

# Inside the Mercutio MDEF

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The **Mercutio MDEF** is a Menu DEFinition resource that allow developers to easily and elegantly extend the power of their application menus. Mercutio allow menus to have multiple-modifier key-equivalents (e.g. shift-command-C), custom icons, item callbacks, and other goodies. The Mercutio MDEF works under System 6.0.4 or later, with or without Color QuickDraw.

For the latest information on Mercutio, go to:

<http://www-leland.stanford.edu/~felciano/da/mercutio/>

## The Mercutio MDEF Package

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The Mercutio MDEF package contains the following:

- **MercutioMDEF.rsrc**: A fully functional version of the MDEF which contains the resources needed to incorporate Mercutio into your applications.
- **Inside Mercutio.pdf**: This document, which explains the features of Mercutio in detail.
- **Mercutio Software License.pdf**: The software license that describes the conditions under which you may use Mercutio.
- Several **release notes** that describe the new features for this release.

In addition, there is a *Sample Code* folder that contains:

- **MercutioDemo(C)** and **MercutioDemo(Pascal)**: demonstration applications that allows you to see Mercutio in action and try out its features.
- **Source code** for the above applications.
- **Xmnu templates**: TMPL resources for Mercutio's preference resource. Includes versions for ResEdit and Resorcerer.

## If you're upgrading...

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If you are upgrading from a previous version of Mercutio, note the following important changes:

- The format of Mercutio's data structures has changed, and you will need to update your API files. In particular, Mercutio's style bit remapping uses a new `FlexStyle` record instead of standard styles. See "FlexStyle" on page 10.
- If you use version 1.2's 'Xmnu' resources, you will need to rebuild them as well since the format has changed. See "'Xmnu' resource" on page 9.

Here's a quick summary of the changes in version 1.3:

- **Support for window font/size:** Mercutio now correctly draws popup menus in the current font and size. This means you can use Mercutio for Geneva 9-pt popup menus and the like.
- **Graphic icons for non-printing keys:** non-printing key equivalents such as page up/down, home/help, etc. can be drawn as text or as icons that look like the keys on the extended keyboard.
- **WorldScript support:** Mercutio now correctly draws menus in non-western scripts (e.g. Japanese, Arabian, etc.), and supports right-to-left system text justification.
- Several new API calls related to the above changes. The GetCopyright callback message ID has changed.
- New format for the Xmnu resource.
- Various cosmetic changes, optimizations and minor bug fixes. Substantially increased stability; fixed several memory-related bugs.
- Mercutio now has a web site:

<http://www-leland.stanford.edu/~felciano/da/mercutio/>

See the accompanying Release Notes for a full list of changes and bug fixes.

## Conventions Used in this Manual

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*Inside the Mercutio MDEF* uses various conventions to present information. Words that require special treatment appear in specific fonts or font styles. Certain information, such as parameter blocks, use special formats so that you can scan them quickly.

Inside the Mercutio MDEF

## Special Fonts

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All code listings, reserved words, and the names of actual data structures, constants, fields, parameters, and routines are shown in Courier (`this is Courier`).

## Types of Notes

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There are several types of notes used in this book.

### Note

A note like this contains information that is interesting but possibly not essential to an understanding of the main text. (An example appears on page 3-23). ♦

### IMPORTANT

A note like this contains information that is essential for an understanding of the main text. (An example appears on page 3-23.) ▲

### ▲ WARNING

Warnings like this indicate potential severe problems that you should be aware of as you design your application. Failure to heed these warnings could result in system crashes and loss of data. (An example appears on page 5-35). ▲

## Technical Support

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Digital Alchemy is a small design and consulting firm based in Palo Alto, California. We specialize in graphic design, custom software development, and exotic human interfaces.

Other shareware products available from Digital Alchemy include:

- CIconButton CDEF: a simple “icon button” CDEF that allows you to use arbitrarily-sized color icon buttons in your applications.
- VersionEdit: a drag-and-drop ‘Vers’ resource editor.

All technical support for Mercutio is provided through electronic mail. For fastest response, please use the Internet e-mail address provided below.

**U.S.Mail** Digital Alchemy  
P.O.Box 9632  
Stanford, CA 94309-9632

**Internet** felciano@camis.stanford.edu

**WWW** <http://www-leland.stanford.edu/~felciano/da/>

Please feel free to contact us with comments, feature requests, or (gasp!) bug reports.

## Quickstart!

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For those of you that want to get started right away, here are the five basic steps to integrate Mercutio into your application:

1. Copy the resources in the “MercutioMDEF.rsrc” file into your application’s resource file. There are 3 resource types that are needed: the “Mercutio” MDEF resource, and the “.MDEF Font” NFNT and FOND resources. Copy them all the resources in this file to the resource file for your application. *Do not renumber them.*
2. Change the MDEF field in your MENU resources to 19999, the resource ID of the Mercutio MDEF. *Don’t change this resource number.*
3. For Pascal, add the “Mercutio API.p” file to your project. For C, add the “Mercutio API.c” and “Mercutio API.h” files to your project.
4. Replace any calls to the toolbox MenuKey routine with the with new MDEF\_MenuKey call. This replacement is needed in order to parse the additional modifier keys. Most likely you will have an event loop routine that looks something like this:

```

CASE event.what OF
    keyDown, AutoKey:
        BEGIN
            theKey := BitAnd(Event.message, charCodeMask);
            IF (BitAnd(Event.modifiers, CmdKey) = CmdKey) THEN BEGIN
                menuResult := menuKey(theKey);
                if HiWord(menuResult) <> 0 THEN BEGIN
                    ProcessMenu(menuResult);
                    HiliteMenu(0);
                END;
            END;
            ELSE BEGIN { cmd not down; handle typing if needed }
                ...
            END;
        END;
    END;

```

which should be changed to look like this:

```

CASE event.what OF
    keyDown, AutoKey:
        BEGIN
            theKey := BitAnd(Event.message, charCodeMask);
            menuResult := MDEF_MenuKey(Event.message,
                                     Event.modifiers, hAnMDEFMenu);
            IF HiWord(menuResult) <> 0 THEN BEGIN
                ProcessMenu(menuResult);
                HiliteMenu(0);
            END;
        END;
    END;

```

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```
ELSE BEGIN { wasn't caught by the menus }  
    ...
```

**Note**

The third parameter to the `MDEF_MenuKey` routine must be a handle to a menu that is using the Mercutio MDEF. ♦

5. Recompile your application.

That's it! Run your program. Any menu item in condense style will show an option key modifier in addition to the command key; any menu item in extend style will show a shift key modifier in addition to the command key. If you want to use additional modifier keys or Mercutio features, read on...

# Basic Architecture

Mercutio provides a number of features that redefine the appearance and behavior of Macintosh menus. Mercutio uses a technique called **style-bit remapping** to control these features on a menu item by menu item basis. The features that are available through style-bit remapping for a given menu are controlled **feature templates**.

## Style-bit remapping

Menu items will typically differ in which Mercutio features they use: one will have a command-shift key equivalent, the next has command-option, etc. Mercutio uses the style field the standard item record to specify which features are used by a menu item. Recall that the style field is a sequence of 8 bit flags, each of which turns a particular text style on or off. The Macintosh toolbox provides a set of constants to manipulate this field (normal = 0, bold = 1, italic = 2, underline = 4, etc.)

**Figure 2-1** Sample menu item with text styles

|                                     |   |           |
|-------------------------------------|---|-----------|
| <input type="checkbox"/>            | 1 | Bold      |
| <input checked="" type="checkbox"/> | 2 | Italic    |
| <input checked="" type="checkbox"/> | 3 | Underline |
| <input type="checkbox"/>            | 4 | Outline   |
| <input type="checkbox"/>            | 5 | Shadow    |
| <input type="checkbox"/>            | 6 | Condense  |
| <input checked="" type="checkbox"/> | 7 | Extend    |
| <input type="checkbox"/>            | 8 | Unused    |

```
myItem.style = [italic + underline + extend]
```



The 8 bit codes of the style field are normally used as **style flags** to indicate the text style of the menu item. Mercutio interprets certain style bits as **feature flags** instead of style flags. This is called **style-bit remapping**, because a style bit is linked, or remapped, to control something other than a text style. For example, by default, Mercutio interprets

## Basic Architecture

the Condense style bit as a flag for the Option key, and the Extend style bit as a flag for the Shift key. Thus an item that is formatted using the Extend text style will have a Shift modifier key instead of a wider text style (Figure 2-2).

**Figure 2-2** Sample menu item with Mercutio's style-bit remapping

|                                     |   |               |
|-------------------------------------|---|---------------|
| <input type="checkbox"/>            | 1 | Bold          |
| <input checked="" type="checkbox"/> | 2 | Italic        |
| <input checked="" type="checkbox"/> | 3 | Underline     |
| <input type="checkbox"/>            | 4 | Outline       |
| <input type="checkbox"/>            | 5 | Shadow        |
| <input type="checkbox"/>            | 6 | <i>Option</i> |
| <input checked="" type="checkbox"/> | 7 | <b>Shift</b>  |
| <input type="checkbox"/>            | 8 | Unused        |

