clicking on a 'RECT' field lets you screen copy the coordinates graphically from a background window.

The Up and Down arrow cursor keys move the selection up or down one field at a time.

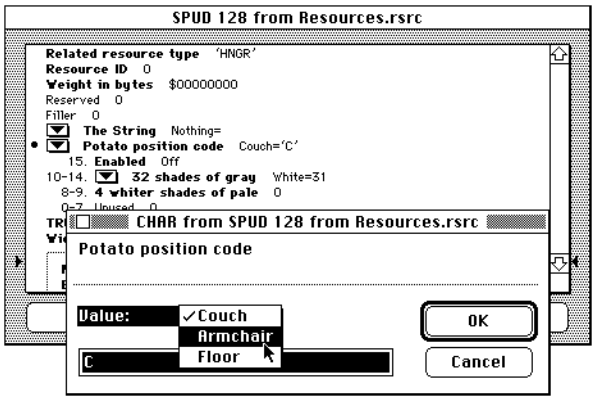
The Right arrow cursor key moves the selection forward by one template list item at a time, at the current indentation level.
The Left arrow cursor key moves the selection backward by one template list item at a time, at the current indentation level.

Option Up arrow scrolls the list to the first field.
Option Down arrow scrolls the list to the last field.

EDITING INDIVIDUAL FIELDS

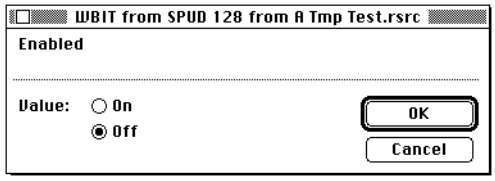
Each time you open a field for editing, the Data Editor places a • (bullet) next to the field to indicate that it is open for editing in its own window. The value of the field is converted to a string and presented to you to edit using the Mac's standard text editing procedures.

If the template describing the field you've opened has one or more associated 'CASE' fields, they will have been collected together in order to create a popup menu of all symbolic case names ('CASE' fields are not displayed in the resource window's field list). When you choose one of the cases from this menu, the value of the symbolic constant is entered automatically for you in the editing box below.



The title of the window contains the four-character 'TMPL' type code to show you the type of data the field represents. The field label is copied into the window as well, to remind you what it's all about.

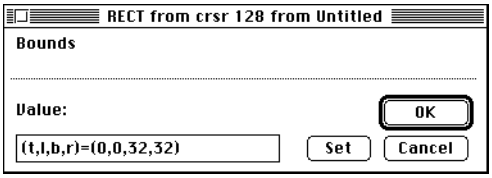
The Editor opens single bit ('BBIT', 'WBIT', 'LBIT', 'BB01', 'WB01', 'LB01', 'BFLG', 'WFLG', 'LFLG') and Boolean ('BOOL') fields into a window that lets you choose one of two radio buttons to specify the binary value.



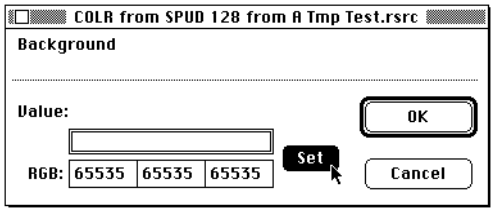
However, you will probably want to use the **Toggle Value** command in the **Custom** menu, which gets the job done more quickly. Most other field types must be opened before you can change them.

Single numerical fields are edited in a straightforward way. Hex fields ('HBYT', 'HWRD', and 'HLNG') fields should begin with a '$', although this is optional. Decimal integer ('DBYT', 'UBYT', 'DWRD', 'UWRD', 'DLNG', and 'ULNG') fields will automatically convert a hex constant beginning with a '$' to decimal when you close the field.

Multiple-bit fields are converted to unsigned decimal, and you can enter either decimal or hex constants as long as the value is less than the maximum size number that will fit in that many bits. The Editor will warn you if the number is too large.



