

Upgrader 1.2.3 & ModifierTool 1.2.3

Technical Guide



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Introduction

The Upgrader application provides a programming environment for creating assistant-like programs to guide users through the on-screen panels necessary to complete an installation or setup task. Each **panel** is a window that prompts the user to perform one step of the task. The panels are implemented by **plug-ins**, which are individual files containing code written by a developer that can be assembled together into a single user experience. To control the order of the plug-ins and provide the information required by each plug-in, the developer creates a **data file**. The Upgrader application, plug-in files and data file are collected together by a developer into a group of files referred to as an **Upgrader-based program**. One example of a shipping Upgrader-based program is the Install Mac OS 8.5 program used to install Apple's Mac OS 8.5 system software.

The companion application, **ModifierTool**, allows modifications of an existing data file or creation of a new one. ModifierTool enables administrators and developers to leverage from existing Upgrader-based programs to create customized solutions, such as tailoring the Install Mac OS 8.5 program for a organization's internal needs.

We begin our discussion with a brief overview of the Upgrader and ModifierTool applications, then present a road map to help readers decide which parts of this documentation are pertinent to their needs.

About Upgrader

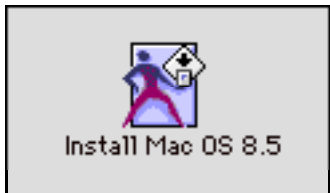
Programs created using the Upgrader application as their foundation will normally be a collection of many files, all working together to present a single, cohesive user experience. This type of modularity enables new programs to be created more quickly and existing programs, such as the Install Mac OS 8.5 program, to more easily be modified for future requirements. Not only does the modularity of an Upgrader-based program make later modifications easier, but it also enables complex disk layouts, such as those required on floppies or multiple CD-ROMs.

An Upgrader-based program is normally assembled from four types of files:

Upgrader application - the icon the user double-clicks to start the program.



Upgrader data file - contains information defining the behavior of the program.



Upgrader plug-in files - implements the user experience of each panel.

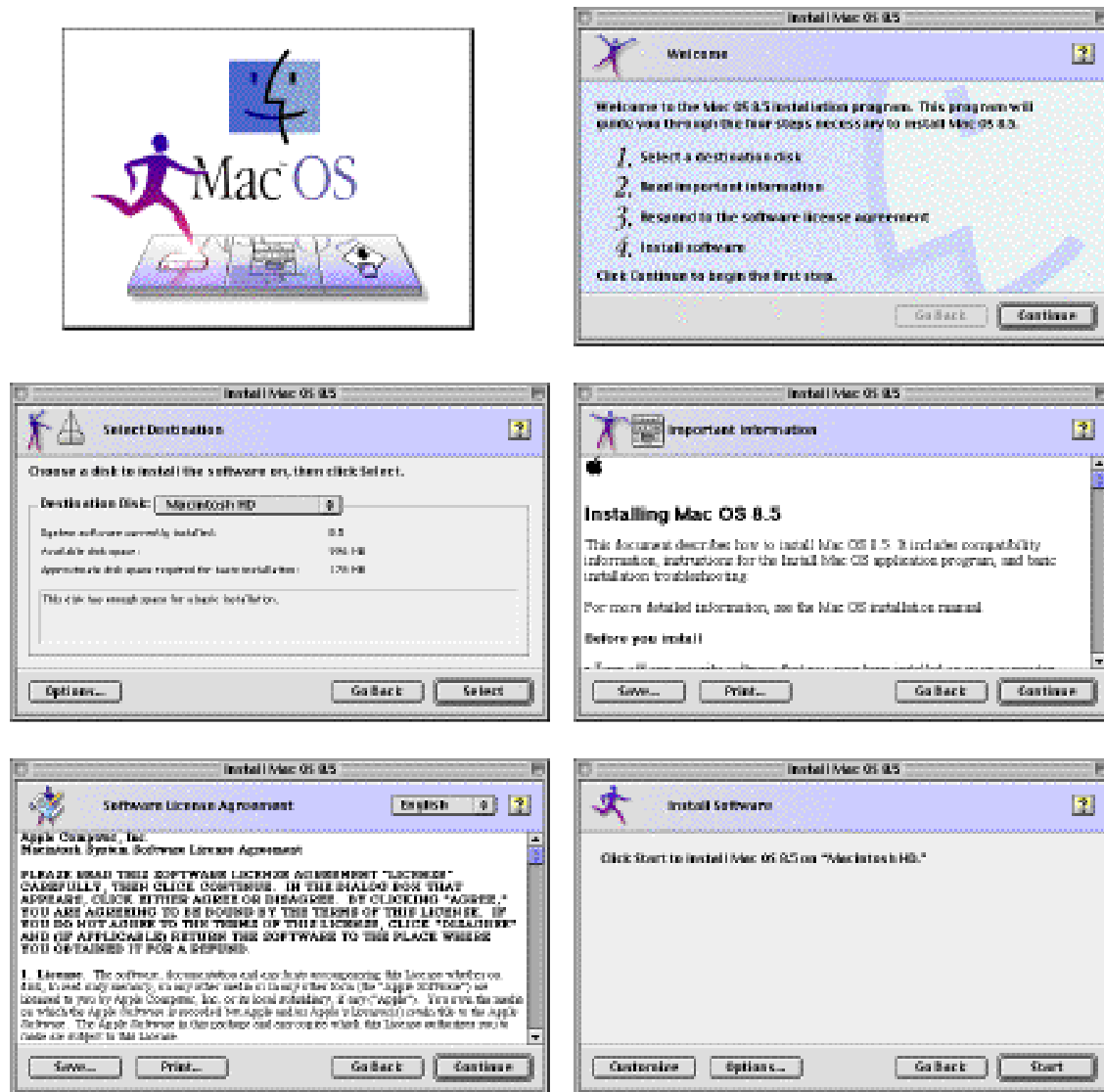


Application helper files - programs that perform specific tasks required by a plug-in.



From this collection of files the users see a simple series of panels, which guides them through a series of steps. Figure 1-1 shows the panels a user sees when upgrading to Mac OS 8.5.

Figure 1-1 The Install Mac OS 8.5 program panels



For the most basic Upgrader-based program, you'll need to understand the purpose of three file types: the Upgrader application file, plug-in files, and the data file.

Upgrader Application File

The Upgrader application file provides a set of services for implementing panels. Plug-ins use the **Upgrader API** to help handle user interaction through routines to receive user events, control panel navigation, display text and dialogs, and more. The file also contains resources that are needed by all the plug-ins, such as 'DLOG' resources, help icon 'PICT's and other common resources.

The user will double-click the Upgrader application to start an Upgrader-based program. The Upgrader application file is often referred to as the “shell” because it manages the relationship between all plug-in files and the data file.

System Requirements

The Upgrader application is designed to run on 68020-based and newer machines running system

software version 7.0 or later. Apple's primary testing has been performed on PowerPC machines running 7.1.2 or later, so developers wishing to support earlier versions are encouraged to perform additional testing on older configurations.

Partition Size

The Upgrader application is shipped with a partition of 1300K, but some plug-ins may require a larger partition to work correctly. Use the following equation to help you determine the appropriate partition size:

Partition size = plug-in memory requirements + size of preloaded resources + 300K

Calculate the "plug-in memory requirements" value by choosing the plug-in with the highest memory requirements. The plug-in documentation should provide the memory requirements of the plug-in. If none is provided, use 200K.

If your Upgrader-based program spans multiple source disks, then you'll need to add the "size of preloaded resources" by using the Memory Required by Preloaded Resources value displayed in the main data file window of ModifierTool.

Upgrader Plug-in Files

A plug-in implements the actual code to draw the panels and interact with the user. Each plug-in file usually manages one or more panels, but it may also operate without any user interaction. Since only one plug-in runs at a time, it controls the Upgrader-based program until it relinquishes control to another plug-in.

A plug-in file normally contains a code resource and various resources needed by the plug-in. The plug-in might also depend on information stored outside the plug-in file, such as shared resources stored in the Upgrader application file, administrator-controlled resources in the data file, and possibly other helper applications that are run either in the background or foreground to support the plug-in.

Upgrader Data File

The Upgrader data file contains information read by the shell and plug-ins to present the panels in the correct order and display the panel contents. The developer of a new Upgrader-based program creates a data file containing the information needed by the plug-in contained in the program. After the release of the developer's Upgrader-based program, clients (such as administrators) can augment the information in the data file to adapt the program to their needs.

Each plug-in usually requires one "preference" resource in the data file, which may reference many other resources contained in the data file. To help manipulate these many resources, editing tools are normally provided by the developer.

Locating the Data File

When the user double-clicks the Upgrader application icon, the Upgrader searches for a single data file in the same folder as the application. An alert allows the user to choose a data file if none or more than one is found.

The developer should always lay out the CD-ROM or floppy to encourage the user to double-click the Upgrader application, instead of the data file. This lessens the chance of another — perhaps incompatible — version of the Upgrader application being launched by the Finder. We suggest hiding the data file outside of the disk or folder's window border.

Choosing an Editing Tool

To create and/or modify the resources in the data file, developers and administrators have three options: use a Rez compiler in concert with the UpgraderTypes.r file (in addition to a resource definition file provided by each plug-in developer), use Resorcerer and our template file, or use the ModifierTool application. All the necessary files are included on the SDK.

Each editing method has its own benefits, but Apple recommends using ModifierTool, since this application makes it easier to maintain the integrity of complex data files. This document will focus on the ModifierTool approach to editing data files, but you'll find a description of the actual shell and plug-in resources in their respective reference sections.

Apple encourages developers who write their own plug-ins to also write a ModifierTool editor so administrators, present and future, can easily modify the plug-in's functionality.

About ModifierTool

Most developers and administrators will use ModifierTool to create and change the information in their Upgrader data file. The architecture of ModifierTool application and its editor files has been designed to match the modular design of Upgrader and its plug-in files. ModifierTool contains a built-in editor for the information the Upgrader application uses to load and run each plug-in in the desired order.

Using This Document

Since not all readers of this document will have the same goals, we present several strategies based on how you may need to interact with the Upgrader and ModifierTool applications.

If you just need to make changes to the Install Mac OS 8.5 program or a program created by someone else, read:

- the “Editing Upgrader Plug-ins” chapter.
- the chapters for the plug-ins you are editing.

If you need to create a new Upgrader-based program using existing plug-ins, read:

- the first section of the “Editing Upgrader Plug-ins” chapter
- any documentation that came with the plug-ins you wish to use.

If you need to write a new plug-in, read:

- the chapter “Writing Upgrader Plug-ins”
- the chapter “Writing ModifierTool Editors”, if you want to make it easy for administrators to modify your plug-in.

Editing Upgrader Plug-ins

This chapter describes how to edit an Upgrader data file using the ModifierTool application.

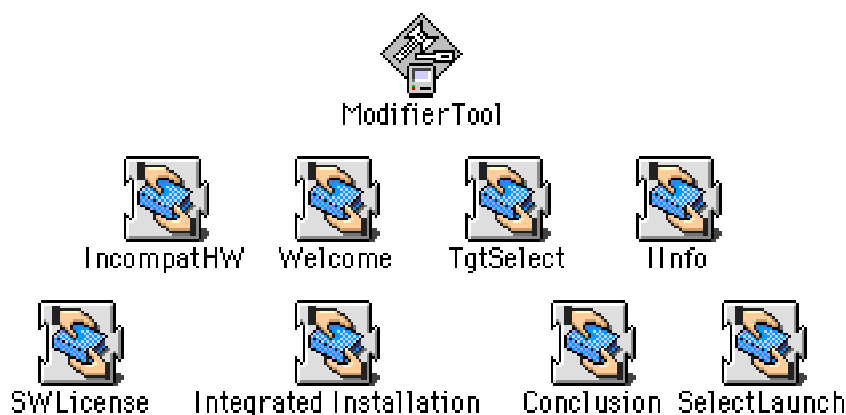
Using ModifierTool

To use ModifierTool, you must have at least the following minimum configuration:

- PowerPC-based computer
- Mac OS 7.1.2 or later
- 2 MB of available memory

Before you begin, make sure all the editors you'll need are in the same folder as the ModifierTool application. Figure 2-1 shows the typical layout of the ModifierTool application and its editor files.

Figure 2-1 ModifierTool application and editor files



We'll use the Install Mac OS 8.5 program in most of our examples as we take the reader through the editing tasks necessary to create and modify the Upgrader application-owned resources in the data file.

Creating and Opening a Data File

To create a new data file, launch ModifierTool and choose New from the File menu. You will be asked to name the data file and choose a location to save it. Once ModifierTool creates the sequence resource and default settings, the main data file window will open (see Figure 2-2), ready for you to begin defining the plug-ins that will make up your Upgrader-based program.

If you need to edit an existing data file, launch ModifierTool and choose Open from the File menu then select the desired data file. You may also drop the data file icon on the ModifierTool icon to open the file.

NOTE

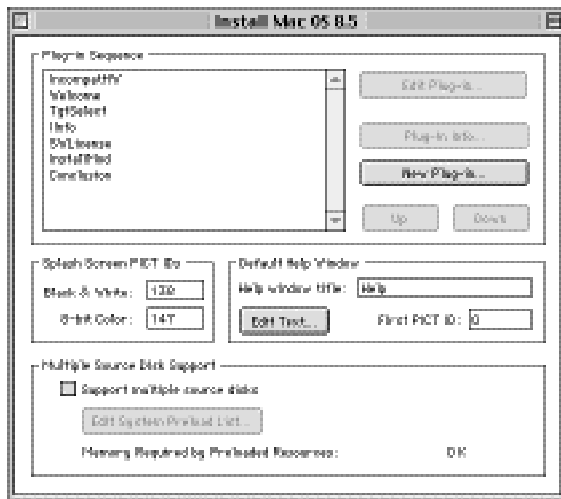
ModifierTool cannot open a data file that is on locked media or is already open for modification by another application.