```
myItem.style = [italic + underline + extend]
```



When a style bit is used to indicate whether or not a particular Mercutio feature is to be used, that bit is called a **feature flag**. Mercutio's feature flags let you control the following six item-specific features:

- The four **modifier keys**: command, shift, option, and control. See “Extended key equivalents” on page 14.
- Whether or not an item is a **dynamic item**. See “Dynamic items” on page 19.
- Whether or not an item is a **callback item**. See “Callback items” on page 23.

## Feature Templates

There are several potential problems with the style-bit remapping scheme:

- What if you want an item to be drawn in extend format?
- What if you want the item to be drawn in extend format and have the shift-key as a modifier for the key equivalent?
- If there are six features to flag, does that mean there are only 2 text styles left to use?

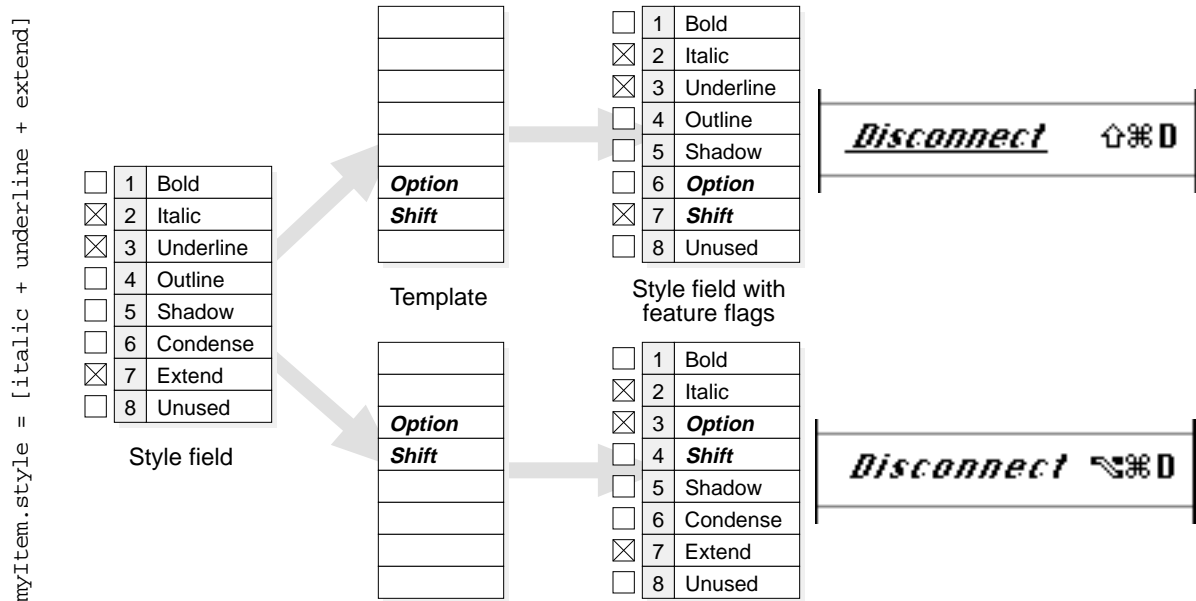
Mercutio addresses these problems by letting you select, on a menu-by-menu basis, which Mercutio style bits to use as feature flags and which ones to use as style flags. For example, if one menu uses the Condense and Extend text styles for several menu items, but doesn't use Outline or Shadow styles, you can use Outline and Shadow as feature flags and restore the Extend and Condense bits to their normal function as style flags. This is done through **feature templates** that tell Mercutio which style bits to map to which features.

Every menu that uses Mercutio has its own mapping template. Thus, one menu might use the Extend style to flag the Shift modifier, whereas the next uses the Italics style to flag Shift but uses the Extend style to flag the Control modifier. Figure 2-1 shows how

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the same set of style bits can be interpreted differently depending on what feature template is used.

**Figure 2-1** Feature selection using a preference template

**Note**

You do not need to allocate a style bit to every Mercutio feature; use only those features you need. In the examples in Figure 2-1, only one modifier key is supported in each example (the Shift-key in the first example, the Option-key in the second one). ♦

You can set the feature template for your menus programmatically using the MenuPrefsRec data structure and the MDEF\_SetMenuPrefs call. Listing 0-1 shows how to set the feature flags for a menu using the first template in Figure 2-1.

**Listing 0-1** Setting the feature flags for a menu

```
PROCEDURE SetMenuPrefs(theMenu : MenuHandle);
VAR
    myPrefs:      MenuPrefsRec;
BEGIN
    WITH myPrefs DO BEGIN
```

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```

isDynamicFlag.s := [];
forceNewGroupFlag.s := [];
useCallbackFlag.s := [];
controlKeyFlag.s := [];
optionKeyFlag.s := [condense];
shiftKeyFlag.s := [extended];
cmdKeyFlag.s := [];
requiredModifiers := cmdKey;
END;
MDEF_SetMenuPrefs(theMenu, @myPrefs);
END;

```

**IMPORTANT**

For compatibility reasons, the default preferences are set to make Mercutio behave the same way it did in version 1.1. In particular, the Condense style bit flags the Option key, the Extend style bit flags the Shift key, and the Command key is the default modifier. ▲

**‘Xmnu’ resource**

Instead of setting the features for your menus programmatically every time your application launches, you can store the feature templates for your menus in Mercutio’s Xmnu resources. As with the MenuPrefsRec record, the Xmnu resource stores settings for individual menus, but not for menu items.

During menu initialization, Mercutio looks for an Xmnu resource with the same resource ID as the menu’s menuID. If no Xmnu resource with a matching ID is found, Mercutio looks for an Xmnu resource with ID 0. If no Xmnu resources are found, Mercutio uses the default settings. Thus, you can set a default for all your application menus by including an Xmnu resource with ID 0 in your resource fork.

TMPL resources for ResEdit and Resorcerer are included with Mercutio to help you fill out these Xmnu resources.

## Mercutio and Apple Guide

Apple Guide uses color and style for menu item coach marks. As developer, you can choose how coach marks should visually highlight menu items; typically this is by drawing the menu item underlined and red. You specify this setting when creating the Apple Guide help file. When drawing a coached item, however, Apple Guide resets the style of the menu item to plain before adding the coach styles. Thus, a menu item that is bold-italic will be drawn red and underline, not red and bold-italic-underline. Clearly, this will reset any style flags you are using with Mercutio.

The solution is to keep your Apple Guide styles separate from feature flag styles, and for your Apple Guide file to use the same styles as your menu resource does:

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- If your application supports Apple Guide, choose the text style you will use for the coach mark, and do not assign it as a Mercutio feature flag.
- When defining your Apple Guide file, make sure the Coach Mark definitions include all the necessary styles for that item. For example, if your menu item is normally Condense-Italic, and you've decided that menu item coach marks will be red and underlined, your coach mark definition for that menu item should be Condense-Italic-Underline, not just Underline.

We are aware that this requires developers to manually synchronize their Apple Guide files with their resource files, an awkward process at best. We are working with Apple to see if there is a more elegant solution to this problem.

## Data Structures

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This section describes the `FlexStyle` record and the `MenuPrefsRec` record in detail as well as the `MenuResPrefs` record.

### FlexStyle

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The `FlexStyle` record is a Pascal variant record structure that allows Mercutio to perform style-bit manipulations quickly. You can treat the `FlexStyle` record like any other Style data structure by using the `s` field of the data structure.

```
TYPE FlexStyle = PACKED RECORD CASE Boolean OF
    false : ( s : Style );
    true : ( val : SignedByte );
END;
```

### MenuPrefsRec

---

The `MenuPrefsRec` record is the data structure that represents the feature template. Every Mercutio feature is represented as a style field in the record; by setting this style you indicate which style bit will be used to flag that feature. The only exception is the `requiredModifiers` field, which is of type integer.

```
TYPE MenuPrefsPtr = ^MenuPrefsRec;
MenuPrefsRec = PACKEDRECORD
    isDynamicFlag: FlexStyle;
    forceNewGroupFlag: FlexStyle;
    useCallbackFlag: FlexStyle;
    controlKeyFlag: FlexStyle;
    optionKeyFlag: FlexStyle;
    shiftKeyFlag: FlexStyle;
```

## Basic Architecture

```

cmdKeyFlag: FlexStyle;
unused: FlexStyle;
requiredModifiers: integer;
END;

```

**Field descriptions**

|                                |  |
|--------------------------------|--|
| <code>isDynamicFlag</code>     | Specifies which style bit will be used to flag whether the menu item is part of a group of menu items defining a dynamic item. |
| <code>forceNewGroupFlag</code> | Specifies which style bit will be used to flag whether the item starts a new dynamic item.                                     |
| <code>useCallbackFlag</code>   | Specifies which style bit will be used to flag whether the MDEF should call the callback procedure before drawing the item.    |
| <code>controlKeyFlag</code>    | Specifies which style bit will be used to flag the Control modifier key.   |
| <code>optionKeyFlag</code>     | Specifies which style bit will be used to flag the Option modifier key.  |
| <code>shiftKeyFlag</code>      | Specifies which style bit will be used to flag the Shift modifier key.   |
| <code>cmdKeyFlag</code>        | Specifies which style bit will be used to flag the Command modifier key.   |
| <code>requiredModifiers</code> | Specifies which modifiers will be used by default.   |

**DESCRIPTION**

The `controlKeyFlag`, `optionKeyFlag`, `shiftKeyFlag`, and `cmdKeyFlag` fields set style-bits used to flag the corresponding modifier keys. For example, if the `controlKeyFlag` field in the `MenuPrefsRec` is set to `[bold]`, any menu items with the bold style-bit set will be drawn with an option key equivalent (but not drawn in boldface.)

You should only use single styles to control these features. For example, don't set `controlKeyFlag` to `[bold, italic, underline]`.

If you don't want to use a particular feature for a given menu, set the style field for that feature to `[]`.

The field `requiredModifiers` can be used enforce consistency across menu item key equivalents. For example, if `requiredModifiers` is set to `cmdKey + optionKey`, *every* menu item with a key equivalent will require at least the Option- and Command-keys to be held down (additional modifiers may be required if the appropriate style bits are set).

**MenuResPrefs**

Previous versions of Mercutio had a `MenuResPrefs` record to access the `Xmnu` resource. This structure is no longer used in version 1.3.

# Using Mercutio

The following is a comprehensive list of the features supported by Mercutio and instructions on how to use them in your software. Except as noted below, the Mercutio MDEF behaves identically to the System 7 MDEF.