Multiple numerical fields ('PNT ' and 'RECT') are edited in a single text editing field. The values are placed in a parenthesized, comma-separated list preceded by a similar list of hint labels to show you which value is which. When you close the field, the Editor scans the text from the end, parsing the list of two or four numbers, and ignores all label text prior to the list of values. You can set the rectangle coordinates graphically by clicking the **Set** button. If the marching ants are completely within another Resorcerer window, the rectangle is recorded in the local coordinates of that window; otherwise, they are recorded as global screen coordinates.



In the case of 'COLR' fields, a standard Resorcerer color box is displayed. To use the Mac's Standard Color Picker to set the color values, click on the **Set** button, or double-click on the color box directly. As with all color boxes in Resorcerer, you can **Copy** and/or **Paste** the color to and from any similar color box in any editor.

You can enter the value of a 'CHAR' field either as a single character or as a hex byte (a '$' followed immediately by two hex digits). 'CHAR' fields with unprintable character values (less than $20) are initially shown in hex.

'HEXD' fields are not editable; however, you can use the **Show Offsets** command in the **Custom** menu to see the offset into the resource data at which the first byte of the 'HEXD' field begins, so that you can use the Hex Editor to view and edit the rest of the resource data at that offset.

To close the field value, click in the window's Go Away box, or choose **Close Resource Item** from the **Resource** menu. If you've made any changes to the field, the Editor displays the field back in the main list with a small dot next to it to indicate that you've worked on it.

CUTTING AND PASTING LIST ITEMS

Individual data fields in the Data Editor field list cannot be cut or pasted, since you can't arbitrarily rearrange the order of fields in your custom resource (editing the 'TMPL' is how you would do that). However, when your custom resource contains a list of repeated items, each of which has the same structure, you can cut and paste these items within their own lists.

When a set of fields in your custom resource comprises a repeated list item, the Editor list cell directly above the first field in the item contains the item number and a label, embedded in a horizontal divider line. The divider line acts as a handle to the entire set of fields in the repeated item. When you select the divider line, the item as a whole is considered selected.

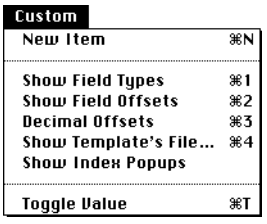
To cut, clear, or copy all fields of a repeated list item, select the horizontal line in the cell above the item's first field, and choose **Cut**, **Clear**, or **Copy** from the **Edit** menu. This compiles the item data, along with other information, and puts it in the clipboard.

To paste an item, first place the list insertion caret at the position where you want to insert the item from the clipboard. The insertion position is just after any horizontal divider line in the same list as the item came from. Then choose **Paste** from the **Edit** menu. After the paste, the Editor places the insertion caret at the appropriate position just after the item pasted so that subsequent **Paste** commands continue to append copies of the item to the list. The top divider line field of each inserted item is marked changed.

Note: Normally, you can't cut and paste items except within their own lists. However, repeated list items from recursive lists (for more on these, see the 'SELF' field described in the "Template Editor" chapter) can be cut, copied, and pasted among all the recursive instances of the list anywhere in the resource.

VIEWING OPTIONS

During editing, you can ask the Data Editor to show you various pertinent field information that you may need to know on occasion, or to help you navigate within large or complex lists.

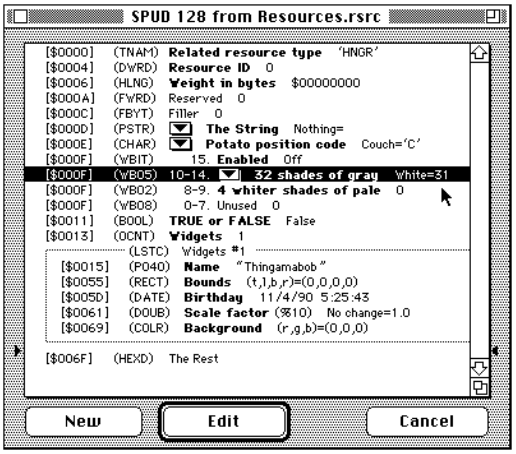


SHOWING FIELD TYPES

To be able to see the individual four-character field types, choose **Show Field Types** from the **Custom** menu. Each type is displayed in parentheses to the left of the field label. When this option is on, any floating point formatting command appended to the label string of a 'REAL', 'DOUB', 'EXTN', 'XT80', 'XT96', or 'UNIV' field also is displayed in parentheses, to the right of the label.