Since only one data file can be open at a time, you will need to close the currently open data file by choosing Close from the File menu before choosing New or Open.

Using the Main Data File Window

The main data file window provides the user with access to the individual plug-in editors, as well as Upgrader application preferences that control attributes such as the order of the plug-ins, the splash screen picture, the default help text, and control over preloaded resources. This window is always present as long as the data file is open. If you close this window, the data file will be closed. If changes were made in this window (including adding or removing plug-ins), you will be asked if you wish to save your changes before closing the window or quitting the ModifierTool application.

Figure 2-2 Main data file window



The items in the main data file window are explained in detail below.

Plug-in Sequence:

Plug-in List

Shows the current list of plug-ins in the default order they will be presented to the user. Click on the name of a plug-in to select it.

Edit Plug-in...

Opens the editing window for the selected plug-in. This

window is implemented by an editor file with the same name as the plug-in file and in the same folder as the ModifierTool application. If an editor cannot be found, the plug-in info window is opened instead.

Double-clicking on a plug-in name is a shortcut for opening a plug-in's editor. If no editor exists, the plug-in info window is opened instead.

| | |
|----------------------|---|
| Plug-in Info... | Shows the plug-in info window for the selected plug-in so attributes of the plug-in can be changed. See the section "Using the Plug-in Info Window" for more information about this window. |
| New Plug-in... | Shows an empty plug-in info window. If the user clicks OK in the plug-in info window, the new plug-in entry will added to the plug-in list. If a plug-in is selected in the list when clicking New Plug-in, the new plug-in will be inserted before the selected plug-in; otherwise, it will be added to the end of the list. |
| <hr/> | |
| Up | Moves the selected plug-in one entry closer to the beginning of the plug-in list. |
| Down | Moves the selected plug-in one entry closer to the end of the plug-in list. |
| Default Help Window: | |
| Help Window Title | The window title of the help window if the plug-in does not set the help window's name upon entry. |
| First PICT ID | The 'PICT' resource ID of the first picture to be displayed in the help text. See the section "Using the text editor window" in this chapter for more information about adding pictures to your text. |
| Edit Text... | Opens the text editor window, so the text can be changed. See the section "Using the text editor window" for more information about editing text. |

NOTE

Make sure to save the data file if you clicked Remove in the file reference window.

Splash Screen PICT IDs:

| | |
|---------------|---|
| Black & White | Resource ID for your black and white splash screen PICT resource. This is a B&W version of the splash screen for monitors showing less than 256 colors. Enter 0 if you do not wish to provide a separate B&W picture. |
|---------------|---|

8-bit Color

Resource ID for your 8-bit color splash screen PICT resource. This is a color version of the splash screen for monitors showing 256 colors or more.

The default splash screen provided with Mac OS 8 data file can be replaced, if necessary. Two 'PICT' resources should be created, a color version and a B&W version. The dimension of your splash screen picture should be no larger than 320 pixels in height by 500 pixels in width. The Upgrader application will automatically resize the window based on the size of the picture.

Once you have created your two new 'PICT' resources follow these instructions to replace the default splash screen resources.

Use a resource editing program, such as ResEdit or Resorcerer, to open the data file.

1. Remove the existing splash screen 'PICT' resources of IDs 138 and 147.
2. Paste your new color splash screen 'PICT' resource into the data file and renumber its ID to 147.
3. Paste your new B&W splash screen 'PICT' resource into the data file and renumber its ID to 138.
4. Quit the resource editing program and open the Upgrader application to verify that your splash screen is displayed.

If you choose to use different IDs for your splash screen 'PICT' resources make sure to change the IDs in this window.

Multiple Source Disk Support

When your Upgrader-based program spans multiple disks, it will be important to instruct Upgrader to preload resources to reduce disk swaps by selecting the Support multiple source disks checkbox. If your first floppy/CD-ROM is also bootable, then you'll also need to specify the System file resources to preload in order to allow the boot disk run off line.

Support multiple source disks checkbox

Causes ModifierTool to create 'RES#' resources in your data file so Upgrader can preload the appropriate resources for each plug-in to allow the volume containing the data file to be ejected.

NOTE

After checking or unchecking this option, you must open and save each plug-in to resync the 'RES#' resource for each plug-in.

Edit System Preload List...

Opens the resource preload editor window so the list of System resources to be preloaded at launch time can be modified. You'll only need to worry about this list if you ship a floppy/CD-ROM disk set which allows the user to boot from the first floppy disk. If you do, then you may need to add System resources to this list that plug-ins or helper applications require during their operation. If you fail to add these

additional resources to this list, extra disk swaps back to the System disk will be required, which can degrade the user experience of your Upgrader-based program.

Memory Required by Preloaded Resources value

Displays the calculated size of all data file resources that will be preloaded by Upgrader. You may need to increase the memory partition of the Upgrader application if this value is large. See the section “Partition Size” in the first chapter for more information.

Using the Plug-in Info Window

The Upgrader needs to know basic information about each plug-in, such as the plug-in’s name and where to find the plug-in file. The plug-in info window allows the user to edit this information (see Figure 2-3).

Figure 2-3 Plug-in info window



The items in the plug-in info window are explained in detail below.

Run Once checkbox

Prevents the user from going back to this plug-in. The Go Back button in the Upgrader-based program will automatically be dimmed if the preceding plug-ins are set to run once.

The Environmental Filter plug-in included with the Install Mac OS 8.5 program uses this feature, since the user’s machine only needs to be checked once at the beginning.

Plug-in Name

Any name that describes the plug-in. Some plug-ins may require the name of another plug-in to jump to during their execution. Use the name entered when referring to this plug-in.

Pref. Rsrc. ID

A 4-byte value passed to the plug-in upon initialization. Most plug-ins will want to use the low-word of this value to store the resource ID of its preference resource. This allows for a single plug-in file to be used for multiple plug-ins, each with a different resource ID.

NOTE

Don’t change the preference resource ID once you’ve created a new plug-in entry. If you do, ModifierTool will lose track of the existing preference resource (including the data you’ve entered) and a new preference resource will be created the next time you open the plug-in’s

editor.

| | |
|-------------------|--|
| Cancel | Ignores any changes made in the plug-in info window. |
| OK | Keeps any changes made in the plug-in info window. |
| Plug-in Location: | |
| Edit... | Opens the file reference editing window to edit the location of the plug-in file. ModifierTool uses the name of the selected plug-in file as it appears on the disk to locate the proper editor. |

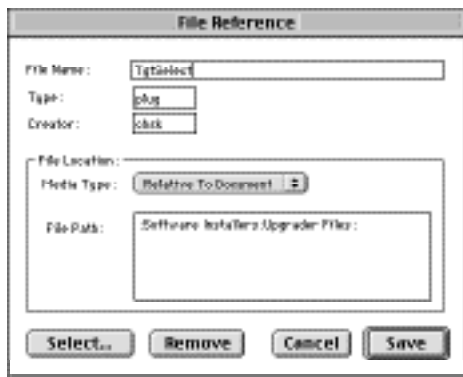
NOTE

Make sure to click OK and then save the data file if you clicked Remove in the file reference window.

Using the File Reference Window

The modular nature of an Upgrader-based program requires references to numerous files. Windows that contain fields referencing a file usually have an Edit button which presents the file reference window (see Figure 2-4). From here the user can fill in the details required to locate the file during the operation of the Upgrader-based program.

Figure 2-4 File reference window



The items in the file reference window are explained in detail below.

| | |
|-----------|--|
| File Name | Name of the file. Limited to 31 characters. |
| Type | Four character “type” of the file. Leave this field empty (no characters, not even spaces) to cause Upgrader to ignore the file’s type when locating the file. |
| Creator | Four character “creator” of the file. Leave this field empty (no characters, not even spaces) to cause Upgrader to ignore the file’s creator when locating the file. |
| Select... | Opens the standard Get File dialog for choosing a file. After |

clicking OK in the Get File dialog, ModifierTool enters information about the chosen file, overwriting the current contents of the fields.

Make sure to select the desired media from the Media Type pop-up menu before clicking the Select button to have ModifierTool generate the appropriate path. To generate a correct relative path, place the data file you are editing in its actual location on your source disk before clicking Select.

File Location:

Media Type

The setting of this pop-up menu tells the Upgrader application how to find the specified file. If media type is set to “Relative to Document”, then the Upgrader-based program expects a relative path from the folder that contains the Upgrader application. If media type is set to “Full Path to Floppy” or “Full Path to CD-ROM” then the path is assumed to be a full path beginning with the name of the floppy or CD-ROM disk.

To support creating a net install from a set of CD-ROM or floppy disks, the Upgrader-based program will first look in the folder containing the data file to find a folder with the same name as the CD-ROM or floppy disk before asking the user to insert the disk.

Changing the Media Type pop-up menu does not automatically modify the contents of the Path field.

Path

This should be a relative path from the folder containing the data file or a full path beginning with the name of the floppy or CD-ROM disk. Use of a full or relative path depends on the media type. See the “Media Type” field description for more information.

If the path is relative, then it should start with a colon. A full path should start with the name of the floppy or CD-ROM disk, instead of a colon.

Using the Text Editor Window

Most text stored in the data file can be updated using the text editor window.

NOTE

Since the text editor window has no controls for changing the font, font size, font style or any other text-related attribute, we suggest that you store your text in a separate document using your favorite word processor. To change the text, copy the text from your word processor, then paste the text into the text editor window.

Upgrader’s text display engine supports pictures embedded within the text that is compatible with SimpleText documents. The text display engine uses a special character (usually Option-space, but it can be set by the plug-in) to define where the top of the picture should be drawn. See *Appendix A* for more information on embedding pictures in text displayed in an Upgrader panel.

Figure 2-5 Text editor window



The items in the text editor window are explained in detail below.

| | |
|--------|---|
| Remove | Deletes the text resource (type: 'TEXT' & 'styl') from the data file and closes the text editor window. |
|--------|---|

NOTE

Make sure to click Save in the window from which you opened the text editor window to correctly update the data file.

| | |
|--------|---|
| Cancel | Closes the text editor window without changing the text resource. |
|--------|---|

| | |
|------|---|
| Save | Updates the text resource in the data file with the contents of the window. |
|------|---|

Data File Reference

Resources

These resources are contained in the data file.

The Sequence Resource ('tsqc')

The sequence resource is the single most important resource used by the Upgrader. It contains the default sequence of plug-ins, specific flags for each plug-in, the IDs of the resources used to find plug-ins, the IDs of resources which are used to preload plug-in resources and other data which isn't directly used by the plug-ins, such as the IDs of splash screen 'PICT's, etc.

```
#define    ShellFlags                                     \
    fill bit[16]                                         /* Reserved */

type kSequenceResourceType {
    switch {
        case format2:
            key integer = 2;                               // Format version
            ShellFlags;                                   // Flags
            integer BWSplashPict;                          // B&W splash screen picture - 'PICT' Rsrc ID
            integer ColorSplashPict;                       // 8-bit color splash screen picture - 'PICT' ID
            integer systemResListID;                       // System file preload list - 'RES#' ID
```

```

integer helpPanelResID;           // Dialog ID of help window - 'DITL' Rsrc ID
integer defaultHelpTitleStrResID; // Help window title - 'STR ' Rsrc ID
integer defaultHelpTextResID;    // Default help text - 'TEXT' Rsrc ID
integer defaultHelpBasePICTResID; // First picture in help text - 'PICT' Rsrc ID
pstring;                         // First plug-in name
align word;
unsigned integer = $$CountOf(pluginList);
wide array pluginList {
    unsigned longint onlyRunOnce = 1;    // Plug-in flags
    pstring;                            // Plug-in name
    align word;
    pstring;                            // Default next plug-in name
    align word;
    unsigned longint;                   // RefCon value
    unsigned integer;                   // Plug-in file location - 'flrf'Rsrc ID
    unsigned integer;                   // Data file preload list - 'RES#'Rsrc ID
};
};
};

```

Field descriptions

| | |
|---------------------------------|--|
| B&W Splash 'PICT' ID | <p>The ID of a 'PICT' resource to be displayed when the main monitor has a color depth of less than 256 colors. Use 0 if you do not wish to provide a separate B&W picture.</p> <p>The dimension of your splash screen picture should be no larger than 320 pixels in height by 500 pixels in width. The Upgrader application will automatically resize the window based on the size of the picture.</p> |
| Color Splash 'PICT' ID | The ID of a 'PICT' resource to be displayed when the main monitor has a color depth of 256 or more colors. |
| System Preload List | <p>The ID of a 'RES#' resource containing a list of the resources that must be preloaded and marked as non-purgeable when the System file is on ejectable media, such as a floppy disk. You'll only need to worry about this list if you ship a floppy disk set which allows the user to boot from the first floppy disk. If you do, then you may need to add System resources to this list that plug-ins or helper applications require during their operation. If you fail to add these additional resources to this list, extra disk swaps back to the System floppy disk will be required, which can degrade the user experience of your Upgrader-based program.</p> |
| Default Help Panel Dialog ID | The ID of the 'DITL' resource of the default help window. This value should be 1050. |
| Default Help Window Title Ref. | The ID of a 'STR ' resource containing the title of the default help window. |
| Default Help Window Text Ref. | The ID of 'TEXT' (and optional 'styl') resource containing the default help text for plug-ins which do not provide their own text. |
| Default Help Window First Pict. | The ID of a 'PICT' resource of the first resource to be displayed in the default help text panel. |
| First Plug-in Name | The name of the plug-in that is to be called first. |
| onlyRunOnce Flag | Use the onlyRunOnce flag if the user should be prevented from going back to this plug-in. The Go Back button in the Upgrader- |

based program will automatically be dimmed if the preceding plug-ins are set to run once.