## Extended Icon Support

Mercutio supports a wide variety of icon types and sizes, including color icons ('cicn') and System 7 icon suites ('icl8', 'ICN#', etc.).

**Figure 3-1** Icon support in Mercutio



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When determining which icon resource to use to display an icon, the Mercutio MDEF follows a particular search order to find out exactly which icon is going to be displayed (Table 3-2).

**Table 3-2** Mercutio icon search order

| System     | Desired Size | Search Order   |
|------------|--------------|--|
| 7          | 32 x 32      | System 7 Icon Suites<br>'cicn'<br>'ICON'<br>'ICN#'   |
| 7          | 16 x 16      | System 7 Icon Suites<br>'cicn' (shrunk)<br>'ICON' (shrunk)<br>'ICN#' (shrunk)                |
| 6.0.4      | 32 x 32      | 'cicn'<br>'icl8'<br>'ICON'<br>'ICN#'   |
| 6.0.4      | 16 x 16      | 'cicn' (shrunk)<br>'icl8' (shrunk)<br>'SICN'<br>'ics#'<br>'ICON' (shrunk)<br>'ICN#' (shrunk) |
| 6.0.4, B/W | 32 x 32      | 'ICON'<br>'ICN#'   |
| 6.0.4, B/W | 16 x 16      | 'SICN'<br>'ics#'<br>'ICON' (shrunk)<br>'ICN#' (shrunk)                                       |

There is limited system software support for icon suites under System 6. However, Mercutio tries to use whatever icon resources are available. If a 'icl8' is found for a given menu item, it will be converted to a 'CICN' and used as the item's icon. Similarly, if an 'ICON' resource is not found, Mercutio will look for a 'ICN#' resource with the same ID. This means you can develop one set of icons that will work for both System 6.0.4 and System 7.

## Support for small icons

The System MDEF lets you include small icons (16 by 16 pixels, usually stored as `sicn` resources) into menu items by putting \$1E into the `cmdChar` field of the menu item record. Unfortunately, this doesn't allow you to use small icons in menu items with key equivalents or hierarchical submenus, since they also use the `cmdChar` field. To address this issue, Mercutio lets you draw icons with resource IDs above a certain value as small

## Using Mercutio

icons. By default, this ID value is 500: all icons with resource IDs 500 and above will be drawn as small icons, regardless of the value of the `cmdChar` field. You can change this value programmatically (see “MDEF\_SetSmallIconIDPreference” on page 36).

## Extended key equivalents

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Mercutio supports an extended set of key equivalents for menu items. This includes additional **modifier keys** as well as the **non-printing keys** on the keyboard (e.g. function keys).

### Support for all modifier keys

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The Mercutio MDEF supports Option, Shift and Control as modifiers in addition to the Command-key.

Caps-lock is not supported.

**Figure 3-1**

| Every conceivable combo! |       |
|--------------------------|-------|
| Cmd                      | ⌘E    |
| Cmd-Shift                | ⌘⇧E   |
| Cmd-Opt                  | ⌘⌥E   |
| Cmd-Shift-Opt            | ⌘⇧⌥E  |
| Cmd-Ctrl                 | ⌘⌞E   |
| Cmd-Ctrl-Shift           | ⌘⌞⇧E  |
| Cmd-Ctrl-Opt             | ⌘⌞⌥E  |
| Cmd-Ctrl-Shift-Opt       | ⌘⌞⇧⌥E |

### MDEF\_MenuKey

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In order to take advantage of Mercutio’s features, you must use the `MDEF_MenuKey` routine instead of the standard Menu Manager `MenuKey` routine. The `MDEF_MenuKey` routine checks against the various combinations of modifier keys that Mercutio allows; the `MenuKey` routine only checks for the Command key.

```
FUNCTION MDEF_MenuKey (theMessage: longint; theModifiers: integer;
hMenu: menuHandle): longint;
```

The `theMessage` and `theModifiers` parameters can be taken directly from an event record. The `hMenu` parameter must be a handle to a Mercutio menu; the `MDEF_MenuKey` routine uses this handle to get at Mercutio’s private data. See “MDEF\_MenuKey” on page 32.

## Modifier-defaults

By default, all key equivalent combinations include the command key. That is, if you don't set any additional feature flags but do fill in the `cmdChar` field for the menu item, Mercutio assumes you require the Command key to be down for the key equivalent to trigger. The `defaultModifiers` field in the `MenuPrefs` record lets you select which modifier keys to use as the default modifiers.

### Using modifier-defaults to add key equivalents to a Style menu

The modifier-defaults feature turns out to be particularly useful for Style menus. The Macintosh Human Interface Guidelines suggest you use the styles to indicate the effects of choosing an item from the style menu (See "Style menu normal and with Command-Shift defaults" on page 15.) Since Mercutio uses the style bits to flag features, it would seem that certain items can't be drawn in their styles if we want the Style menu to include additional modifiers.

In particular, at least one style can't be drawn as a text style because it's being used as a feature flag. For example, if we use the Italic bit to flag the Shift-key, the third item in the left menu in Figure 3-1 wouldn't be drawn italics.

**Figure 3-1** Style menu normal and with Command-Shift defaults

| Font             | Style |
|------------------|-------|
| Plain Text       | ⌘T    |
| <b>Bold</b>      | ⌘B    |
| <i>Italic</i>    | ⌘I    |
| <u>Underline</u> | ⌘U    |
| Outline          |       |
| <b>Shadow</b>    |       |
| Condense         |       |
| Extend           |       |

Conventional Style Menu

| Font             | Style |
|------------------|-------|
| Plain Text       | ⇧⌘T   |
| <b>Bold</b>      | ⇧⌘B   |
| <i>Italic</i>    | ⇧⌘I   |
| <u>Underline</u> | ⇧⌘U   |
| Outline          | ⇧⌘O   |
| <b>Shadow</b>    | ⇧⌘S   |
| Condense         | ⇧⌘C   |
| Extend           | ⇧⌘E   |

Desired Style Menu

You can use the `defaultModifiers` field to address this problem. Listing 0-2 shows how to set the default modifiers to be Command-Shift and clear the feature flags (by setting the style fields in the `MenuPrefs` record to [ ]). Using these settings, any menu item with data in its `cmdChar` field will assume that the Command- and Shift-keys to be held down for the key equivalent to trigger (the right menu in Figure 3-1).

**Listing 0-2** Setting the feature flags for a menu

```

PROCEDURE SetStyleMenuPrefs(theStyleMenu : MenuHandle);
VAR
    myPrefs:      MenuPrefsRec;
BEGIN
    WITH myPrefs DO BEGIN
        isDynamicFlag.s := [];
        forceNewGroupFlag.s := [];
        useCallbackFlag.s := [];
        controlKeyFlag.s := [];
        optionKeyFlag.s := [];
        shiftKeyFlag.s := [];
        cmdKeyFlag.s := [];
        requiredModifiers := cmdKey + shiftKey;
    END;
    MDEF_SetMenuPrefs(theStyleMenu, @myPrefs);
END;

```

**Note**

This `defaultModifiers` feature was added to Mercutio as a direct result of user requests for a method of using additional modifiers for Style menu items. Bear in mind that the Apple Human Interface Guidelines have specific recommendations for key equivalents in the Style menu (as shown in the image above); if you use other key equivalents, you run the risk of interrupting the continuity of the user experience. ♦

## Support for non-printing key-equivalents

The Mercutio MDEF supports non-printing keys such as the function keys, page up, page down, arrow keys, tab and delete. Certain non-printing key equivalents, such as the Return, Enter, Tab, Clear and Help keys, can be displayed as icons or spelled out in full text (Figure 3-1). Others, such as the Delete key, are only displayed as icons. You can indicate your preference programmatically (see “MDEF\_SetKeyGraphicsPreference” on page 36).

**Figure 3-1** Example of non-printing characters as key equivalents

|                       |         |                       |           |
|-----------------------|---------|-----------------------|-----------|
| <b>Return</b>         | ⌘return | <b>Return</b>         | ⌘(return) |
| <b>Enter</b>          | ⌘enter  | <b>Enter</b>          | ⌘(enter)  |
| <b>Tab</b>            | ⌘tab    | <b>Tab</b>            | ⌘(tab)    |
| <b>Clear</b>          | ⌘clear  | <b>Clear</b>          | ⌘(clear)  |
| <b>Help</b>           | ⌘help   | <b>Help</b>           | ⌘(help)   |
| <b>Delete</b>         | ⌘⌫      | <b>Delete</b>         | ⌘⌫        |
| <b>Forward Delete</b> | ⌘⌭      | <b>Forward Delete</b> | ⌘⌭        |

The Mercutio MDEF interprets *lowercase characters* in the menu item’s cmdChar field as these non-printing keys. For example, a lowercase A (‘a’) in the cmdChar field will appear as Enter in the menu. Table 3-2 describes how the ASCII lowercase characters are mapped to new values in order to support non-printing characters.