SHOWING FIELD OFFSETS

Each field that represents data begins at a specific offset from the beginning of the resource. To make the offset at which each field starts visible, choose **Show Offsets** from the **Custom** menu. Each offset is drawn, in brackets, to the left of the label string, in hex.



The offset for consecutive bits or bit fields remains the same as long as the bit fields occur in the same underlying chunk of data (byte, word, or long). For instance, the offset of each bit within a word (a set of 'WBIT' fields) will be the same as the word's offset.

Note: If you are editing pre-processed resource data using a filtered template, and the filter has not set the `sameOffsets` bit in the `FilterRecord`, the offsets displayed refer only to the intermediate form of the data you are editing. The offsets of the fields in the post-processed resource data will be different (somewhere).

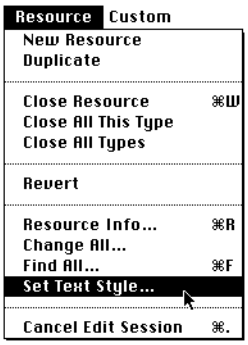
DECIMAL OFFSETS

To convert the offsets being displayed with the **Show Offsets** command described above from hexadecimal to decimal, choose **Decimal Offsets** from the **Custom** menu. Decimal offsets are also drawn inside a set of brackets, but with no leading 0's or '$' sign.

SHOWING THE TEMPLATE'S FILE

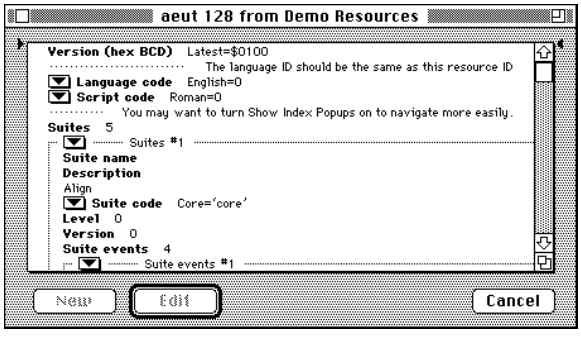
To see which file the template the Data Editor is using to parse the resource you're looking at, use the **Show Template's File...** command.

SETTING THE TEXT DISPLAY FONT



To change the style that text is displayed in, choose **Set Text Style...** from the **Resource** menu. After setting the font and size, click in the **OK** button to make the change to the frontmost Data Editor window. The **Save & OK** button lets you install the text style you've set as the Data Editor's default style, which it uses each time you open a custom resource.

SHOWING INDEX POPUPS



For certain large resources, such as 'aete' or 'aeut' resources, with muliply nested lists of complicated items, it is useful to be able to scroll directly to a given item. To do this, turn **Show Index Popups** on. This tells the Data Editor to display small popup boxes (similar to CASE popups) at the start of each list item divider line. Clicking on any of them lets you choose where in the list you want to be.

PRINTING A CUSTOM RESOURCE

To print your custom resource editing session, choose **Print to Printer...** from the **File** menu. The Editor prints all selected fields in the resource field list as they look on your screen, with the exception that popup boxes are suppressed to save space (unless you hold the Option key down). If no fields are selected, it prints the entire resource field list.

CLOSING YOUR CUSTOM RESOURCE

When you are through editing fields and list items in your custom resource, click in the Editor window's Go Away box to close the resource and save your changes back to the in-memory copy of your file.

The Editor scans the fields from the beginning of the list in order to compile the resource data back to its machine-readable form. If the Editor has been using a filtered template, it then passes the data just compiled to the filter, which post-processes the data into its final form. For more on filtered templates, see the "Designing Filters" section of the "Template Editor" chapter.