The Environmental Filter plug-in included with the Install Mac OS 8 program uses this feature, since the user's machine only needs to be checked once during the launch of the program.

| | |
|------------------------|--|
| Plug-in Name | The name of the plug-in to be added to the list. |
| Next Plug-in Name | The name of the default next plug-in that the Upgrader is to look for once this plug-in is finished. |
| RefCon Value | A 4-byte value passed to the plug-in upon initialization. Most plug-ins will want to use the low-word of this value to store the resource ID of its preference resource. This allows for a single plug-in file to be used for multiple plug-ins, each with a different resource ID. |
| Plug-in File Ref. | The ID of an 'flrf' resource which defines the location of the plug-in. Integer values 1 and 0 are reserved for use by the Upgrader. |
| System Preload List ID | The ID of a 'RES#' resource, which contains the types and IDs of all the specific plug-in resources contained within the data file which are to be preloaded. You'll only need to worry about this list if you ship a floppy disk set which allows the user to boot from the first floppy disk. If you do, then you may need to add System resources to this list that plug-ins or helper applications require during their operation. If you fail to add these additional resources to this list, extra disk swaps back to the System floppy disk will be required, which can degrade the user experience of your Upgrader-based program. |

The File Reference Resource ('flrf')

The file reference resource is the standard method of defining the location of a file on your source disks. Plug-in writers will need to create one of these for their plug-in and add it to the data file. The ID of the resource will then need to be added to that plug-in's information in the Sequence resource so that the Upgrader can find the 'flrf' resource and use it to locate the plug-in.

Plug-ins can also use the file reference resource to specify applications, documents and other files that the plug-in uses. Use the routine `PSMakeFSSpecFromFileRefID` to convert a file reference ID into an `FSSpec`.

```
#define    kUnknownMedia    0        // Net install setup on CD-ROM. Use relative path.
#define    kFloppyDiskMedia  1        // Multiple floppy disk set. Use full path.
#define    kCDROMDiskMedia   2        // Multiple CD-ROM disk set. Use full path.

#define    FileRefFlags                                \
    fill bit[16]                                       /* Reserved */

type 'flrf' {
    switch {
        case format0:
            key integer = 0;                // Format version
            FileRefFlags;                  // Flags
            literal longint;                // File Type
            literal longint;                // File Creator
            longint;                        // File Creation Date (optional)
            pstring;                        // File Path
```

```

        align word;
        pstring;                                // File Name
        align word;
    };
};

```

Field descriptions

| | |
|--------------------|--|
| Media Type | <p>This value tells the Upgrader application how to find the specified file. If media type is <code>kUnknownMedia</code>, then the Upgrader-based program expects a relative path from the folder that contains the Upgrader application. If media type is <code>kFloppyDiskMedia</code> or <code>kCDROMDiskMedia</code> then the path is assumed to be a full path beginning with the name of the floppy or CD-ROM disk.</p> <p>To support creating a net install from a set of CD-ROM or floppy disks, the Upgrader-based program will first look in the folder containing the data file to find a folder with the same name as the CD-ROM or floppy disk before asking the user to insert the disk.</p> |
| File Type | The four character “type” of the file. Use 0 to cause Upgrader to ignore the file’s type when locating the file. |
| File Creator | The four character “creator” of the file. Use 0 to cause Upgrader to ignore the file’s creator when locating the file. |
| File Creation Date | The creation date of the file in seconds. Use 0 to cause Upgrader to ignore the file’s creation date when locating the file. |
| File Path | <p>This should be a relative path from the folder containing the data file or a full path beginning with the name of the floppy or CD-ROM disk. Use of a full or relative path depends on the media type. See the “Media Type” field description for more information.</p> <p>If the path is relative, then it should start with a colon. A full path should start with the name of the floppy or CD-ROM disk, instead of a colon.</p> |
| File Name | Name of the file. Limited to 31 characters. |

The Resource List Resource ('RES#')

The resource list resource contains a list of resource type and ID pairs for holding the list of resources to preload. This resource is referenced from the sequence resource to hold the resources to preload from the System file and data file

Plug-in writers can also use a 'RES#' resource located in the plug-in file to preload resources stored in the plug-in file by passing the ID to the `PSCollect` routine.

```

type 'RES#' {
    integer = $$CountOf(ResArray);
    array ResArray {
        literal longint;           // Resource type to preload
        integer;                  // Resource ID to preload
    };
};

```

The Data File Format Resource ('dfmt')

The data file format resource defines the version of the data file, so Upgrader can determine if it can read the data file or not. The user will receive a message if Upgrader cannot open data file because the format resource is incompatible or missing.

```
type 'cfmt' {  
    byte DataFileMajorRevisionNumber;           // The major version number  
    byte DataFileMinorRevisionNumber;          // The minor version number  
};
```

Upgrader application versions and the data file versions they support:

| <u>Upgrader Versions</u> | <u>Data File Versions Supported</u> |
|--------------------------|-------------------------------------|
| 1.1 | 0.3 |
| 1.1.1 - 1.2.3 | 0.4 |

Environmental Filter Plug-in

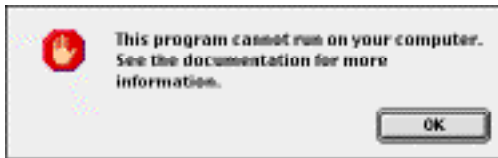
This chapter describes the environmental filter plug-in.

About the Environment Filter Plug-in

The environment filter plug-in alerts the user if the computer model is not supported or the version of system software running is too old. For either case, the user is presented with the alert in Figure 3-1.

Plug-in file name: IncompatHW

Figure 3-1 Incompatible environment alert

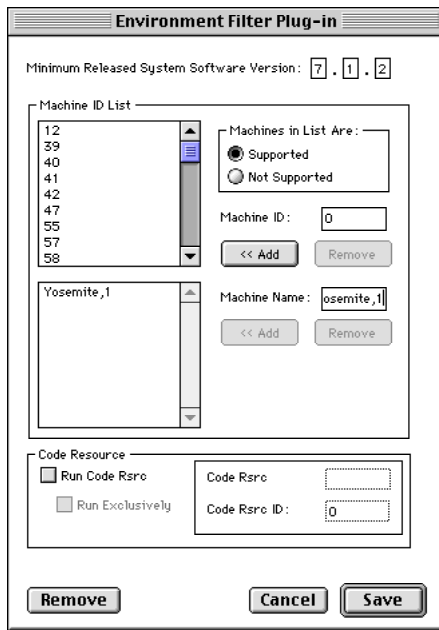


No alert is presented if the environment is sufficient.

Editing the Environment Filter Plug-in

The environment filter editor is shown in Figure 3-2. This editor allows the developer or administrator to change on which computer models and system software versions the Upgrader-based program will run.

Figure 3-2 Environmental Filter plug-in editor



The items in the environment filter plug-in editor window are explained in detail below.

Minimum Released System...

Enter the minimum Mac OS system version on which your Upgrader-based program should be run. Since the Upgrader application requires at least system 7.0, enter a version of 7.0.0 or higher.

Machine Identifier Lists:

These are lists of the computer models supported/not supported (see “Machines in List Are:” below) by your Upgrader-based program. Each computer model is identified by its gestalt 'mach' ID, or its model name, found in the Name Registry. You can add IDs to or remove IDs from this list. See the “Gestalt.h” file on the most recent ETO CD for a list of current gestalt 'mach' IDs.

Machines in List Are:

These radio buttons specify whether or not the computer models in the machine Identifier Lists (see above) are supported for installation.

IMPORTANT

There is only ONE 'mach' ID list and ONE machine name list — selecting a different radio button does not give you different lists. You must decide whether to specify **either** supported machines **or** unsupported machines.

Machine ID

Enter a new machine ID number you wish to add to the ID list. If you enter an ID number that is not in the list, the “<< Add” button will be enabled.

Remove

Removes the selected ID from list.

| | |
|--------------|---|
| << Add | Adds the ID in the “Machine ID” field to the list if it doesn’t already exist. |
| Machine Name | Enter a new machine name you wish to add to the name list. If you enter an name that is not in the list, the “<< Add” button will be enabled. |
| Remove | Removes the selected name from list. |
| << Add | Adds the name in the “Machine Name” field to the list if it doesn’t already exist. |

NOTE

For installations that should only be installed on computers with certain configurations, Apple recommends that the install determines that the needed features are present, rather than making the determination on the class of the computer.

With Upgrader, we recommend that you write a code resource to make this determination, rather than using the 'mach' ID and Machine Name lists.

Code Resource:

The IncompatHW plugin can run code resources, to allow the plugin to perform additional checks, that are not built into the plugin itself.

| | |
|-----------------|--|
| Run Code Rsrc: | Tells the IncompatHW plugin to run the code resource with type specified in the Code Rsrc field and with ID specified in the Code Rsrc ID field. |
| Run Exclusively | With this checkbox checked, the code resource is run, but the checks for minimum system software and machine name and ID are not run. |
| Remove | Deletes the environment filter plug-in resources from the data file and closes the editor window. |
| Cancel | Closes the editor window without updating the environment filter plug-in resources. |
| Save | Updates the environment filter plug-in resources in the data file with the contents of the window. |

Resources

The Environmental Filter Plug-in Preference Resource ('efpr')

```
#define      EFPPrefFormatThreeFlags                                \
    boolean   kMachineListNotSupported, kMachinListSupported;      \
    boolean   kDontUseCodeRsrc, kUseCodeRsrc;                      \
    boolean   kDontRunCodeRsrcExclusively, kRunCodeRsrcExclusively  \
    fill bit[13]

type 'efpr' {
    switch {
        case format3:
            key integer = 3; /* Format version */
            EFPPrefFormatThreeFlags; /* Flags */
            integer; /* Minimum release SSW version */
            integer; /* 'STR#' resource ID for machine names */
            ResType; /* Code Resource type */
            integer; /* Code Resource ID */
            integer = $$CountOf(MachIDArray);
            array MachIDArray {
                integer; /* Machine Gestalt ID */
            };
        };
    };
};
```

kMachineListNotSupported/kMachinListSupported flag

Use the kMachineListNotSupported flag if the machine IDs and machine names listed are not supported by this Upgrader-based program, and therefore should alert the user. Use the kMachinListSupported flag if the machine IDs and machine names listed are the only computer models that are supported by this Upgrader-based program.

kDontUseCodeRsrc/kUseCodeRsrc flag

Use the kUseCodeRsrc flag to run a code resource specified in the 'efpr' to determine if this computer is supported by this Upgrader-based program.

kDontRunCodeRsrcExclusively/kRunCodeRsrcExclusively flag

Use the kRunCodeRsrcExclusively flag to only run the code resource, and skip the built in hardware and system software checks, to determine if this computer is supported by this Upgrader-based program. Use the kDontRunCodeRsrcExclusively flag to run the code resource in addition to the built-in checks. The The IncompatHW plugin will allow the program to run, if all of the checks, including the code resource, state that the program can run on the computer.

Minimum Released System...

The minimum Mac OS system version on which your Upgrader-based program should run. The value is in BCD format. For example, version 7.1.2 would be specified in hex as 0x0712. Since the Upgrader application requires at least system 7.0, the

value must be 0x0700 or higher.

| | |
|-----------------------------|--|
| Machine Name String Rsrc ID | The ID of the 'STR#' resource that contains the list of supported/unsupported computer names. 0 if there is no list of names. |
| Code Rsrc Type | The type of the code resource to be run to perform additional checks. The description of the interface is in the file "IncompatHWExt.h". |
| Code Rsrc ID | The ID of the code resource to be run to perform additional checks. The description of the interface is in the file "IncompatHWExt.h". |
| Gestalt Machine ID | A Gestalt machine ID. See the "Gestalt.h" file on the most recent ETO CD for a list of current gestalt 'mach' IDs. |

Welcome Plug-in

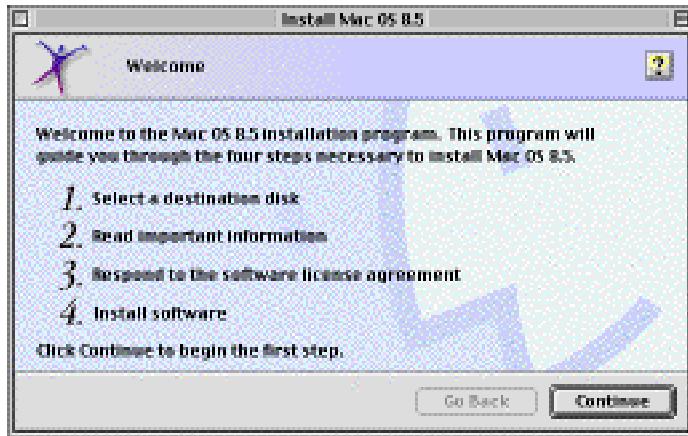
This chapter describes the welcome plug-in.

About the Welcome Plug-in

The welcome plug-in presents a single panel for displaying a combined graphic and text message that describes the rest of the user experience. Figure 4-1 shows the Welcome plug-in panel in the Install Mac OS 8.5 program.

Plug-in file name: Welcome

Figure 4-1 Welcome plug-in panel



The Install Mac OS 8.5 welcome plug-in uses text superimposed on top of a graphic (smiling Mac OS dude with the numbers 1 through 4).


Most plug-ins contain a help window (Figure 4-2), which is accessible via the Help icon button().

Figure 4-2 Help window

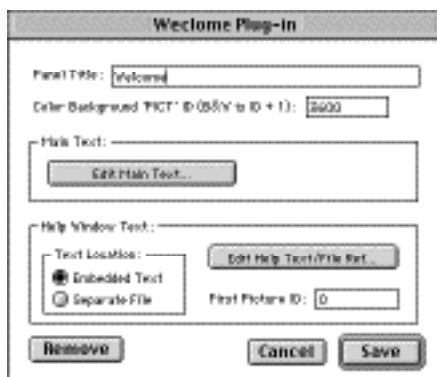


The content of the help window is defined by the developer or administrator. If the user leaves the help window open while moving to another plug-in, the content will automatically be updated with the next plug-in's help text.