### Note

Note that the arrow keys are the only non-printing keys that don’t have lower-case equivalents (we ran out with only 26 lowercase letters to choose from). You’ll need to enter these values (\$80-\$83) by hand using ResEdit or another resource editor. ♦

**Table 3-2** Mercutio ASCII character mapping

| Char | ASCII      | Becomes  | Key-Code |
|------|------------|----------|----------|
| a    | 97 (\$61)  | Return   | \$4C     |
| b    | 98 (\$62)  | Enter    | \$24     |
| c    | 99 (\$63)  | Tab      | \$30     |
| d    | 100 (\$64) | Num Lock | \$47     |
| e    | 101 (\$65) | F1       | \$7A     |
| f    | 102 (\$66) | F2       | \$78     |

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**Table 3-2** Mercutio ASCII character mapping

| Char | ASCII      | Becomes     | Key-Code |
|------|------------|-------------|----------|
| g    | 103 (\$67) | F3          | \$63     |
| h    | 104 (\$68) | F4          | \$76     |
| i    | 105 (\$69) | F5          | \$60     |
| j    | 106 (\$6A) | F6          | \$61     |
| k    | 107 (\$6B) | F7          | \$62     |
| l    | 108 (\$6C) | F8          | \$64     |
| m    | 109 (\$6D) | F9          | \$65     |
| n    | 110 (\$6E) | F10         | \$6D     |
| o    | 111 (\$6F) | F11         | \$67     |
| p    | 112 (\$70) | F12         | \$6F     |
| q    | 113 (\$71) | F13         | \$69     |
| r    | 114 (\$72) | F14         | \$6B     |
| s    | 115 (\$73) | F15         | \$71     |
| t    | 116 (\$74) | Help        | \$72     |
| u    | 117 (\$75) | Del         | \$33     |
| v    | 118 (\$76) | Forward Del | \$75     |
| w    | 119 (\$77) | Home        | \$73     |
| x    | 120 (\$78) | End         | \$77     |
| y    | 121 (\$79) | Page Up     | \$74     |
| z    | 122 (\$7A) | Page Down   | \$79     |
|      | 16 (\$10)  | Up Arrow    | \$7E     |
|      | 17 (\$11)  | Down Arrow  | \$7D     |
|      | 18 (\$12)  | Left Arrow  | \$7B     |
|      | 19 (\$13)  | Right Arrow | \$7C     |

## Use '.MDEF Font' for menu symbols

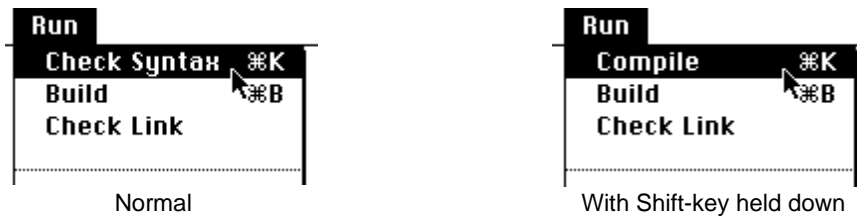
All keyboard symbols (modifiers and key equivalent characters) are stored in a custom font called `.MDEF Font`. To use the Mercutio MDEF, you will need to copy this font information (a NFNT/FOND resource pair) into the resource fork of your application.

Do not rename or renumber this font.

## Dynamic items

**Dynamic menu** items are items that change appearance and behavior depending on what modifier keys are being held down. This is useful for closely-related commands, rarely-used commands, power-user commands, or other situations where you want to provide functionality without cluttering your menus. Several commercial applications use this kind of menu. For example, the THINK Pascal® “Run” menu changes its appearance if the shift-key is held down (Figure 3-1)

**Figure 3-1** Menu in THINK Pascal®



You can accomplish the same thing using Mercurio (Figure 3-2). The main difference is that Mercurio will also display the modifier keys being held down.

**Figure 3-2** Menu with Mercurio



Mercurio does this by grouping sets of menu items, called **item alternates**, that occupy the same location in the menu—the actual item from this set that is displayed depends on the modifier keys held down by the user. Obviously, not every menu item will have alternates, so not all items will change when modifier keys are held down. For example, the “Build” command in Figure 3-2 above doesn’t change.

## Using Mercutio

**Note**

For a dynamic menu item to switch to its alternate, the user must hold down the alternate's modifier combination exactly. In Figure 3-2, if the user holds down Option- and Shift-, the menu would display "Check Syntax", not "Compile". ♦

## Using Dynamic Items in Mercutio

---

You establish a set of item alternates by grouping them sequentially in the MENU resource. Mercutio considers a sequence of menu items as a group if they:

1. Have the `isDynamic` flag set.
2. Share the same key equivalent.

The first item in the set is the one that is initially displayed when the menu appears; the subsequent ones are alternates that will appear if their particular combination of modifiers is held down.

You may want to have two dynamic items next to each other that share the same key equivalent character. You can force a separation between two groups of items that share the same key equivalent character with the `ForceNewGroup` flag.

Listing 0-3 shows how to set the feature template for a menu that uses the Condense style bit to flag the Option key, the Extend style bit to flag the Shift key, and the Outline style bit to flag dynamic items (i.e. the default behavior plus support for dynamic items).

---

### Listing 0-3      Setting the feature flags for a menu

```
PROCEDURE SetMyMenuPrefs(theStyleMenu : MenuHandle);
VAR
    myPrefs:      MenuPrefsRec;
BEGIN
    WITH myPrefs DO BEGIN
        isDynamicFlag.s := [outline];
        forceNewGroupFlag.s := [];
        useCallbackFlag.s := [];
        controlKeyFlag.s := [];
        optionKeyFlag.s := [condense];
        shiftKeyFlag.s := [extended];
        cmdKeyFlag.s := [];
        requiredModifiers := cmdKey;
    END;
    MDEF_SetMenuPrefs(theStyleMenu, @myPrefs);
END;
```

## Using Mercutio

Using this feature template, any sequence of menu items with their Outline bits set and with the same key equivalent will be considered item alternates for a single dynamic item. Figure 3-1 shows a “Print” menu item with four item alternates that will toggle depending on what menu items are held down.

**Figure 3-1** Dynamic “Print” menu item with 4 alternates

|                  |      |   |
|------------------|------|---|
| Print            | ⌘P   | } Item alternates for a single dynamic item |
| Print All Files  | ⌘P   |   |
| Print Folder...  | ⌘P   |   |
| Print Folders... | ⌘P   |   |
| Print            | ⌘P   | No modifiers held down                      |
| Print All Files  | ⌘⌥P  | Option-key held down                        |
| Print Folder...  | ⇧⌘P  | Shift-key held down                         |
| Print Folders... | ⇧⌘⌥P | Option- and Shift-keys held down            |
| Print            | ⌘P   | Any other modifier combination held down    |

A more complete example of how to design and build Dynamic Items for your application is shown in Figure 3-2 on page 3-22.

**Note**

Mercutio searches sequentially through all the alternates for a given item, and selects the first match; if there are several alternates that have the same modifier sequences and key equivalent, only the first one will be available to the user. ♦

**Figure 3-2** Scenario demonstrating Dynamic Items





We want to create a menu that supports three key equivalents (the default Command-, plus Option- and Shift-), and uses Dynamic items. \*





First we decide how we'd like the menu to look and behave. In our example, we try to enforce a simple interface rule when appropriate: the Option-key toggles between single and multiple objects (e.g. "Add File..." vs. "Add Files...").

Now that we know what items will be in the menu, and where and when they will appear, we need to decide how to indicate flag the different features on each menu item. In particular, we decide which bits in the menu item's style field will be used as feature flags.

|   |                 |                 |
|---|-----------------|-----------------|
| 1 | Bold            |                 |
| 2 | <i>newGroup</i> | <i>newGroup</i> |
| 3 | Underline       |                 |
| 4 | <b>Dynamic</b>  | <b>Dynamic</b>  |
| 5 | Shadow          |                 |
| 6 | <b>Option</b>   | <b>Option</b>   |
| 7 | <b>Shift</b>    | <b>Shift</b>    |
| 8 | Unused          |                 |

In this example, we will set the preferences programmatically. We fill out a MenuPrefsRec record to represent our feature template, and call MDEF\_SetMenuPrefs. Note that we set the requiredModifiers field as well (that is, in our menu, the default modifier key for key equivalents is Command-).

|         |  |
|---------|--|
| Group 1 |  Add File...    |
|         |  Add Files...   |
|         |  Add Folder...  |
|         |  Add Folders... |
| Group 2 | Remove Objects   |
|         | Remove All Objects   |
| Group 3 | <i>Rebuild</i>   |
|         | Rebuild All  |
| Group 4 | Save %S  |
|         | Save All %S  |
| Group 5 | Close Window %W  |
|         | Close All Windows %W   |
| Group 6 | Print %P   |
|         | Print All Files %P   |
|         | Print Folder... %P   |
|         | Print Folders... %P  |

|  |  |
|--|--|
|  Add File...<br>Remove Objects<br>Rebuild<br>Save %S<br>Close Window %W<br>Print %P             |  Add Files...<br>Remove All Objects<br>Rebuild All<br>Save All %S<br>Close All Windows %W<br>Print All Files %P |
| <b>default</b>   | <b>with Option key down</b>  |
|  Add Folder...<br>Remove Objects<br>Rebuild<br>Save %S<br>Close Window %W<br>Print Folder... %P |  Add Folders...<br>Remove Objects<br>Rebuild<br>Save %S<br>Close Window %W<br>Print Folders... %P               |
| <b>with Shift key down</b>   | <b>with Option and Shift keys down</b>   |

We decide we want to use the Italic, Outline, Condense and Extend styles to control the various feature settings. This gives us a style field and feature template as represented on the left. We can now assign these preference settings to the menu programmatically using MDEF\_SetMenuPrefs, or via an 'Xmenu' resource.

```
WITH prefs DO BEGIN
    optionKeyFlag.s := [condense];
    shiftKeyFlag.s := [extend];
    cmdKeyFlag.s := [];
    controlKeyFlag.s := [];
    isDynamicFlag.s := [outline];
    forceNewGroupFlag.s := [italic];
    useCallbackFlag.s := [];
    requiredModifiers.s := cmdKey;
END;
MDEF_SetMenuPrefs(hMenu, @prefs);
```

Finally, we build our menu using our favorite resource editor. Note that all the items are outlined (since they all belong to one of the groups of dynamic items), and that, with one exception, we don't need to indicate where one group ends and another starts, since Mercutio implicitly uses a change of key equivalent character as an end-of-group marker.

- ← explicit end-of-group (italic style)
- ← implicit end-of-group (separator, not in outline style)
- ← implicit end-of-group (new key equiv.)
- ← implicit end-of-group (new key equiv.)

\* This example is based on the sample code in the Mercutio package; a notable difference is that the sample code also uses the Underline style to flag Callback items.

## Callback items

---

**Callback items** allow you to determine the contents of a menu item at runtime. This is for situations where you don't know the contents of the item ahead of time. For example, a "File Type" menu might include icons from applications that the user has on the hard drive; you could use dynamic items to pull the icons out of the Desktop Database at runtime.

Mercutio allows you to associate a **callback procedure** with a Mercutio menu, and flag certain items as callback items. Before drawing any callback item, Mercutio will load in the item data (item text, icon handle, item modifiers, enabled state, etc.) from the MENU resource, then call the callback procedure in your application to give you the opportunity to modify the data before the item is displayed.

### Note

Style bits are interpreted before your callback procedure is called. Since the item text is drawn in whatever style is returned from the callback procedure, your callback procedure can set the item's text style safely without affecting the modifier keys or other features. ♦

## The Callback Procedure

---

The callback procedure is called for each menu item whose `useCallback` flag is set. The callback procedure receives a record with the item's data, as well as a message field which indicates what fields the procedure may change. The callback procedure has the following header:

```
PROCEDURE MyCallbackProc (menuID: integer; previousModifiers:
integer; VAR itemData: RichItemData);
```

The `previousModifiers` field is supplied in case you want to compare the current modifiers against those held down the last time this item was referenced.

A callback procedure gets called several times for each menu item because Mercutio requires different information at different times. The `cbMsg` field indicates what fields Mercutio wants filled in. There are three values it can take:

```
cbBasicDataOnlyMsg = 1;
cbIconOnlyMsg = 2;
cbGetLongestItemMsg = 3;
```

Depending on the value of `cbMsg`, different fields are filled in and available for changing by the callback procedure (See "RichItemData" on page 25.)

Listing 0-4 shows the structure of a typical callback procedure.

**Listing 0-4** Sample callback procedure

```

PROCEDURE MyCallbackProc (menuID: integer;
                          previousModifiers: integer;
                          VAR itemData: RichItemData);
BEGIN
  itemData.changedByCallback := false;
  CASE itemData.itemID OF

    3 :
      BEGIN
        CASE itemData.cbMsg OF
          cbBasicDataOnlyMsg : BEGIN
            ... fill in data for item 3
          END;
          cbIconOnlyMsg : BEGIN
            ... fill in icon data for item 3
          END;
          cbGetLongestItemMsg: BEGIN
            ... fill in longest data for item 3
          END;
          itemData.changedByCallback := true;
        END;

    7 :
      BEGIN
        CASE itemData.cbMsg OF
          cbBasicDataOnlyMsg : BEGIN
            ... fill in data for item 7
          END;
          cbIconOnlyMsg : BEGIN
            ... fill in icon data for item 7
          END;
          cbGetLongestItemMsg: BEGIN
            ... fill in longest data for item 7
          END;
        END;
        itemData.changedByCallback := true;
      END;

    ... et al for other callback menu items ...
  END; { CASE itemData.itemID }
END;

```

## Using Mercutio

## RichItemData

This record stores information about the contents, behavior, and visual appearance of a single menu item. The first four fields are the same as the four-byte header for each menu item in a MENU resource.

```

TYPE  richItemData = PACKED RECORD
    iconID: Byte;
    keyEq: char;
    mark: char;
    textStyle: FlexStyle;
    itemID: integer;
    itemRect: rect;
    flags: itemFlagsRec;
    iconType: ResType;
    hIcon: Handle;
    pString: stringPtr;
    itemStr: str255;
    cbMsg: integer;
END;
richItemPtr = ^richItemData;

```

**Field descriptions**

|           |   |
|-----------|---|
| iconID    | Resource ID of the item's icon.                           |
| keyEq     | ASCII value of the key equivalent.                        |
| mark      | ASCII value of the mark symbol.                           |
| textStyle | Font face to use when displaying the menu item.           |
| itemID    | Position of the item in the menu.                         |
| itemRect  | Coordinates of where the item will be drawn.              |
| flags     | Mercutio feature flags (interpreted from the item style). |
| iconType  | 4-character resource type for the icon.                   |
| hIcon     | Handle to the icon data.                                  |
| pString   | Pointer to the item string.                               |
| itemStr   | Storage for the item string.                              |

**DESCRIPTION**

If you supply a handle to a new menu icon in `hIcon`, be sure to set the `iconType` field as well.

The `iconType` field indicates to what type of icon data `hIcon` points. Usually this is one of the standard resource types ('ICON', 'sicon', 'cicon'). It can also be 'suit' if you use System 7 icon suites.

## Using Mercutio

The `hIcon` field is a handle to icon data. Mercutio will dispose this handle after drawing the icon unless the callback procedure sets the `dontDisposeIcon` flag in the `flags` field.

The `pString` field points to the menu item's text string. By default, it points to the beginning of the `itemStr` field which holds the item text from the `menuHandle`. You can change it to point to another string, or change the `itemStr` field directly.

The `cbMsg` field takes one of 3 values:

- `cbBasicDataOnlyMsg = 1`: fill in the non-icon data fields only.
- `cbIconOnlyMsg = 2`: fill in the icon data fields only.
- `cbGetLongestItemMsg = 3`: fill in the longest possible menu item. Mercutio uses this item to determine the maximum width of the menu. You should determine what the longest item would be (i.e. longest item text, biggest icon, most modifiers, etc.), and return it.

The following sections explain what fields are available to you for changing.

- $\rightarrow$  : Mercutio fills this field with data, but you should not change it.
- $\leftrightarrow$  : Mercutio fills this field with data; you may change it.
- $\leftarrow$  : Mercutio needs this field; you should fill it in.
- $\otimes$  : This field contains invalid data; you should not change it.

Table 3-1 explains what fields are available to you for changing depending on the value of `cbMsg`.

**Table 3-1** Field permissions for callback messages in `cbMsg`

| Field                  | <code>cbBasicDataOnlyMsg</code> | <code>cbIconOnlyMsg</code> | <code>cbGetLongestItemMsg</code> |
|------------------------|---------------------------------|----------------------------|----------------------------------|
| <code>iconID</code>    | $\leftrightarrow$               | $\leftrightarrow$          | $\leftrightarrow$                |
| <code>keyEq</code>     | $\leftrightarrow$               | $\otimes$                  | $\leftrightarrow$                |
| <code>mark</code>      | $\leftrightarrow$               | $\otimes$                  | $\leftrightarrow$                |
| <code>textStyle</code> | $\leftrightarrow$               | $\otimes$                  | $\leftrightarrow$                |
| <code>itemID</code>    | $\rightarrow$                   | $\rightarrow$              | $\rightarrow$                    |
| <code>itemRect</code>  | $\rightarrow$                   | $\rightarrow$              | $\rightarrow$                    |
| <code>flags</code>     | $\leftrightarrow$               | $\otimes$                  | $\leftrightarrow$                |
| <code>iconType</code>  | $\otimes$                       | $\leftrightarrow$          | $\leftrightarrow$                |
| <code>hIcon</code>     | $\otimes$                       | $\leftarrow$               | $\leftrightarrow$                |
| <code>pString</code>   | $\leftrightarrow$               | $\otimes$                  | $\leftrightarrow$                |
| <code>itemStr</code>   | $\leftrightarrow$               | $\otimes$                  | $\leftrightarrow$                |
| <code>cbMsg</code>     | $\rightarrow$                   | $\rightarrow$              | $\rightarrow$                    |

## Using Mercutio

If your callback procedure does change any of the fields, you must set the `changedByCallback` flag in the `itemFlagsRec`.

**IMPORTANT**

Mercutio relies on the setting of the `changedByCallback` flag to determine whether any information has changed. If the flag is not set, Mercutio will ignore any changes you made to the record. ♦

## ItemFlagsRec

---

This is a record structure used to flag the features of a given menu item. It is derived by the MDEF from the `style` field and the `MenuPrefsRec` as described above.

```

TYPE  ItemFlagsPtr = ^ItemFlagsRec;
      ItemFlagsRec = PACKED RECORD
          { high byte }
          forceNewGroup: boolean;
          isDynamic: boolean;
          useCallback: boolean;
          controlKey: boolean;
          optionKey: boolean;
          unused10: boolean;
          shiftKey: boolean;
          cmdKey: boolean;

          { low byte }
          isHier: boolean;
          changedByCallback: boolean;
          Enabled: boolean;
          hilited: boolean;
          iconIsSmall: boolean;
          hasIcon: boolean;
          sameAlternateAsLastTime: boolean;
          dontDisposeIcon: boolean;
      END;
```

**Field descriptions**

|                            |  |
|----------------------------|--|
| <code>forceNewGroup</code> | A Boolean value indicating whether or not the menu item forces the start of a new group of item alternates for a dynamic item. Mercutio ignores this field if the <code>isDynamic</code> field is not set to <code>TRUE</code> . |
| <code>isDynamic</code>     | A Boolean value indicating whether or not the menu item is part of a group of item alternates for a dynamic item.  |
| <code>useCallback</code>   | A Boolean value indicating whether or not the menu item will call a callback procedure before being drawn. Mercutio ignores this field   |