Editing the Welcome Plug-in

The welcome editor is shown in Figure 4-3. This editor allows the developer or client to change panel's text, graphic, and help text.

Figure 4-3 Welcome editor window



The items in the welcome plug-in editor window are explained in detail below.

Panel Title

Enter the name that shows at the top of the panel.

Color Background 'PICT' ID

Enter the ID of the 'PICT' resource that you wish displayed in the background of the window. To support displaying a B&W picture when the monitor is displaying less than 256 colors/grays, also add a 'PICT' resource with an ID of 1 plus the ID entered in this field.

The picture must be exactly 205 pixels in height by 506 pixels in width; otherwise, the picture will be scaled to fit the panel. ModifierTool does not provide a facility for adding, removing or changing 'PICT' resources inside the data file. Use your favorite resource editing program, such as ResEdit or Resorcerer, to add your pictures to the data file.

Main Text:

Edit Main Text...

Opens the text editor window so the main text can be changed.

Help Window Text:

Text Location:

Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text *or* a file reference is saved, not both.

Edit Help Text/File Ref...

Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file.

First Picture ID

Enter the ID of the first 'PICT' resource embedded in the text.

Remove

Deletes the welcome plug-in resources from the data file and closes the editor window.

Cancel

Closes the editor window without updating the welcome plug-in resources.

Save

Updates the welcome plug-in resources in the data file with the contents of the window.

Welcome Plug-in Reference

Resources

Welcome Plug-in Preference Resource ('wppr')

```
#define    WPPrefFlags                                     \
    boolean    kReserved1, kReserved2; /* Ignored. */ \
    boolean    kHelpTextInRsrc, kHelpTextInFile; /* Location of help text. */ \
    fill bit[14]                                     /* Reserved */

type 'wppr' {
    switch {
        case format2:
            key integer = 2; /* Format version */
            WPPrefFlags; /* Flags */
            integer; /* Main Text - 'flrf' or 'TEXT' Rsrc ID */
            integer; /* Help text - 'flrf' or 'TEXT' Rsrc ID */
            integer; /* First help text picture - 'PICT' Rsrc ID */
            integer; /* Background color picture (B&W: ID + 1) - 'PICT' Rsrc ID */
            integer; /* Plug-in string list Rsrc ID ('STR#') - 'STR#' Rsrc ID */
    };
};
```

kHelpTextInRsrc, kHelpTextInFile flag

Use kHelpTextInRsrc to specify that the Help Text Reference ID field points to a 'TEXT' resource. Use kHelpTextInFile to specify that the Help Text Reference ID field points to a 'flrf' resource.

| | |
|-----------------------------|--|
| Main Text Reference ID | The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, the ID of a 'flrf' resource if stored in a separate text file. |
| Help Text Reference ID | The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, the ID of a 'flrf' resource if stored in a separate text file. |
| Help Text First Picture ID | The ID of a 'PICT' resource containing the first picture to be embedded in the help text. |
| Color Background 'PICT' ID | The ID of a 'PICT' resource that you wish to be displayed in the background of the window. To support displaying a B&W picture when the monitor is displaying less than 256 colors/grays, also add a 'PICT' resource with an ID of 1 plus the ID entered in this field. The picture must be exactly 205 pixels in height by 506 pixels in width; otherwise, the picture will be scaled to fit the panel. |
| Plug-in string list Rsrc ID | <p>The ID of a 'STR#' resource containing text strings required by the plug-in.</p> <p>'STR#' resource string index definitions:</p> <ol style="list-style-type: none"> 1. Panel title name 2. Help window title |

Target Selection Plug-in

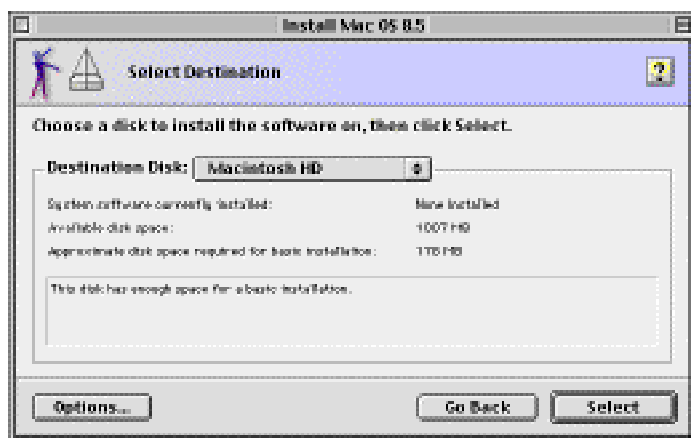
This chapter describes the target selection plug-in.

About the Target Selection Plug-in

The target selection plug-in presents a single panel so users can choose the destination disk. Figure 5-1 shows the target selection plug-in panel in the Install Mac OS 8.5 program.

Plug-in file name: TgtSelect

Figure 5-1 Target selection plug-in panel



The target selection plug-in recommends the hard drive on which the user is most likely to install. The search for a valid destination disk occurs in the following order:

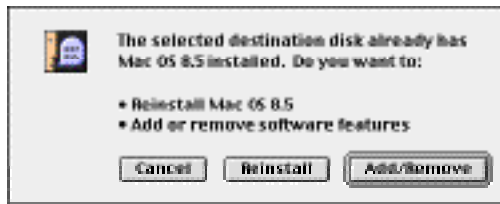
1. Selected device in the Startup Device control panel, and we can install onto it.
2. Select the boot volume, if we can install onto it and it's not ejectable.
3. Select any volume connected SCSI hard disk, and finally any writable device.

If an acceptable destination disk is not found, the disk information is hidden, the Select button is disabled, and instructions of how to proceed are displayed in the message area.

Disk information is displayed for the selected destination disk. If the blessed System Folder exists on the disk, its version number is displayed; otherwise, the text “None Installed” is displayed. In addition to the disk’s available space, the estimated disk space required for the recommend installation provided by the developer or administrator is displayed.

If the installation will install an entire System Folder, then the clean install option is available to the user so a new System Folder can be created, instead of upgrading the existing System Folder on the chosen destination disk. If the user chooses to install into an already upgraded System Folder, then an alert allows the user to skip directly to the custom installation panel (see Figure 5-2), bypassing the important information and software license panels. The reinstall alert will not be shown if the user has selected the clean install option.

Figure 5-2 Reinstall alert

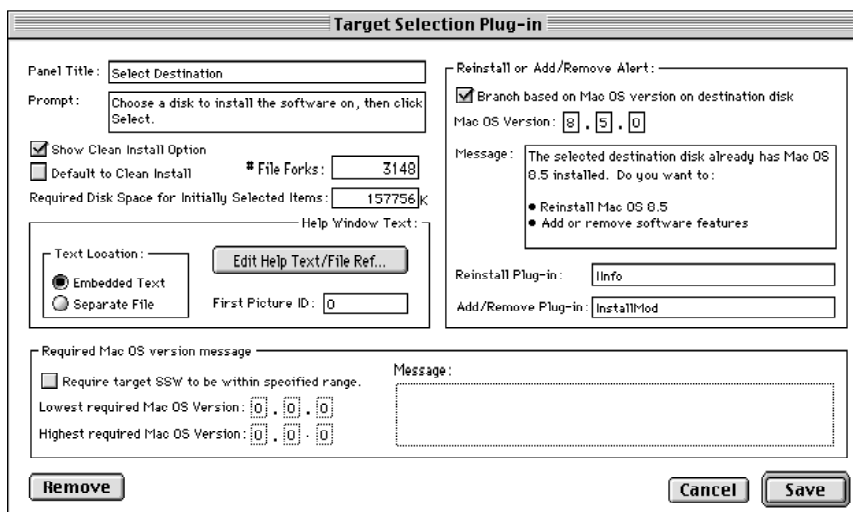


Editing the Target Selection Plug-in

The target selection editor is shown in Figure 5-3. This editor allows the developer or administrator to change the following items in the target selection plug-in panel:

- panel title name
- panel prompt string
- whether a clean install is allowed.
- approximate disk space required by a recommended installation
- reinstall alert version number and text
- help window text

Figure 5-3 Target selection editor window



The items in the target selection plug-in editor window are explained in detail below.

| | |
|-----------------------------------|--|
| Panel Title | Enter the name that shows at the top of the panel. |
| Panel Prompt | Enter the text that prompts the user to perform the action of selecting an appropriate destination disk. |
| Show Clean Install Option | Select this option if the recommended installation can create a valid new System Folder, and the user is allowed to modify this setting. |
| Default to Clean Install | Select this option if the recommended installation can create a valid new System Folder, and a clean install is to be selected by default. |
| Required Disk Space | Enter the raw number of kilobytes (1 kilobyte = 1024 bytes) in the files being copied for the recommended installation. The plug-in will approximate that amount space required by adding this value to the number of file forks multiplied by half the block size of the selected destination disk. See information about “Count The Forks” in the Installation Plug-in chapter to help you determine this value. |
| # File Forks | The number of file forks being copied for the recommended installation. Most Macintosh files have either a data fork, resource fork, or both. The plug-in uses this value to better estimate the required disk space by calculating the extra space beyond the size of the files needed on the destination due to its block size. See information about “Count The Forks” in the Installation Plug-in chapter to help you determine this value. |
| Help Window Text: | |
| Text Location: | Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text <i>or</i> a file reference is saved, not both. |
| Edit Help Text/File Ref... | Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file. |
| First Picture ID | Enter the ID of the first 'PICT' resource embedded in the text. |
| Reinstall or Add/Remove Alert: | |
| Branch based on Mac OS version... | Select this option to present the reinstall alert so the user can jump directly to the custom installation panel when the version of the system software on the destination disk matches. |
| Mac OS Version | Enter the version of system software on the chosen destination disk that will trigger the reinstall alert. This should normally be the same version as the system software being installed. |
| Message | Enter the text to be displayed in the reinstall alert. |
| Reinstall Plug-in | Enter the name of the plug-in to advance to when the Reinstall button is clicked by the user. |

| | |
|----------------------------------|--|
| Add/Remove Plug-in | Enter the name of the plug-in to advance to when the Add/Remove button is clicked by the user. |
| Required Mac OS Version Message: | |
| Required target SSW version... | Select this option to prevent the user from continuing if the version of the system software on the chosen destination disk is not within the specified range. This option is most often used for installations that only upgrade specific versions of Mac OS. |
| Lowest Mac OS Version | Enter the minimal required version of system software on the chosen destination. |
| Highest Mac OS Version | Enter the maximum required version of system software on the chosen destination disk. This should normally be the same version as the system software being installed. |
| Message | Enter the text to be displayed in the message area of the target selection panel. |
| Remove | Deletes the target selection plug-in resources from the data file and closes the editor window. |
| Cancel | Closes the editor window without updating the target selection plug-in resources. |
| Save | Updates the target selection plug-in resources in the data file with the contents of the window. |

Target Selection Plug-in Reference

Global Data

Target Selection Plug-in Global Data

Data types read and set:

| | |
|--------------------|---|
| Destination Disk | The volume refnum of the currently chosen destination disk. (Type: 'trgt', Data: 2-byte signed integer) |
| Clean Install Flag | A flag designating whether the clean install option has been selected by the user. (Type: 'clin', Data: 1-byte Boolean) |

Data types set only:

| | |
|-------------------------------|---|
| Goto Custom Installation Flag | A flag set to true if the user clicks the Add/Remove button in the reinstall alert; otherwise, it is set to false. (Type: 'incu', Data: 1-byte Boolean) |
|-------------------------------|---|

Resources

Target Selection Plug-in Preference Resource ('tspr')

```
#define      TSPPrefFlags                                     \
    boolean   kHelpTextInRsrc, kHelpTextInFile;             /* Location of help text. */ \
    boolean   kDontCheckSystemVersion, kCheckSystemVersion; \
    boolean   kDontShowCleanInstall, kShowCleanInstall;     \
    boolean   kDontRequireTargetSysVersion, kRequireTargetSysVersion; \
    boolean   kDefaultDirtyInstall, kDefaultCleanInstall;   \
    fill bit[11]                                           /* Reserved */

type 'tspr' {
    switch {
        case format4:
            key integer = 4; /* Format version */
            TSPPrefFlags;   /* Preference Flags */
            longint;        /* Actual Kbytes copied for recommended installation */
            integer;        /* System software version being installed, if any */
            integer;        /* Minimum Required System software version */
            integer;        /* Maximum Required System software version */
            integer;        /* Plug-in reference ID if reinstall - 'STR ' Rsrc ID */
            integer;        /* Plug-in reference ID if add/remove - 'STR ' Rsrc ID */
            integer;        /* Help text - 'flrf' or 'TEXT' Rsrc ID */
            integer;        /* First help text picture - 'PICT' Rsrc ID */
            integer;        /* Plug-in string list - 'STR#' Rsrc ID */
            longint;        /* Number of file forks created during installation. */
    };
};
```

kHelpTextInRsrc/kHelpTextInFile flag

Use kHelpTextInRsrc to specify that the Main Text Reference ID field points to a 'TEXT' resource. Use kHelpTextInFile to specify that the Main Text Reference ID field points to a 'flrf' resource.

kDontCheckSystemVersion/kCheckSystemVersion flag

Use kDontCheckSystemVersion to prevent the display of the reinstall alert. Use kCheckSystemVersion to display the reinstall alert if the version of the system software on the chosen destination disk matches the version in the "System software version installed" field.

kDontShowCleanInstall/kShowCleanInstall flag

Use kDontShowCleanInstall to prevent the user from modifying the a clean install setting. This would be the case if your recommended installation does not install an entire System Folder, and kDefaultDirtyInstall has been set. This would also be the case where a clean install is wanted to be performed by default, and this option should not be modified. Use kShowCleanInstall to allow the user to modify the clean install option.