## Using Mercutio

|                         |   |
|-------------------------|---|
|                         | if the menu has no callback procedure associated with it (See “MDEF_SetCallbackProc” on page 33.)   |
| controlKey              | A Boolean value indicating whether or not the menu item uses the Control key as a modifier for the key equivalent. Ignored if the keyEq field of the RichItemData record is empty.  |
| optionKey               | A Boolean value indicating whether or not the menu item uses the Option key as a modifier for the key equivalent. Ignored if the keyEq field of the RichItemData record is empty.   |
| unused10                | Reserved for future use.  |
| shiftKey                | A Boolean value indicating whether or not the menu item uses the Shift key as a modifier for the key equivalent. Ignored if the keyEq field of the RichItemData record is empty.  |
| cmdKey                  | A Boolean value indicating whether or not the menu item uses the Command key as a modifier for the key equivalent. Ignored if the keyEq field of the RichItemData record is empty.  |
| isHier                  | A Boolean value indicating whether or not the menu item is a hierarchical menu item. Mercutio sets this to true if the data from the MENU resource shows a value of hMenuCmd (\$1B) in the item’s keyEq field.  |
| changedByCallback       | A Boolean value indicating whether or not any of the fields in this record or in the RichItemData record have been changed by the callback procedure.   |
| enabled                 | A Boolean value indicating whether the menu item will be drawn enabled or disabled.   |
| hilited                 | A Boolean value indicating whether the menu item will be drawn hilited or not.  |
| smallIcon               | A Boolean value indicating whether or not the menu item is a hierarchical menu item. Mercutio sets this to true if the data from the MENU resource shows a value of (\$1E) in the item’s keyEq field, or if the item’s icon field shows a value of 500 or greater (See “Support for small icons” on page 13.) |
| hasIcon                 | A Boolean value indicating whether or not the menu item has an icon associated with it. Mercutio sets this to true if the data from the MENU resource shows a non-zero value in the item’s icon field.  |
| sameAlternateAsLastTime | A Boolean value indicating whether or not the item has changed since the last time the callback was called for this item. If set to true and the item is a dynamic item, Mercutio will not redraw it to avoid unnecessary flicker.  |
| dontDisposeIcon         | A Boolean value indicating whether or not Mercutio should dispose the handle to icon data. Ignored if hIcon is NIL.   |

## DESCRIPTION

This set of flags control most of Mercutio’s features, including whether or not an item is a callback item or not.

## Mercutio and resource IDs

---

Please do not renumber the MDEF or Font resource IDs in the Mercutio package. The IDs must remain intact for Mercutio to work.

- Since Mercutio overrides the toolbox `MenuKey` procedure, it needs to support regular menus as well as Mercutio menus. To distinguish between the two, Mercutio checks the MDEF field in each menu, and compares it against its resource ID of 19999. Thus, if you renumber Mercutio, it will no longer recognize menus that it controls.
- Applications that use Mercutio must store font information in their resource forks. The IDs of this font could potentially interfere with fonts installed in the user's System Folder. In order to avoid having the Font Manager manipulate the fonts in the application fork, their IDs must be from in a particular range of numbers:

Developers who use a font as a method of storing symbols which are used in a palette, or store a font in the resource fork of their application for some other special purpose, should use numbers in the range 32,256-32,767. This range is not associated with any script.  
(from "TE2 : Font Family Numbers").

We recognize that this restriction on renumbering is undesirable and are considering alternative solutions for future releases of Mercutio.

# The MDEF Messages

MDEFs are code resources that function by responding to a series of messages sent by the Menu Manager. There are 7 messages that all System 7 compatible MDEFs should recognize; Mercutio recognizes these 7 plus several others needed to control the various features and settings in Mercutio menus.

MDEFs are procedures with the following header:

**Listing 0-5** Menu definition procedure header

```
PROCEDURE MyMDEF (message: Integer; theMenu: MenuHandle;  
                  VAR menuRect: Rect; hitPt: Point;  
                  VAR whichItem: Integer);
```

The parameters are interpreted differently depending on the value of the message parameter. Table 4-1 describes all of the messages understood by the Mercutio MDEF.

**Table 4-1** Mercutio MDEF Messages (italics indicate non-standard messages)

| Message                   | Call  |
|---------------------------|---|
| <i>areYouCustomMsg</i>    | Used to determine whether the MDEF is one of Digital Alchemy's custom MDEFs or not. If so, <code>menuRect.topLeft</code> will contain the 4 character resType 'CUST'. |
| <i>getVersionMsg</i>      | Returns the MDEF version number in <code>menuRect.topLeft</code> (typecast to a longint)  |
| <i>getCopyrightMsg</i>    | Returns a <code>StringHandle</code> to the MDEF copyright information in <code>menuRect.topLeft</code> .  |
| <i>setCallbackMsg</i>     | Set the callback procedure for the MDEF to the procedure pointed to in <code>hitPt</code> .   |
| <i>stripCustomDataMsg</i> | Dispose any custom data structures setup by the MDEF.   |

## The MDEF Messages

**Table 4-1** Mercutio MDEF Messages (*italics indicate non-standard messages*)

| Message                  | Call   |
|--------------------------|--|
| <i>setPrefsMsg</i>       | Set menu preferences (feature template) to the <code>MenuPrefsRec</code> record pointed to in <code>hitPt</code> .   |
| <i>mMenuKeyMsg</i>       | Given a keyboard event, determine whether it maps to a key equivalent in one of the currently installed menus (both custom and standard menus are checked).  |
| <i>mDrawItemStateMsg</i> | Draw menu item <code>itemID</code> in rectangle <code>menuRect</code> . If <code>hitPt.h = 1</code> , the item is drawn in hilited state. If <code>hitPt.v = 0</code> , the item is drawn disabled.                                      |
| <i>mDrawMsg</i>          | Draw the entire menu within <code>menuRect</code>  |
| <i>mChooseMsg</i>        | Unhilit menu item <code>itemID</code> , hilit the item under point <code>hitPt</code> , and return the ID of that item in <code>itemID</code> .  |
| <i>mSizeMsg</i>          | Calculate the size of the menu and store values in the <code>menuHeight</code> and <code>menuWidth</code> fields of <code>theMenu</code>   |
| <i>mPopUpMsg</i>         | Calculate the rectangle in which the popup should appear, and return it in <code>menuRect</code> .   |
| <i>mDrawItemMsg</i>      | Draw menu item <code>itemID</code> in rectangle <code>menuRect</code> .  |
| <i>mCalcItemMsg</i>      | Calculate the rectangle of menu item <code>itemID</code> . The <code>top</code> and <code>left</code> fields of <code>menuRect</code> should be filled in; the MDEF will calculate the <code>right</code> and <code>bottom</code> fields |

**Note**

Table 4-1 is provided for informational purposes only; in order to encourage compatibility with future versions of Mercutio, you should use the wrapper routines provided in the C and Pascal API files, described in Chapter 5, “Mercutio API Routines.” ♦

# Mercutio API Routines

---

The following routines are provided in the C and Pascal application programming interface (API). At the very least, you will need to use the MDEF\_MenuKey routine to trap key equivalents using the Mercutio MDEF.

## MDEF\_MenuKey

---

The MDEF\_MenuKey function finds the menu and item associated with a keypress.

```
FUNCTION MDEF_MenuKey (theMessage: longint; theModifiers: integer;
hMenu: menuHandle): longint;
```

|              |   |
|--------------|---|
| theMessage   | The message field from an Event record          |
| theModifiers | The modifiers field from an Event record        |
| hMenu        | A handle to a menu that uses the Mercutio MDEF. |

### DESCRIPTION

MDEF\_MenuKey is a replacement for the standard toolbox call MenuKey for use with the Mercutio MDEF. Given the keypress message and modifiers parameters from a standard event record, it checks to see if the keypress is a key-equivalent for a particular menu item.

If you are currently using custom menus (i.e. menus using a Mercutio MDEF), pass the handle to one of these menus in hMenu. If you are not using custom menus, pass in NIL or another menu, and MDEF\_MenuKey will use the standard MenuKey function to interpret the keypress.

As with MenuKey, MDEF\_MenuKey returns the menu ID in high word of the result, and the menu item in the low word.

## MDEF\_SetCallbackProc

---

The MDEF\_SetCallbackProc procedure sets the callback procedure.

```
PROCEDURE MDEF_SetCallbackProc (menu: MenuHandle; theProc:
procPtr);
```

|         |  |
|---------|--|
| menu    | A handle to the specified menu record. |
| theProc | A pointer to the callback procedure.   |

### DESCRIPTION

The MDEF\_SetCallbackProc procedure sets the procedure that will be called for each item before it is drawn. The procedure is also called during the SizeMenu message call. The callback routine should have the following header:

```
PROCEDURE MyGetItemInfo (menuID: integer;
                        previousModifiers: integer;
                        VAR itemData: RichItemData);
```

|                  |  |
|------------------|--|
| menuID           | The ID of the menu that is being referenced. Note: the itemData record contains the ID of the item itself.   |
| previousModifier | The state of the modifiers the last time the callback procedure was called. You may want to use this to set the dirty flag (see below). Only the high-byte of this parameter is valid. |
| itemData         | A parameter block data structures. The validity and read-write state of the fields is defined by the cbMsg field as described below.   |

For more information on how to use callback procedures with Mercutio, see “Callback items” on page 3-23, or check the sample code that came with Mercutio.

## MDEF\_CalcItemSize

---

The MDEF\_CalcItemSize procedure calculates and returns the coordinates of the rectangle in which the menu item will be displayed.

```
PROCEDURE MDEF_CalcItemSize (menu: MenuHandle; item: integer;
VAR theRect: rect);
```

|         |  |
|---------|--|
| menu    | A handle to the specified menu record.   |
| item    | The number of the menu item.   |
| theRect | Holds the top and left coordinates of the desired rectangle. When the procedure returns, the bottom and right coordinates are filled in. |

**DESCRIPTION**

MDEF\_CalcItemSize will calculate the height and width for a given menu item. It assumes that theRect.top and theRect.left of theRect are filled in; Mercutio will fill in theRect.bottom and theRect.right.

**MDEF\_DrawItem**

The MDEF\_DrawItem procedure draws a menu item in the specified location.

```
PROCEDURE MDEF_DrawItem (menu: MenuHandle; item: integer;
destRect: rect);
```

|          |   |
|----------|---|
| menu     | A handle to the specified menu record.        |
| item     | The number of the menu item.                  |
| destRect | The rectangle where the item should be drawn. |

**DESCRIPTION**

The MDEF\_DrawItem procedure will draw a given item in the rectangle you specify. This is useful for drawing popup menus that should show the current menu item as it would be drawn by Mercutio (Figure 5-1). The sample code provided with Mercutio demonstrates how to do this.

**Figure 5-1** Popup menu drawn with MDEF\_DrawItem

**Test the popup message:**

**MDEF\_DrawItemState**

The MDEF\_DrawItemState procedure draws a menu item at a specified location and in the specified enabled and hilited states.

```
PROCEDURE MDEF_DrawItemState (menu: MenuHandle; item: integer;
destRect: rect; hilited, enabled: boolean);
```

|          |  |
|----------|--|
| menu     | A handle to the specified menu record.           |
| item     | The number of the menu item.                     |
| destRect | The rectangle where the item should be drawn.    |
| hilited  | Whether the item should be drawn hilited or not. |

## Mercutio API Routines

enabled                      Whether the item should be drawn enabled or not.

## DESCRIPTION

The `MDEF_DrawItemState` procedure allows you to override the menu item's highlighted and enabled settings.

## MDEF\_StripCustomMenuData

---

The `MDEF_StripCustomMenuData` procedure will remove any custom data allocated by the Mercutio MDEF for the specified menu.

```
PROCEDURE MDEF_StripCustomMenuData (menu: MenuHandle);
```

menu                      A handle to the specified menu record.

## DESCRIPTION

`MDEF_StripCustomMenuData` will remove any custom data allocated by the Mercutio MDEF. Use this before writing a Mercutio menu to disk as a MENU resource.

▲ **WARNING**

If you write your MENU resource to disk *before* calling `MDEF_StripCustomMenuData`, it may not initialize correctly the next time you load the menu and have Mercutio display it. ▲

## MDEF\_SetMenuPrefs

---

The `MDEF_SetMenuPrefs` procedure sets the feature preferences for the specified menu.

```
PROCEDURE MDEF_SetMenuPrefs (menu: MenuHandle; pPrefs:
MenuPrefsPtr);
```

menu                      A handle to the specified menu record.

pPrefs                    A pointer to the Mercutio preferences data structure.

## DESCRIPTION

The `MDEF_SetMenuPrefs` procedure lets you determine which style bits for the menu items will be interpreted as feature flags for the MDEF.

The `pPrefs` pointer should point to a `MenuPrefs` record which holds the settings for the current menu. Mercutio makes a copy of these preferences and stores them internally, so the data structure may be disposed of after the call to `MDEF_SetMenuPrefs` returns.

You can call `MDEF_SetMenuPrefs` repeatedly to change the preferences of a menu.

If the preferences you are setting can impact the height or width of the menu (e.g. allowing new modifier keys which could make certain menu items wider), you must call `CalcMenuSize` on the menu after the `MDEF_SetMenuPrefs` call.

## MDEF\_SetKeyGraphicsPreference

---

The `MDEF_SetKeyGraphicsPreference` procedure sets whether a menu will display non-printing keys as graphics or as text strings.

```
PROCEDURE MDEF_SetKeyGraphicsPreference (menu: MenuHandle;
preferGraphics: boolean);
```

|                             |  |
|-----------------------------|--|
| <code>menu</code>           | A handle to the specified menu record.   |
| <code>preferGraphics</code> | A boolean indicating whether non-printing key equivalents should be drawn as graphic icons or as text. |

### DESCRIPTION

The `MDEF_SetKeyGraphicsPreference` procedure lets you determine how all Mercutio menus display non-printing keys such as Page Up, Page Down, Home, Function Keys, etc.

To see an example of the effect of changing this preference, see “Example of non-printing characters as key equivalents” on page 17.

## MDEF\_SetSmallIconIDPreference

---

The `MDEF_SetSmallIconIDPreference` procedure sets the ID above which all icons will be drawn as small sized icons.

```
PROCEDURE MDEF_SetSmallIconIDPreference (menu: MenuHandle;
iconsSmallAboveID: integer);
```

|                                |  |
|--------------------------------|--|
| <code>menu</code>              | A handle to the specified menu record.   |
| <code>iconsSmallAboveID</code> | An integer representing the resource ID above which icons will be drawn small. |

### DESCRIPTION

The `MDEF_SetSmallIconIDPreference` procedure lets you determine what size icons in menu items are drawn. As with the System MDEF, menu items with `$1E` in the `cmdChar` field of the menu item will have icons drawn at a 16 by 16 pixel size, rather than the default 32 by 32 pixel size.

## Mercutio API Routines

However, because the is also used for key equivalents, the System MDEF doesn't allow small icons in menu items with key equivalents. To address this limitation, the Mercutio MDEF draws any icons with resource IDs above 500 at the small size (16 by 16 pixels). MDEF\_SetSmallIconIDPreference lets you change this resource ID threshold.

## MDEF\_IsCustomDef

---

The MDEF\_IsCustomDef function returns TRUE if the menu is being controlled by a Digital Alchemy MDEF.

```
FUNCTION MDEF_IsCustomDef (menu: MenuHandle): boolean;
```

menu                      A handle to the specified menu record.

### DESCRIPTION

This function checks an "author code" embedded in the MDEF.

#### Note

MDEF\_IsCustomDef will return false if another MDEF is controlling the menu. ♦

## MDEF\_GetCopyright

---

The MDEF\_GetCopyright function returns a Pascal string containing the copyright notice for Mercutio.

```
FUNCTION MDEF_GetCopyright (menu: MenuHandle): str255;
```

menu                      A handle to the specified menu record.

### DESCRIPTION

The string returned by MDEF\_GetCopyright is the appropriate notice to use in manuals and About boxes. For more information on when to use this, see "Licensing and Distribution" on page 7-41.

## MDEF\_GetVersion

---

The MDEF\_GetVersion function returns a version number for Mercutio.

```
FUNCTION MDEF_GetVersion (menu: MenuHandle): longint;
```

menu                      A handle to the specified menu record.

## DESCRIPTION

The version number returned by `MDEF_GetVersion` is in the same format as the “short version” information as normally stored in a 'vers' resource.

# Compatibility

---

Mercutio attempts to be compatible with the System 7 MDEF default behavior whenever possible. This chapter summarizes the differences in appearance and behavior between Mercutio and the System 7 MDEF (aside from the obvious additional features that Mercutio provides.)

## Saving MENU resources

---

Mercutio stores custom data at the end of the menu's handle. This data must be initialized at application startup. Because of this, it is important that you don't save your MENU resources back to your application's resource fork. If you do, the next time you launch the program, Mercutio will use the old outdated data.

Note that any such UI changes that need to persist from one session to the next should be stored in the Preferences folder, not to the application itself. This is particularly important in order to let your application run off of CD-ROMs and other locked volumes.

## Hierarchical menu glitch

---

When moving back and forth between two adjacent hierarchical menus, the hierarchical menu sometimes appears near the top of the parent menu item, and sometimes near the bottom. According to Apple's Developer Technical Support, this is a bug in the Menu Manager that the system MDEF hacks to get around. Because this is a relatively minor cosmetic glitch, we decided against making illegal forays into the internal Menu Manager structures in order to fix it.

## Better scroll positioning

---

The system MDEF occasionally leaves a gap at the bottom of a scrolling menu instead of extending to the bottom of the screen; Mercutio doesn't do this. This is probably a side-effect of some assumptions they make for speed optimizations.

## Compatibility

## MenuKey compatibility

---

The standard toolbox `MenuKey` routine ignores the shift key; `MDEF_MenuKey` doesn't. That is, if you hit shift-command-T and there is only a command-T item, `MDEF_MenuKey` returns 0, whereas `MenuKey` would have returned the command-T item.

The standard `MenuKey` routine allows you to select (via command keys) from a hierarchical menu item whose parent menu item or parent menu is disabled. This is a bug that `MDEF_MenuKey` fixes.

## NowMenus incompatibility

---

`NowMenus` from `NowSoftware` is incompatible with custom MDEFs (not just `Mercutio`). The only incompatibility relates to `NowMenus`' ability to redefine key equivalents. `NowSoftware` acknowledges this limitation of `NowMenus`. For more information, contact [utilities@nowsoft.com](mailto:utilities@nowsoft.com).

# Licensing and Distribution

---

This chapter describes the terms under which you may use Mercutio in your applications or distribute the Mercutio package. We've tried to come up with a licensing scheme that is fair and allows shareware and freeware developers to use Mercutio without paying a licensing fee.

## IMPORTANT

The “Mercutio Software License.pdf” document contains the legal software license. This chapter is only here to help explain the license. ▲

## Overview

---

Normally, to use Mercutio in your application, you license it from Digital Alchemy and pay a licensing fee. A more attractive alternative is our **Poor Man's License**, which allows you to use Mercutio provide you credit us in your About box and manual, and send us a copy of the software. If you are interested in licensing Mercutio for fee, or according to other terms, contact Digital Alchemy directly.

## Software License

---

Usage of the Mercutio MDEF is subject to a software license and licensing fee. The license is in the accompanying file entitled “**Mercutio Software License.pdf**”. The license lets you use and distribute the Mercutio MDEF in a single Macintosh application. To do so, you must agree to do the following:

- Notify us that you are using Mercutio. You can register online using a form available through <http://www-leland.stanford.edu/~felciano/da/mercutio/>
- Include a particular copyright statement in your documentation (see “Mercutio Software License.pdf” for details)
- Pay a licensing fee or use the Poor Man's License as described below.