kDontRequireTargetSysVersion/kRequireTargetSysVersion flag

Use kDontRequireTargetSysVersion to ignore the version of the system software on the chosen destination disk. Use kRequireTargetSysVersion to prevent the user from continuing if the version of the system software on the chosen destination disk is not within the range specified in the "Minimum

| | |
|---|--|
| | Required SSW version" and "Maximum Required SSW version" fields. |
| kDefaultDirtyInstall/kDefaultCleanInstall | Use kDefaultCleanInstall to have the clean install option selected by default. |
| Actual Kbytes copied | <p>The raw number of Kbytes in the files being copied for the recommended installation. The plug-in will approximate that amount space required by adding this value to the number of file forks multiplied by half the block size of the selected destination disk.</p> <p>See information about "Count The Forks" in the Installation Plug-in chapter to help you determine this value.</p> |
| System software version installed | The version of system software on the chosen destination disk that will trigger the reinstall alert. This should normally be the same version as system software being installed. The value is in BCD format. For example, version 8.0.1 would specified in hex as 0x0801. |
| Minimum Required SSW version | When using the kRequireTargetSysVersion flag, the minimum version of system software allowed on the chosen destination disk. A version lower than this value will prevent the user from continuing. The value is in BCD format. For example, version 8.0.1 would specified in hex as 0x0801. |
| Maximum Required SSW version | When using the kRequireTargetSysVersion flag, the maximum version of system software allowed on the chosen destination disk. A version higher than this value will prevent the user from continuing. Most of the time, the value will be the same version of system software being installed. Enter a value of 0 (zero) to not constrain the maximum version. The value is in BCD format. For example, version 8.0.1 would specified in hex as 0x0801. |
| Plug-in reference ID if reinstall | The ID of a 'STR ' resource containing the name of the plug-in to advance to when the user clicks the Reinstall button in the reinstall alert. |
| Plug-in reference ID if add/remove | The ID of a 'STR ' resource containing the name of the plug-in to advance to when the user clicks the Add/Remove button in the reinstall alert. Certain global data values are set to notify the plug-in that the user chosen this option. |
| Help Text Reference ID | The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, the ID of 'flrf' resource if stored in a separate text file. |
| Help Text First Picture ID | The ID of a 'PICT' resource containing the first picture to be embedded in the help text. |
| Plug-in string list Rsrc ID | <p>The ID of a 'STR#' resource containing text strings required by the plug-in.</p> <p>'STR#' resource string index definitions:</p> <ol style="list-style-type: none"> 1. Panel title name 2. Panel prompt text 3. Destination disk pop-up menu title |

4. Help window title

5. Reinstall alert message text

Number of file forks copied

The number of file forks being copied for the recommended installation. Most Macintosh files have either a data fork, resource fork, or both. The plug-in uses this value to better estimate the required disk space by calculating the extra space beyond the size of the files needed on the destination due to its block size.

See information about “Count The Forks” in the Installation Plug-in chapter to help you determine this value.

Read Me Plug-in

This chapter describes the Read Me Plug-in.

About the Read Me Plug-in

The read me plug-in provides a scrollable text message area for presenting important information for the user. Figure 6-1 shows the read me plug-in panel in the Install Mac OS 8 program.

Plug-in file name: IInfo

The Save and Print buttons are enabled if the user can save and print the text. When saving, a SimpleText document is created.

Figure 6-1 Read Me plug-in panel



Editing the Read Me Plug-in

The read me editor is shown in Figure 6-2. This editor allows the developer or administrator to change the panel's title, text, and help text.

Figure 6-2 Read Me editor window



The items in the Read Me plug-in editor window are explained in detail below.

| | |
|----------------------------|--|
| Panel Title | Enter the name that shows at the top of the panel. |
| Main Text: | |
| Text Location: | Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text <i>or</i> a file reference is saved, not both. |
| Edit Main Text/File Ref... | Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file. |
| First Picture ID | Enter the ID of the first 'PICT' resource embedded in the text. |
| Help Window Text: | |
| Text Location: | Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text <i>or</i> a file reference is saved, not both. |
| Edit Help Text/File Ref... | Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file. |
| First Picture ID | Enter the ID of the first 'PICT' resource embedded in the text. |
| Remove | Deletes the read me plug-in resources from the data file and closes the editor window. |
| Cancel | Closes the editor window without updating the read me plug-in resources. |
| Save | Updates the read me plug-in resources in the data file with the contents of the window. |

Read Me Plug-in Reference

Resources

Read Me Plug-in Preference Resource ('rmpr')

```
#define    RMPPrefFlags                                     \
    boolean    kMainTextInRsrc, kMainTextInFile;          /* Help text location */  \
    boolean    kHelpTextInRsrc, kHelpTextInFile;          /* Main text location */  \
    fill bit[14]                                       /* Reserved */

type 'rmpr' {
    switch {
        case format1:
            key integer = 1;                                /* Format version */
            RMPPrefFlags;                                   /* Flags */
            integer;                                        /* Main Text - 'flrf' or 'TEXT' Rsrc ID */
            integer;                                        /* First main text picture - 'PICT' Rsrc ID */
            integer;                                        /* Help text - 'flrf' or 'TEXT' Rsrc ID */
            integer;                                        /* First help text picture - 'PICT' Rsrc ID */
            integer;                                        /* Plug-in string list - 'STR#' Rsrc ID */
    };
};
```

kMainTextInRsrc/kMainTextInFile flag

Use kMainTextInRsrc to specify that the Main Text Reference ID field points to a 'TEXT' resource. Use kMainTextInFile to specify that the Main Text Reference ID field points to a 'flrf' resource.

kHelpTextInRsrc, kHelpTextInFile flag

Use kHelpTextInRsrc to specify that the Help Text Reference ID field points to a 'TEXT' resource. Use kHelpTextInFile to specify that the Help Text Reference ID field points to a 'flrf' resource.

Main Text Reference ID

The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, ID of 'flrf' resource if stored in a separate text file.

Main Text First Picture ID

The ID of a 'PICT' resource containing the first picture to be embedded in the main text.

Help Text Reference ID

The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, the ID of 'flrf' resource if stored in a separate text file.

Help Text First Picture ID

The ID of a 'PICT' resource containing the first picture to be embedded in the help text.

Plug-in string list Rsrc ID

The ID of a 'STR#' resource containing text strings required by the plug-in.

'STR#' resource string index definitions:

1. Panel title name
2. Help window title

Software License Plug-in

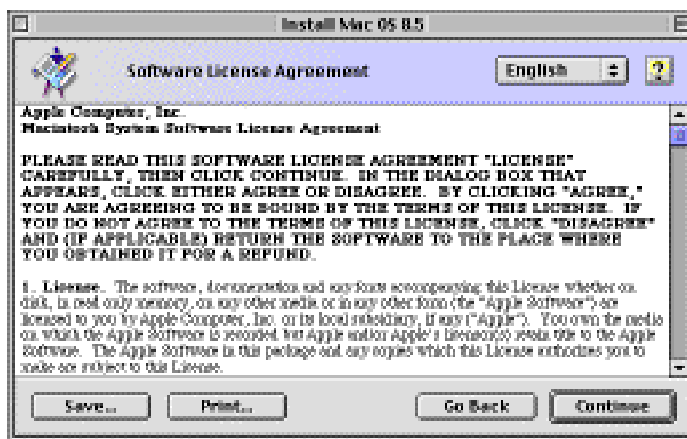
This chapter describes the Software License Plug-in.

About the Software License Plug-in

The software license plug-in presents a single panel to allow the user to read and agree to the software license before proceeding. As an option, multiple language versions of the text can be provided to address certain multi-country legal requirements. Figure 7-1 shows the software license plug-in panel in the Install Mac OS 8 program.

Plug-in file name: SWLicense

Figure 7-1 Software license plug-in panel



A pop-up menu appears in the top-right corner of the panel when multiple language versions of the license are available. Upgrader will hide certain languages from the pop-up menu when the language cannot be displayed appropriately. The following region codes will only appear if their respective script is the primary system script: verJapan, verTaiwan, verKorea, verArabic, verGreece, verThailand, verChina, verRussia, verUkrania, 72 (Bulgaria), and verIsrael. For example, Japanese will only show in the pop-up menu when running an actual Japanese system, not just a U.S. system with the Japanese Language Kit installed.

When the user clicks Continue, the Agree/Disagree alert is presented (see Figure 7-2) to force the user to

explicitly denote his or her acceptance or non-acceptance to the license.

Figure 7-2 Agree/Disagree alert

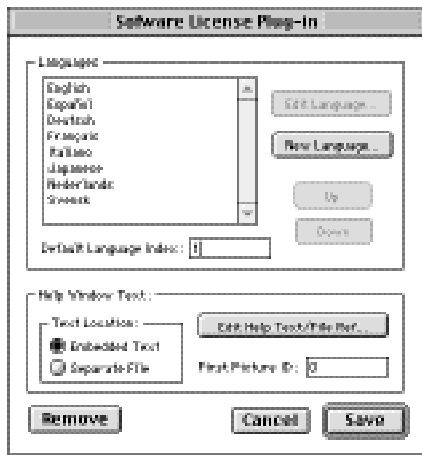


If the user clicks Agree in the Agree/Disagree alert, the user advances to the next panel. If the user clicks Disagree, then the user goes to a panel defined by the developer. In the case of the Install Mac OS 8 program, then user is taken back to the Welcome panel.

Editing the Software License Plug-in

he software license editor is shown in Figure 7-3. This editor allows the developer or administrator to change the license text and add/subtract the provided languages of the license text.

Figure 7-3 Software license editor window



The items in the software license plug-in editor window are explained in detail below.

Languages:

Edit Language...

Shows the language editor window for the selected language, so attributes of the language can be changed.

Double-clicking on a language name is a shortcut for clicking the Edit Language button.

New Language...

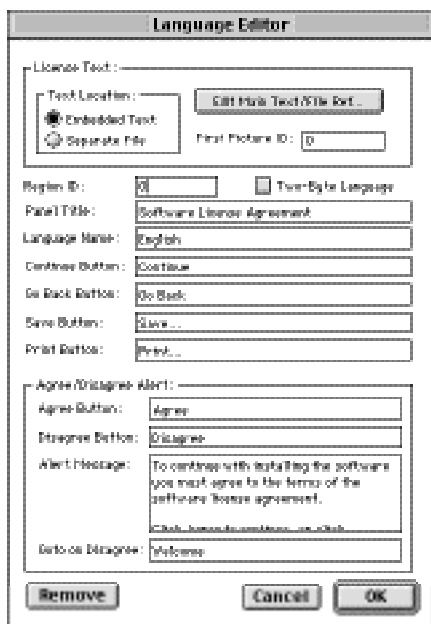
Shows an empty language editor window. If the user clicks OK the new language entry will added to the languages list. If a language is selected in the list when clicking New Language, the new language will be inserted before the selected language; otherwise, it will be added to the end of the list.

Up

Moves the selected entry one position closer to the beginning of

| | |
|----------------------------|--|
| | the languages list. |
| Down | Moves the selected entry one position closer to the end of the languages list. |
| Default Language Index | The language entry index (starting with 1) which will be used as the default language if the running system's primary language ID does not match a language ID contained in the language list. |
| Help Window Text: | |
| Text Location: | Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text <i>or</i> a file reference is saved, not both. |
| Edit Help Text/File Ref... | Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file. |
| First Picture ID | Enter the ID of the first 'PICT' resource embedded in the text. |
| Remove | Deletes the software license plug-in resources from the data file and closes the editor window. |
| Cancel | Closes the editor window without updating the software license plug-in resources. |
| Save | Updates the software license plug-in resources in the data file with the contents of the window. |

Figure 7-4 Language editor window



The items in the language editor window are explained in detail below.

License Text:

| | |
|----------------------------|--|
| Text Location: | Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text <i>or</i> a file reference is saved, not both. |
| Edit Main Text/File Ref... | Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file. |
| First Picture ID | Enter the ID of the first 'PICT' resource embedded in the text. |
| Region ID | Enter the region code of the language. This allows the software license plug-in to default to the appropriate language version of the text based on the primary language of the running system. See the "Script.h" file on the most recent ETO CD for a list of the current language codes. |
| Two-Byte Language | Select this option if the language defined requires a two-byte script system, such as Japanese or Chinese. This allows the software license panel to disable the language name in the pop-up menu if the system software is incapable of correctly displaying the text. |
| Panel Title | Enter the name that shows at the top of the panel. |
| Language Name | Enter the name of the language. If possible, we suggest that you use the name as written in its native language. Exceptions to this guideline are two-byte languages, which may be displayed as garbage unless written in the localized language of the program. |
| Continue Button | Enter the name of the Continue button. |
| Go Back Button | Enter the name of the Go Back button. |
| Save Button | Enter the name of the Save button. |
| Print Button | Enter the name of the Print button. |
| Agree/Disagree Alert: | |
| Agree Button | Enter the name of the Agree button. |
| Disagree Button | Enter the name of the Disagree button. |
| Message | Enter the text to be displayed in the Agree/Disagree alert. |
| Goto on Disagree | Enter the name of the plug-in to go back to when the user clicks Disagree. |
| Remove | Deletes the language entry. |
| Cancel | Closes the language editor window without updating the language entry. |
| OK | Updates the language entry with the contents of the window. |

Resources

Software License Plug-in Preference Resource ('swpr')

```
#define    LVPPrefFlags                                     \
    boolean    kHelpTextInRsrc, kHelpTextInFile;          /* Help text location */ \
    fill bit[15]                                         /* Reserved */

#define    LangEntryFlags                                   \
    boolean    kOneByte, kTwoByte;                        /* Language character length */ \
    boolean    kTextInRsrc, kTextInFile;                  /* License text location */ \
    fill bit[14]                                         /* Reserved */

type 'swpr' {
    switch {
        case format4:
            key integer = 4;                                /* Format version */
            LVPPrefFlags;                                   /* Flags */
            integer;                                        /* Help text ref - 'flrf' or 'TEXT' Rsrc ID */
            integer;                                        /* First help text picture - 'PICT' Rsrc ID */
            integer;                                        /* Plug-in string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Disagree plug-in name ref - 'STR ' Rsrc ID */
            integer;                                        /* Panel title string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Language name string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Continue button string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Save button string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Print button string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Go Back button string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Agree button string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Disagree button string list ref - 'STR#' Rsrc ID */
            integer;                                        /* Agree/Disagree dialog text ref - 'STR#' Rsrc ID */
            integer;                                        /* Default language index */
            integer = $$CountOf (LanguageArray);
            array LanguageArray
            {
                LangEntryFlags;                            /* Language flags */
                integer;                                    /* Region Code (from Script.h) */
                integer;                                    /* License text ref - 'flrf' or 'TEXT' Rsrc ID */
                integer;                                    /* First license text picture - 'PICT' Rsrc ID */
            };
        };
    };
};
```

kHelpTextInRsrc, kHelpTextInFile flag

Use kHelpTextInRsrc to specify that the Help Text Reference ID field points to a 'TEXT' resource. Use kHelpTextInFile to specify that the Help Text Reference ID field points to a 'flrf' resource.