## Use and Distribution of the Mercutio MDEF

---

You must include the following text in your manual or on-line documentation:

**Mercutio MDEF from Digital Alchemy  
Copyright © Ramon M. Felciano 1992-1996, All Rights Reserved**

All licenses are non-transferable, single-application licenses, and include free upgrades to future versions of Mercutio. Contact Digital Alchemy for details about licensing fees.

Licensing fees and terms are subject to change without notice. All technical support will be provided via e-mail.

### Poor Man's License (summary)

---

The licensing fee is waived through the Poor Man's License. Under the Poor Man's License, you can use Mercutio for free in your application if you do the following:

1. Include the following text in your About box:

**Mercutio MDEF copyright © Ramon M. Felciano 1992-1996**

2. Include the following in your User manual or on-line documentation:

**Mercutio MDEF from Digital Alchemy  
Copyright © Ramon M. Felciano 1992-1996, All Rights Reserved**

3. Send us a copy of your product (including free upgrades to any future versions that still use the MDEF). The address is provided in the front of this manual. If the software includes full on-line documentation, you can send it via e-mail.
4. Notify us as soon as you start distributing software that contains Mercutio.

If you are developing shareware or freeware that will be distributed across the Internet, you don't need to explicitly send me a copy. Just notify me when the software is released, tell me where I can find it, and include me in your database of registered users.

### Other terms

---

As mentioned above, other licensing terms are available—contact Digital Alchemy for details.

## Use and Distribution of the Mercutio MDEF Package

---

The Mercutio MDEF Distribution Package contains a fully functional version of the MDEF. You may copy, share or give the package to whomever you wish provide you always distribute the package in its entirety and no modifications are made to its contents; you may not sell, trade it, or otherwise charge for it.

Licensing and Distribution

The Mercutio MDEF Distribution Package may be included as part of a CD-ROM or other collection of developer or on-line materials provided you notify Digital Alchemy of this fact.

# Troubleshooting

---

This chapter will help you solve any problems you might run into or answer question you may have about Mercutio. Feel free to send us e-mail if you have any other questions.

## Basic checklist

---

If you are having trouble getting Mercutio to work, the following checklist may help narrow down the problem.

- ☐ You must have the “.MDEF Font” FONT and NFNT resources installed in your resource fork.
- ☐ The Mercutio MDEF must be installed in the resource fork of your application. It’s resource ID must be 19999.
- ☐ You must assign tell your menus to use the Mercutio MDEF rather than the System MDEF by setting the MDEF field of the MENU resource to 19999.
- ☐ If you want to use any Mercutio features other than the Shift- and Option- key support, you must set your preferences with an Xmenu resource or programmatically using the MDEF\_SetMenuPrefs call.
- ☐ MDEF\_SetMenuPrefs affects a single menu, so you must issue a separate call for every menu.
- ☐ To be safe, call CalcMenuSize after every call to MDEF\_SetMenuPrefs. This isn’t required, but it will make sure that Mercutio keeps the height and width of menus correct.
- ☐ You must replace every call to MenuKey with a call to MDEF\_MenuKey.
- ☐ The last parameter to MDEF\_MenuKey *must* be a handle to a menu that uses Mercutio.

## Common symptoms and remedies

---

If you run into difficulties getting up and running with Mercutio, these tips may help you overcome them.

### **Some of my key equivalents have become page up/down, function keys, etc.!**

---

- Mercutio maps lowercase key equivalent characters to non-printing keys such as page up/down (See “Support for non-printing key-equivalents” on page 17.) If you installed Mercutio and are getting these key equivalents unexpectedly, make sure the characters in the `keyEq` field of the menu items are uppercase, not lowercase.

### **The width/height of my menu is all screwed up!**

---

- Make sure you call `CalcMenuSize` after you set the preferences for a given menu.

### **My callback routine isn't being called!**

---

- Check the `MenuPrefsRec` or `Xmnu` resource for that menu to make sure that the `useCallbackFlag` field has a style associated with it.
- Make sure the menu item(s) in question have that style bit set.
- Make sure you've called `MDEF_SetCallbackProc` to link your procedure to that menu. Remember that you need to do this for every menu that uses that procedure.

### **My menu item isn't appearing in the correct text style.**

---

- If that style is missing, you are probably using it as a feature flag. Check the `MenuPrefsRec` or `Xmnu` resource for that menu.

### **All I get is the Shift- and Option- modifiers.**

---

- Remember that the only features that work “out of the box” are Shift- and Option-. If you want your menus to support the Control-key, dynamic items, or item callbacks, you must set those preferences with `MDEF_SetMenuPrefs`. See “MenuPrefsRec” on page 10.

### **My menu items have extra modifier keys.**

---

- You have some extra feature flags set. Check the `MenuPrefsRec` or `Xmnu` resource for that menu, as well as the style bit settings for the menu items in question.

### **How can I have different key equivalent characters in the alternates for a given dynamic item?**

---

- You can't.

**The modifier keys show up correctly, but the menu doesn't respond to keypresses**

---

- Make sure you are calling MDEF\_MenuKey, not the Toolbox MenuKey routine.
- Make sure the last parameter to MDEF\_MenuKey is a menuHandle for a menu that uses Mercutio.

**ResEdit complains about illegal fields in the Xmnu TMPL resource.**

---

- You're probably using the TMPL resource designed for Resorcerer. Copy a fresh one from the "Xmnu Template for Resedit" file.

**My icons are being drawn smaller than normal.**

---

- Check the resource ID of the icons in question. Remember that, by default, Mercutio draws any icon with a resource ID between 500 and 512 as a small icon. This range can be changed programmatically—See "Support for small icons" on page 13.

**My popup menu isn't appearing in Geneva 9 point anymore**

---

- Version 1.3 now supports drawing popup menus in the window font. Look at the Sample Code to see how this is done. If the routines from the Sample Code don't work for you, contact us.

## Frequently Asked Questions

---

If you have other questions about Mercutio, these may answer them for you. If not, please feel free to contact Digital Alchemy directly.

**What menu do I need to pass into the API routines??**

---

You can pass *any* menu that uses Mercutio. The menu parameter that all the API routines have simply gives them a way to find Mercutio by examining the MDEF field of the menuHandle.

**Our product includes three applications that use Mercutio. How many licenses do we need?**

---

Three—a single license covers a single Macintosh application. However, to take advantage of the Poor Man's License, you only need to send one copy of the product, assuming it includes all three applications.

The credit information should be in all three About boxes and user manuals.

**Does the license include upgrades to Mercutio?**

---

Yes. As long as you abide by the terms of the license, you can use any future versions of Mercutio.

## Troubleshooting

**What about upgrades to my product?**

---

If you are taking advantage of the Poor Man's License, you should send me a copy whenever you release a product upgrade.

**To use the Poor Man's License, is it OK if we include your name in the Read Me file instead of the About box?**

---

No.

**To use the Poor Man's License, what text needs to be displayed in the About box / user manual?**

---

Use `MDEF_GetCopyright` to get the correct copyright notice.

**Why is this thing called "Mercutio" anyway?**

---

When I first started programming Mercutio, I was taking a Shakespeare class at Stanford. Part of the class included playing out selected scenes from the plays we were reading; I played Mercutio, Romeo's hothead brother, and was pretty immersed in the character at the time.

In other words, it seemed like a good idea at the time. :)

**What was the "Shakespeare MDEF Collection" and what happened to it?**

---

Mercutio 1.0 was first released in early 1992. Many developers requested features such as additional modifier keys and support for non alphanumeric key-equivalents. Including all of the features in a single MDEF would have used up all of the style bits; the Shakespeare MDEF Collection was to address these requests by providing a suite of MDEFs with a variety of feature combinations. We subsequently came upon the idea of storing the style-bit-to-feature mapping external to the MDEF, which allowed us to provide all the features and still let developers choose which style-bits to give up. This obviated the need for a collection of MDEFs.

The Shakespeare MDEF Collection may still make an appearance sometime in the future once it becomes unrealistic to add more features to Mercutio. Until then, however, we'll leave it to the Halls of Vaporware fame!

# Glossary

**Callback item** A menu item that has its `useCallbackFlag` set so that Mercutio calls a callback procedure before displaying the item. See also **callback procedure**.

**Callback procedure** An application procedure that can perform modifications on menu item data before the menu item is displayed. Mercutio calls this routine for items that have their `useCallbackFlag` set. See also **callback item**.

**Dynamic item** An item that changes appearance and behavior depending on what modifier keys are being held down. A dynamic item is controlled by a set of item alternates, each of which represents a different appearance and behavior for the item. For example, a dynamic item might be controlled by two alternates: the default one, and one that shows up if the user holds down the Option-key. See also **item alternates**.

**Feature flag** A style bit used to turn a Mercutio feature on or off for a given menu item. This is the way Mercutio determines which modifier keys a menu item uses, whether it is a dynamic item, etc.

**Feature template** A record that determines which style bits in the menu item's style field will be used as style flags and which ones will be used as feature flags. See also **feature flag**, **style flag**.

**Item alternates** A set of menu items, grouped sequentially in MENU resource, that can appear at the same location in a menu depending on what modifiers are being held down. See also **dynamic items**.

**Mercutio menu** A menu controlled by the Mercutio MDEF.

**Modifier keys** The Shift, Option, Command, Control, and Caps Lock keys. For the purposes of use with Mercutio, the Caps Lock key is ignored.

**Non-printing keys** Keys on the Macintosh keyboard that don't typically have ASCII representations and don't appear in printed documents. Examples are the function keys, arrow keys, page up and page down.

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**Style-bit remapping** The mechanism by which Mercutio interprets certain style bits as feature flags instead of style flags. See also **feature flag**, **style flag**.

**Style flag** A style bit used to turn a text style on or off for a given menu item. This is the way style bits are normally used by the toolbox and the System MDEF.