Help Text Reference ID

The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, the ID of 'flrf' resource if stored in a separate text file.

Help Text First Picture ID

The ID of a 'PICT' resource containing the first picture to be

| | |
|--------------------------------------|---|
| | embedded in the help text. |
| Plug-in string list ref | The ID of a 'STR#' resource containing text strings required by the plug-in. 'STR#' resource string index definitions: 1. Help window title |
| Disagree plug-in name ref | The ID of a 'STR ' resource containing the name of the plug-in to go back to when the user clicks Disagree in the Agree/Disagree alert. |
| Panel title string list ref | The ID of a 'STR#' resource containing the panel title for each language entry in the order listed. |
| Language name list ref | The ID of a 'STR#' resource containing the language names appearing in the pop-up menu for each language entry in the order listed. |
| Continue button name list ref | The ID of a 'STR#' resource containing the Continue button names for each language entry in the order listed. |
| Save button name list ref | The ID of a 'STR#' resource containing the Save button names for each language entry in the order listed. |
| Print button name list ref | The ID of a 'STR#' resource containing the Print button names for each language entry in the order listed. |
| Go Back button name list ref | The ID of a 'STR#' resource containing the Go Back button names for each language entry in the order listed. |
| Agree button name list ref | The ID of a 'STR#' resource containing the Agree button names for each language entry in the order listed. |
| Agree/Disagree dialog text list ref | The ID of a 'STR#' resource containing the text to be displayed in the Agree/Disagree alert for each language entry in the order listed. |
| Disagree button name string list ref | The ID of a 'STR#' resource containing the Disagree button names for each language entry in the order listed. |
| Default language index | The language entry index (starting with 1) which will be used as the default language if the running system's primary language ID does not match a language ID contained in the language list. |
| Language Entry: | |
| kOneByte/kTwoByte flag | Use kOneByte if the language only uses one byte to define its characters. Use kTwoByte if the language only uses two bytes to define its characters, such as Japanese or Chinese. |
| kTextInRsrc, kTextInFile flag | Use kTextInRsrc to specify that the License Text Reference ID field points to a 'TEXT' resource. Use kTextInFile to specify that the License Text Reference ID field points to a 'flrf' resource. |
| Region Code | The region code of the language. This allows the software license plug-in to default to the appropriate language version of the text based on the primary language of the system software. |

See the “Script.h” file on the most recent ETO CD for a list of the current region codes.

License Text Reference ID

The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, ID of 'flrf' resource if stored in a separate text file.

License Text First Picture ID

The ID of a 'PICT' resource containing the first picture to be embedded in the main text.

Installation Plug-in

This chapter describes the installation plug-in.

About the Installation Plug-in

The installation plug-in manages the sequential installation of one or more software components via installation engine applications, such as Apple's Installer Engine, Apple Software Restore, and limited support for MindVision's Installer. Actually, any application can be run by the installation plug-in as part of an installation, but for those fully supported engines, the user is presented with a unified progress dialog, installation report, and error handling. As with other plug-ins, the developer or administrator specifies the software components available to the user in the data file.

In addition to the multiple software component installation used to install Mac OS 8.5, the installation plug-in is designed to replace the old Installer 4.0.X application by providing a user experience more tailored for a single Installer script. The installation plug-in automatically chooses either the multiple component mode or the single Installer script mode depending on the software components specified.

The installation plug-in also includes features that enable both developers and administrators provide an easy-to-use installation environment tailored for their users. Here is a summary of the features:

- Parasites - an installation program invisibly connected to user-visible software component, which can be used to enhance or patch an existing installation program.
- Installation reports - a SimpleText document left on the destination disk that contains a listing of the actions performed during the installation.
- Disk Checking - the user's destination disk can optionally be verified and fixed before your software is installed.
- Add/Delete Installers - administrators can add third-party or in-house installation programs to an existing Upgrader data file.
- Selection Set Files - administrators can easily redefine the default installation so users install only what is necessary.
- Remote Installation - in conjunction with Apple's Network Assistant program, administrators can remotely update computers via the network from a centralized computer.
- Billboards - users can be informed and entertained by pictures (supplied by developers) in the progress dialog during the installation.

Plug-in file name: Integrated Installation

Multiple Component Mode

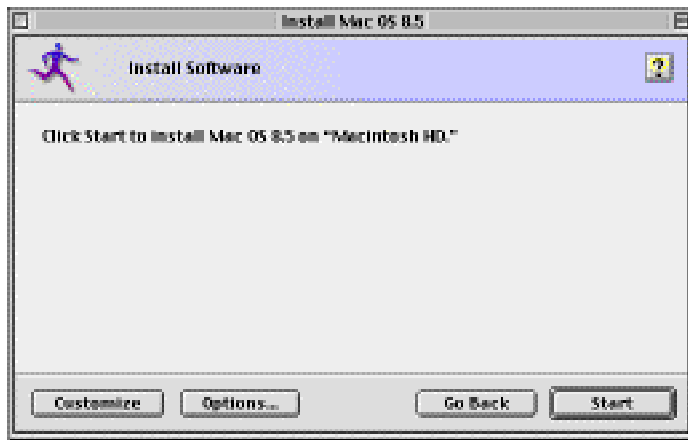
Complex installations using several installation programs will normally use the multiple component mode. The standard approach is to provide both an easy installation panel and a custom installation panel, although in unique situations it is possible to present only one of the panels.

Easy Installation Panel

The easy installation panel prompts the user to click the Start button to begin the developer- or administrator-defined default installation. The prompt should encourage the casual user to accept the default installation.

The prompt area can accommodate styled or unstyled text superimposed on a graphic. See Figure 8-1 for an example of the Mac OS 8.5 easy installation panel.

Figure 8-1 Easy Installation panel

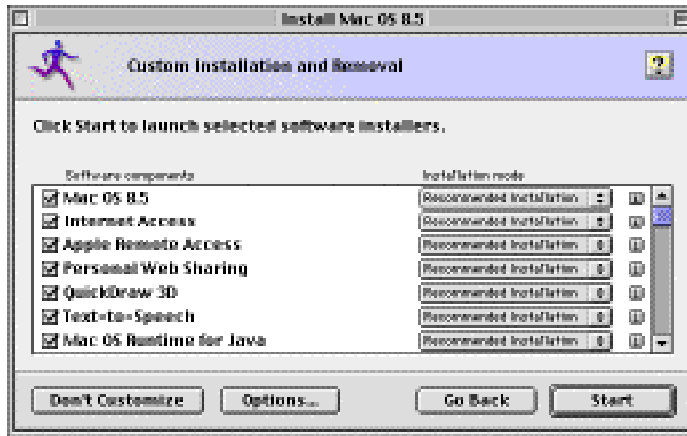


The additional options available to the user depend on the developer. The Customize button takes the user to the custom installation panel, and the Options button opens the options dialog.

Custom Installation Panel

The custom installation panel allows the user to determine which software components are installed, and depending on the engine used to install the component, further customize the installation or perform a removal. Figure 8-2 shows the custom installation panel in the Mac OS 8.5 installation program.

Figure 8-2 Custom Installation panel



When using Apple's Installer Engine to perform the installation for the component, the developer can write the Installer script in a way that provides further selection of component features. When the user selects either Customized Installation or Customized Removal from the pop-up menu, the custom selection dialog is shown (see Figure 8-3).

Figure 8-3 Custom Selection Dialog



From within the custom selection dialog, the user checks the features to be installed or removed. The contents of the list are entirely defined by the component's Installer script.

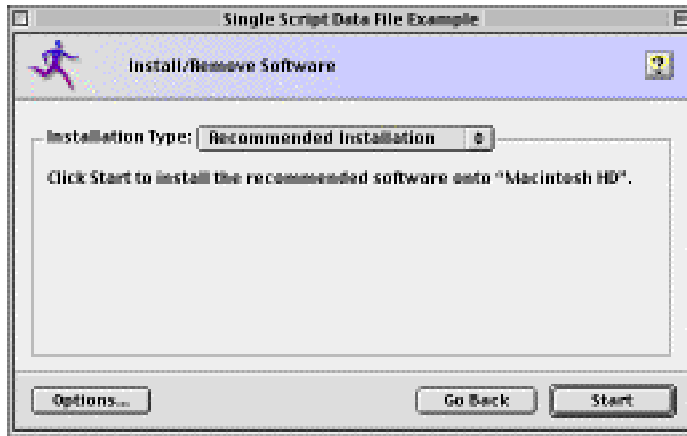
Single Installer Script Mode

The single Installer script mode is used when a developer has implemented the software component's installation using one host Apple Installer script. Even though only one visible Installer script can be specified, any number of parasites can be used in addition to the Installer script.

User Interface

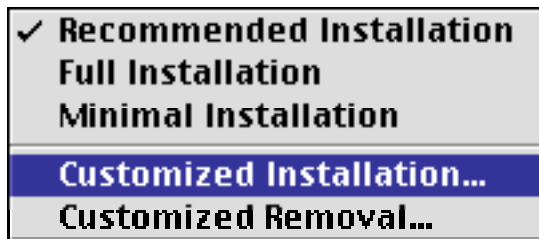
The user is presented with one installation panel that allows the user to select predefined easy feature sets and provides access to the custom selection dialog for customizing an installation or removal. Figure 8-4 shows an example single Installer script mode installation panel.

Figure 8-4 Installation panel using single Installer script mode



The installation panel will default to the recommended installation, if one is provided; otherwise, the user will be asked to select the features to install. The prompt text will change depending on the menu item selected. Most developers will want to provide several easy features sets to allow casual users at least some control over the software features installed. Figure 8-5 shows a installation type pop-up menu that attempts to address both casual and power users.

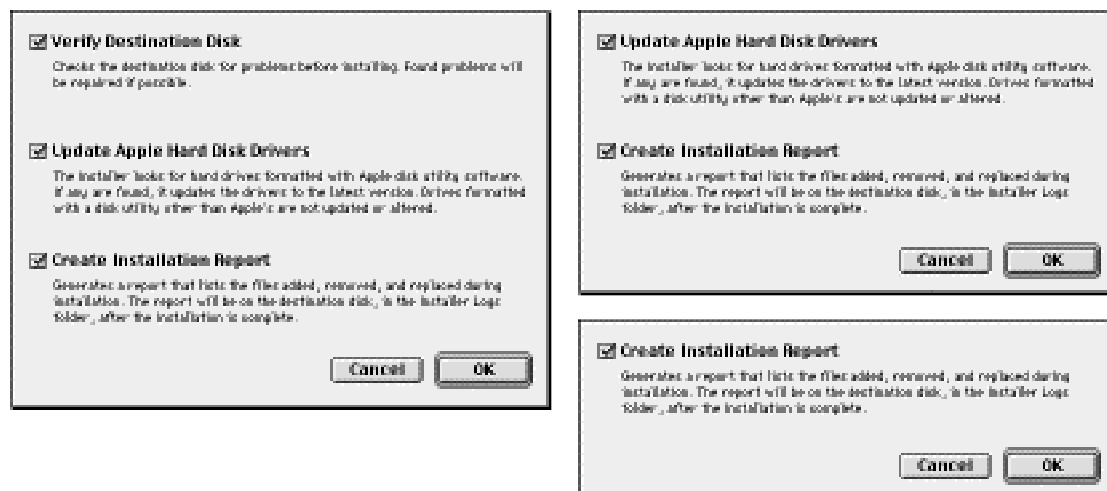
Figure 8-5 Installation type pop-up menu with additional easy feature sets



User Options

Depending on the settings in the data file, the developer can provide the user with control over three possible options: disk checking, hard disk drivers updating, and installation report generation. Upgrader adapts the options dialog to show only those checkboxes modifiable by the user for the given data file settings. Figure 8-6 shows the three possible versions of the options dialog.

Figure 8-6 Three faces of the options dialog



Disk Checking

When the disk checking option is selected, version 1.0.1 or later of the DFA Server application is launched and run. DFA Server returns one of a number of error values to the installation plug-in, which it converts into an error message. If the disk was okay, no message alert is displayed. If the disk was fully repaired, an alert tells the user there were problems but they were fixed. If the check or repair can proceed if all other applications are quit, the user will be asked if they wish to have applications quit first.

NOTE

The user is never prevented from continuing with the installation if problems could not be fixed.

Updating Hard Disk Drivers

The installation plug-in runs version 1.5.1 or later of the Drive Setup application to update Apple brand hard disks. Drive Setup will skip any non-Apple brand hard drive or an Apple brand hard drive that has been formatted with a non-Apple driver. When the update cannot occur, the disks that were not updated are listed for the user with encouragement to contact the vendor.

NOTE

The user can continue with the installation even if some hard disk driver could not be updated.

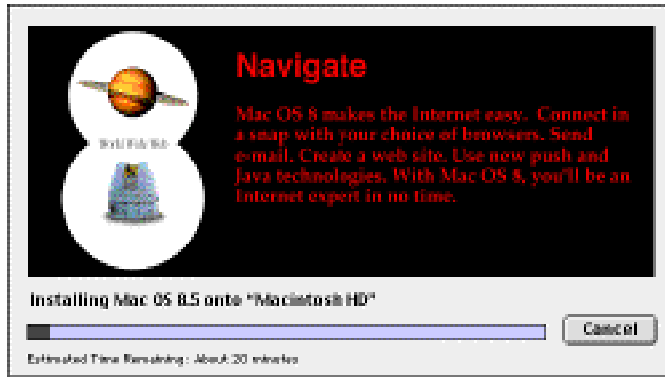
Installation Reports

When installation reports are enabled, one or more SimpleText documents describing the actions and error messages are created inside a folder with the name of the product inside the Installer Logs folder on the selected destination disk. The amount of detail depends on the engine used to install the software component. At present, only Installer Engine provides a list of detailed file actions.

Installation Progress Dialog

A single progress dialog is presented while the various engines perform the actual installation. The user can halt the installation by clicking the Cancel/Stop button, developers can provide billboards to amuse and educate the user during the process. The estimated time remaining is also provided.

Figure 8-7 Progress dialog with billboards



Canceling or Stopping the Installation

Either a Cancel button or a Stop button is available for the user to click at any time. When the button text is “Cancel”, the user can halt the installation process and her hard disk is restored to its original state. When the button text is “Stop”, the user can halt the installation process but the installation is not complete and the installation product may or may not be usable.

If the user stops an installation after at least one component has been installed, the user will be asked if she wishes to stop, skip the component that was installing, or try installing the component again. If the user stops the installation then starts the installation again without exiting the installation plug, then installation will pick up again with the unfinished component.

Presenting Billboards

Developers can inform and educate their users via pictures displayed in the progress dialog during the installation. Any number of pictures can be attached to each software component. The actual ‘PICT’ resources are stored in the data file.

NOTE

If you supply a large number of pictures or the pictures you supply are very large, make the ‘PICT’ resources purgeable so Upgrader will not run out of memory.

Time Remaining Estimation

The installation plug-in calculates the time remaining for the entire installation using several parameters, such as the speed of the source and target disk, but the estimation is only that, an estimation. Since we use a calculated average engine speed, which may differ greatly between engines, we allow the developer fine-tune time each component installation using a progress time multiplier value.

The progress time multiplier value can be a number from 1 to 200. The value is a percentage of an

average Installer Engine-based installation. For example, a value from 101 through 200 lengthens the estimated time shown in the progress dialog to account for an installer that takes longer than the average Installer Engine-based installation.

Administrator Customization

Upgrader contains specific functionality for making the administrator's job easier. This functionality falls into the following categories:

- **Adapt an Upgrader-based program user interface to your organization.** This is accomplished by adding, deleting, or modifying the panels in order to present different information or perform unique tasks.
- **Addition or deletion of software components.** You can add your own software installers to those supplied by the developer of the Upgrader-based program. And if careful, delete software components inappropriate for your situation.
- **Redefinition of the default installation.** Whether or not you add or delete software components, you may wish to define your own customized installation and select a level security necessary to limit user deviation from your default installation.
- **Perform remote installations using Apple's Network Assistant.** Most Upgrader-based programs are easily configured to perform installations to networked computers from a centralized location using Network Assistant.

Most of these customizations can be mixed and matched depending on the desired result. You'll first need to decide who will be performing the installation. Use the following descriptions to guide your decision:

User-Initiated: The user starts and uses the Upgrader-based program without aid from the administrator. Most likely the installation is performed over the network.

1. Decide if you need to change any of the text presented in the informative panels, such as the welcome panel or the read me panel. ModifierTool gives you access to the displayed text for each panel.
2. Decide if additional tasks must be performed before the installation begins. For example, you might require that user run a virus checker or some in-house application before installing. A simple application launcher plug-in is provided on the Installer SDK that can easily be dropped into an existing Upgrader-based program using ModifierTool. Those of you with programming skills and greater demands can use these plug-in examples as a starting place for your own customized panels.
3. Add or delete software component installers. If your organization requires additional software be installed with the product, then write an installer for it using one of the supported engines and add it to the list of software components using ModifierTool.
4. Redefine the default installation by creating a selection set file containing the selections and options you want your users to use. You have a choice whether to allow your users to further customize your default installation, or to force them to only install your default installation.
5. Set up your installation with the selection set file in the same folder as the data file, then test and deploy.

Administrator Performed: The administrator walks from computer to computer, performing the installation themselves.

1. Add or delete software component installers.
2. Redefine the default installation by creating a selection set file.
3. Copy the selection set file to the same folder as the data file, then test and deploy.

Remote Installed: The administrator sets up and initiates a Network Assistant-based installation.

1. Add or delete software component installers.
2. Redefine the default installation by creating a selection set file.
3. Set up files for remote installation.
4. Test and deploy.

Now that you've decided how to install the product, read the pertinent sections below.

Add/Delete/Modify Panels

The modular design of Upgrader-based programs make it safe and easy to delete or modify the standard panels, or even add your own panels to enable your users to perform such tasks as run a virus checker or in-house application. Your requirements and skills will determine how much change is appropriate.

To begin analyzing what might be appropriate, read the editing instructions for each plug-in. This will let you know what's possible so you can prioritize what's important in your situation.

Add/Delete Software Component Installers

More than likely you already know what additional software should be installed with the product. The next step is to determine the best method of choosing an engine to install the other software. If the other software is already installed by one of the supported engines, then integration should be easy.

If you're starting from scratch with a bunch of in-house applications or files, investigate using Apple Software Restore first. All you really need to do is create a disk image with the files in the locations you want them installed. Documentation and examples using Apple Software Restore (ASR) is available on the Installer SDK.

Creating and Using Selection Sets

Selection set files contain a customized default installation for a particular Upgrader data file. Once you've finished your changes to the data file, run the Upgrader-based program and choose the selections and options you want the user to use, then select Save Selection Set from the Special menu. A Save dialog box will appear.

Figure 8-8 Special menu and Selection Set Save dialog box.



Selecting the Don't allow user to customize checkbox at the bottom of the Save dialog will hide the Customize button and prevent the user from installing anything but the default installation.

Since a selection set file automatically loads when found in the same folder as the data file, an administrator can further guarantee the user will perform the default installation by checking the

Require Selection Set File checkbox in the installation plug-in's ModifierTool editing window. When this option is selected and the selection set file is missing, an alert is displayed and the Upgrader-based program quits.

Performing Remote Installations Using Network Assistant

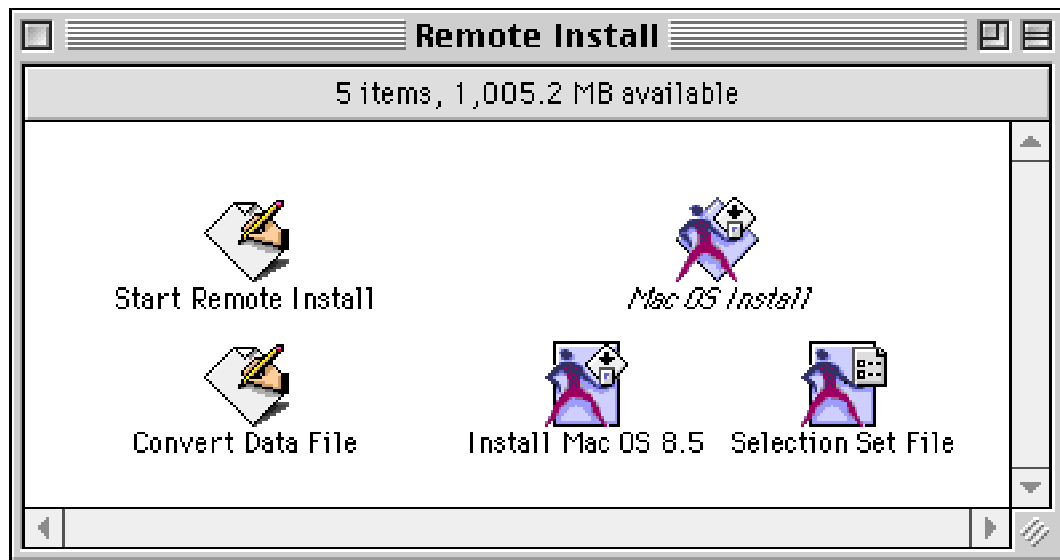
If you have Apple's Network Assistant installed on the workstations on your network, you can use it to install a product on those workstations. To do this, you configure and set up files on a guest access server volume, then use Network Assistant to initiate the installation onto the selected workstations.

Before you start, be sure the Network Assistant workstation software is installed on all the workstations on which you want to install the product.

Configuring and setting up a remote installation

To configure your Upgrader-based program to remotely install using Network Assistant, follow these steps:

1. If the Upgrader-based program comes on a CD-ROM, you can just share the CD-ROM with guest access privileges from a computer; otherwise, copy the product folder onto a server volume that has read-only guest access.
2. Create a folder on a server volume that has read-only guest access. You can name this folder whatever you would like, but for the purpose of this example, we'll name this folder "Remote Install".
3. Copy the files "Start Remote Install" and "Convert Data File" to the "Remote Install" folder. You'll find these files on the Installer SDK.
4. Copy the data file from the product folder to the "Remote Install" folder. For Mac OS 8.5, this file is named "Install Mac OS 8.5".
5. If you need to add additional software installers to the product's installation, drop the data file in the "Remote Install" folder onto Modifier Tool and follow the directions in the section "Add/Delete Software Component Installers" and the chapter on the Integration Installation plug-in. NOTE: If you perform a clean install of system software, you will need to add the installation of the Network Assistant workstation files to enable you to connect with the workstations after restarting the the new system software.
6. If you wish to redefine the default installation, follow the directions in the section "Creating and Using Selection Sets" to create a selection set file. Place the newly created selection set file in the "Remote Install" folder.
7. Convert the data file by dropping the file onto the Convert Data File application. If you have created your Upgrader-based program using different plug-ins, or the order of the plug-ins is different than the Mac OS 8.5 data file, you may need to convert your data file manually. A data file prepared for use with Network Assistant will have the following plug-ins: IncompatHW (optional), Integrated Installation, and Conclusion. The converted data file must also include an 'auin' resource. The easiest way to create this resource is to convert the "Install Mac OS 8.5" data file using the Convert Data File application, then copy the 'auin' to your data file using ResEdit or Resorcerer.
8. Log on to your guest access server volume(s) from another computer and create two aliases: one to the Upgrader application in the product folder/shared CD-ROM (this application is named "Mac OS Install" for Apple's Mac OS 8.5 release), and an alias to the "Start Remote Install" in the "Remote Install" folder. Copy these two aliases on a floppy or server volume to facilitate copying these files back to your read-only guest access volume. Place the data file alias on the root level of the server's boot volume. Place the Upgrader application alias in the "Remote Install" folder. Your "Remote Install" folder should look similar to this:



9. Before testing your configuration using Network Assistant, you can start the installation manually from a workstation by double-clicking the "Start Remote Install" application. The installation will begin automatically upon opening the "Start Remote Install" application. You can click Cancel to stop the installation.

Installing the product using Network Assistant

1. Open the Network Assistant program and select the workstations in the Workstations list on which you want to install the product.
2. Choose Copy Item from the Manage menu.
3. In the dialog box that appears, find the alias to "Start Remote Install" file on your administration workstation.
4. Select the alias in the list and click the "Copy and Open" button.
5. Network Assistant copies the alias to all the workstations and opens the alias, which automatically starts the installation of the software you selected. The product will be installed onto the current boot volume of workstation. While the product is installing, the name of the Upgrader application will appear in the status column.
6. If the product requires a restart, the workstation will automatically be restarted after the installation has completed successfully. If an error occurred during installation, the workstation will stay in the Upgrader application with an alert displayed on the workstation describing the problem.
7. When the workstations have restarted, select them in the Workstations list and choose Software Search from the Reports menu.
8. Use the dialog box that appears to search for the alias to "Start Remote Install" file.
9. In the report that appears, select all the copies of the alias, click the delete button in the report window, and click Delete in the dialog box that appears.

Engines

The installation plug-in contains support for Installer Engine and Apple Software Restore with partial support for MindVision's Installer.

Installer Engine

Apple's Installer Engine is a background-only version of the Installer 4.0.X used by Apple. Installer Engine implements a full-featured public Apple event suite, enabling developers and administrators to create solutions using Installer Engine.

To use Installer Engine, a developer writes an Installer script, which contains the necessary decision making code and actions to perform the installation. Since Installer Engine can execute Installer scripts written for Installers as old as version 3.3, migrating your older Installer scripts to Upgrader is very easy. You'll find documentation, examples, and tools on the Installer SDK to help you write Installer scripts, or command Installer Engine via Apple events.

Apple Software Restore

The Apple Software Restore (ASR) application installs the files from disk images created by Apple's Disk Copy application. ASR has been used in the past to restore an entire user's hard disk, hence the name, but changes in version 1.3.2 enable it to be driven via Apple events by the installation plug-in.

You'll find documentation and examples for using ASR on the Installer SDK.

MindVision Installer

The installation plug-in contains limited support for running MindVision's installer via Apple events. The installation type is limited to an easy installation only, and the MindVision installer's progress dialog is shown in front of Upgrader's progress window due to the design of the MindVision Apple event suite.

Contact MindVision at www.mindvision.com for information about licensing the MindVision installer.

Other Applications

Most any application can be specified to be launched by the installation plug-in to perform the installation tasks for a software component. The application will be launched by the installation plug-in with an 'oapp' Apple event if no document is specified, or an 'odoc' Apple event if a document is specified. The installation plug-in waits for the application has quit before it launches the next software component.

If the application being launched will force other applications to be quit or will force a restart when it completes, then it must be the last software component in the list.

Development Topics

Using Parasites

Parasites are software installers used to fix or enhance the actions of the previous installer, but are hidden from the user. One or more parasite software installers can follow a visible software component installer (host), and are run if the software component is installed. If the user stops the installation of a parasite, a stern warning is displayed urging the user to continue. The parasite installer can be any application, but if it is an Installer Engine-based installer it must provide a recommended installation.

A parasite can be conditionally run based on the features selected in the host when the host is a Installer Engine-based installer. See the description of the host feature ID list for more information

Calculating Installation Sizes

Several fields in the installation and target selection plug-ins require data about the size of the recommended installation and the number of file forks created. The “Count The Forks” tool supplied on Installer SDK helps automate this process.

Follow these steps to calculate the installation sizes:

1. Place the Count The Forks application file in the same folder as your data file and the Upgrader application.
2. If your product can be installed onto an empty disk, erase the destination disk. Otherwise, double-click the Count The Forks application, select the destination disk in the list and click the Select “<volume name>” button.
3. Start Upgrader, select the destination disk, then proceed to the installation plug-in. If you allow customization, click the Customize button and select all software components.
4. Start the installation and allow it to complete.
5. Find and open the file name “Number of Forks” on the root of the destination disk. An entry for each selected software component will have been added automatically by the installation plug-in as it ran. Each entry contains four numbers. The first two numbers are the accumulated size and number of forks after the installation of the component completed. The next two numbers are the bytes and forks added to the disk by the component.
6. For each software component (including parasites) enter the size and number forks for that component. Make sure to use the “new” values from the “Number of Forks” for each component.
7. To determine the size and number forks to be entered into the preference resource of the target selection plug-in, find the entry of the last software component installed as part of the default installation. Enter the accumulated bytes and forks from this entry into the fields if you erased the destination disk before you started. If you ran Count The Forks manually once before starting the installation because you couldn’t install onto an empty disk, subtract the values in the first entry from the entry of the last software component installed as part of the default installation and enter the result in the fields.

Extending the Installation Plug-in

Creating a Preflight Function

A preflight function attached to a software component can determine if the component should be hidden or checked at runtime, overriding the default attributes specified in the data file. This might be necessary if a specific installer program is designed to work on a subset of the environments the Upgrader-based program supports.

Developers can perform the following runtime decisions:

- Show or hide the software component in the easy installation panel, custom installation panel, or both panels. This allows one or more installers to be used to install a single product, each designed for a particular environment. To handle this case, the developer just needs to write a preflight function to show the appropriate one. The installation plug-in already uses this strategy for implementing its built-in support for running the correct Apple Installer script based on the processor type (68K or PPC) using the two document fields provided for each software component.
- Check or uncheck a software component based on an environmental factor. For example, the Install Mac OS 8 Upgrader-based program initially selects the Apple Location Manager item when running on PowerBooks.

Routine Definition:

```

// Result definition
enum {
    kNoError          = 0,
    kInternalError     = -1
};

typedef SInt32 SoftwareInstallerPreflightResult;

// Parameter block definition
struct SoftwareInstallerPreflightPBRec {

    // Fields set on entry
    SInt16      fDestinationVRefNum;
    SInt32      fRefCon;
    Boolean     fDoingCleanInstall;

    // Fields set by you on exit
    Boolean     fSkipOnEasy;
    Boolean     fSkipOnCustom;
    Boolean     fOverrideDefaultSelection;
    Boolean     fSelectIfOverridden;
};

typedef struct SoftwareInstallerPreflightPBRec SoftwareInstallerPreflightPBRec,
*SoftwareInstallerPreflightPBPtr;

```

Field Descriptions:

| | |
|----------------------------------|--|
| fDestinationVRefNum | Volume RefNum of selected destination disk. |
| fRefCon | 32-bit value passed to the code resource from data file. |
| fDoingCleanInstall | True if user has specified a clean install. |
| fSkipOnEasy | If true, forces the software installer to be hidden and skipped when running in Easy HI mode. |
| fSkipOnCustom | If true, forces software installer to be hidden and skipped when running in Custom HI mode. |
| fOverrideDefaultSelection | If true, forces initial selection state of software installer checkbox to that specified in the fSelectIfOverridden field. |
| fSelectIfOverridden | Selection state of software installer checkbox if fOverrideDefaultSelection field is true. |

Creating a Cleanup Application

The cleanup application is run after any successful installation to perform post-installation disk modifications. It's best to perform all cleanup operations within the software installers themselves, but sometimes you may not have control over the actions of the installers and will need a way to clean up the disk after the installation. Since the cleanup application is given no indication of which installers were run, your cleanup tasks must handle all possible installation combinations.

The cleanup application is launched with two additional parameters in the 'oapp' or 'odoc' Apple event — the selected destination disk and the process serial number of the Upgrader application. After being launched, the cleanup application should perform its tasks, then send a conclusion Apple event back to the installation plug-in before quitting.

The following parameters are included by the installation plug-in with the 'oapp' or 'odoc' Apple event upon launch of the cleanup application:

| | |
|--------------------------------|---|
| Target volume | The vRefNum of the selected destination disk. Parameter keyword: 'vtgt' Data type: typeShortInteger |
| Upgrader process serial number | The process serial number of the Upgrader application, so you can send the conclusion Apple event back to the Upgrader application. This parameter is included because the address you receive in the keyAddressAttr or keyOriginalAddressAttr parameters will always be the Finder. Parameter keyword: 'spsn' Data type: typeProcessSerialNumber |

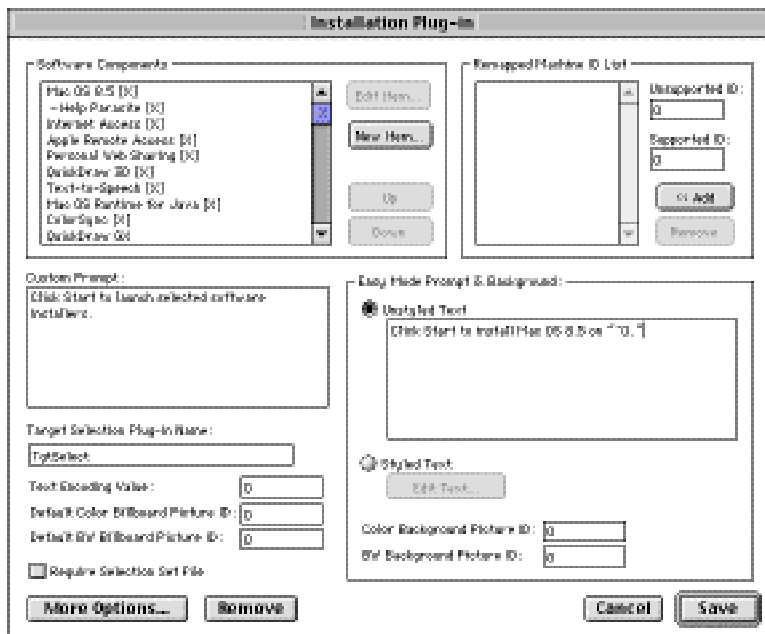
A conclusion Apple event that must be sent to the installation plug-in (using the Upgrader's address) by the cleanup application before the cleanup application quits:

Event class: 'pma!'; Event ID: 'revl'. No additional parameters are necessary.

Editing the Installation Plug-in

The installation editor is shown in Figure 8-9. This editor allows the developer or administrator to change the presentation and functionality of the installation plug-in panels:

Figure 8-9 Installation editor window



The items in the installation plug-in editor window are explained in detail below.

Software Components List

| | |
|--------------|---|
| Edit Item... | Shows the software component window for the selected item. Double-clicking on a software component name is a shortcut for clicking the Edit Item button. |
| New Item... | Shows an empty software component window. If the user clicks OK, the new component entry will added to the software components list. If a component is selected in the list when clicking New Item, the new component will be inserted before |

the selected component; otherwise, it will be added to the end of the list.

Up

Moves the selected component one entry closer to the beginning of the software components list. If the software component has parasites, you must move them up or down separately.

WARNING

Take care when reordering the software components. The order may be important for creating the proper installation result.

Down

Moves the selected item one entry closer to the end of the software components list.

Remapped Machine ID List (Installer Engine only)

The Remapped Machine ID list only applies to Installer Engine-based software components.

Unsupported ID

The gestalt ID of a machine that one or more of the specified Apple Installer Engine-based Installer scripts were not designed to install on. See the “Gestalt.h” file on the most recent ETO CD for a list of current gestalt 'mach' IDs. The Add button is enabled if the value entered is not already in the list.

Supported ID

The gestalt ID of a machine that the unsupported machine ID should be remapped to. If a listed unsupported ID matches the ID of the machine, then its remapped ID is passed to the Apple Installer Engine application upon launch of each Installer script. The Installer script will then make decisions as if it is actually running on the older machine. See the document *Installer Script Guide* for more information about the remapping functionality.

Remove

Removes the selected ID entry from list.

<< Add

Adds the unsupported/supported ID pair to the remapped machine ID list. The list is automatically sorted by the unsupported ID value.

Easy Mode Prompt & Background

Unstyled Text

Select this option to display the entered prompt text in the easy mode panel when running in multi-component mode. The text is limited to 255 characters and will be drawn in the system's font.

You can have Upgrader insert the name of the selected destination disk into your prompt string by using “^0”.

Styled Text

Select this option to display styled text in the easy mode panel when running in multi-component mode. Click the Edit Text button to change the styled text.

Unfortunately, the selected destination disk name cannot be inserted into the styled text.

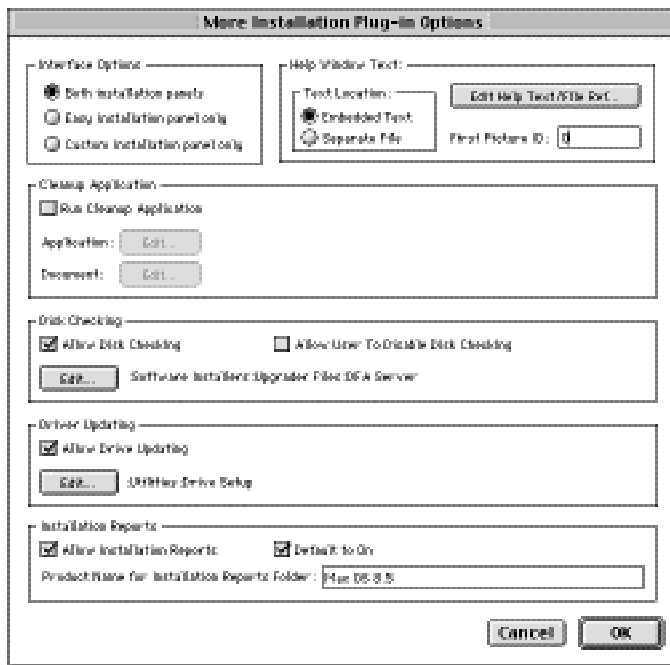
Color Background Picture ID

Enter the ID of the 'PICT' resource that you wish displayed in

| | |
|-------------------------------------|---|
| | <p>the background of the window. This picture will be displayed when the monitor is displaying 256 or more colors/grays.</p> <p>The picture must be exactly 205 pixels in height by 506 pixels in width; otherwise, the picture will be scaled to fit the panel. ModifierTool does not provide a facility for adding, removing or changing 'PICT' resources inside the data file. Use your favorite resource editing program, such as ResEdit or Resorcerer, to add your pictures to the data file.</p> |
| BW Background Picture ID | <p>Enter the ID of the 'PICT' resource that you wish displayed in the background of the window. This picture will be displayed when the monitor is displaying less than 256 colors/grays.</p> |
| Custom Prompt | <p>Enter the prompt text displayed in the customize mode panel. Since the prompt is limited to two lines, please verify that your text fits in the actual panel.</p> <p>You can have Upgrader insert the name of the selected destination disk into your prompt string by using “^0”.</p> |
| Target Selection plug-in name | <p>The name of the plug-in to go back to if the destination disk unexpectedly disappears. This will usually be the target selection plug-in name.</p> |
| Text Encoding Value: | <p>The text encoding value for the localized language of the files being installed by the software component installers. See the “TextCommon.h” interface file included with MPW and Metrowerks for the appropriate text encoding value of the language being installed. Installer scripts that do not specify their own code in the ‘inpr’ will use this value. (Installer Engine only)</p> |
| Default Color Billboard Picture ID | <p>Enter the ID of the 'PICT' resource that you wish displayed in the progress window when the software component does not specify it's own. This picture will be displayed when the monitor is displaying 256 or more colors/grays.</p> <p>The picture can be up to 190 pixels in height by 470 pixels in width.</p> |
| Default BW Billboard Picture ID | <p>Enter the ID of the 'PICT' resource that you wish displayed in the progress window when the software component does not specify it's own. This picture will be displayed when the monitor is displaying less than 256 colors/grays.</p> <p>The picture can be up to 190 pixels in height by 470 pixels in width.</p> |
| Require Selection Set File checkbox | <p>Select this option to require a selection set file be present in the same folder as the data file. This option allows an administrator to force the user to perform a custom tailored default installation, instead of the default installation the developer specified. Developers should never ship their data file with this option selected.</p> <p>See “About Selection Sets” earlier in this chapter for more information about selection sets.</p> |

| | |
|--------|--|
| Remove | Deletes the installation plug-in resources from the data file and closes the editor window. |
| Cancel | Closes the editor window without updating the installation plug-in resources. |
| Save | Updates the installation plug-in resources in the data file with the contents of the window. |

Figure 8-10 More installation plug-in options window



The items in the more installation plug-in options window are explained in detail below.

Interface Options:

| | |
|--------------------------------|---|
| Both installation panels | Select this option to show both the easy and custom installation panels. |
| Easy installation panel only | Select this option to show the easy installation panel only. In this case, the Customize button will be hidden. |
| Custom installation panel only | Select this option to show the custom installation panel only. In this case, the Don't Customize button will be hidden. |

Cleanup Application:

| | |
|-------------------------|--|
| Run Cleanup Application | Select this option to run the clean up application following the successful completion any installation. |
| Edit... | Click to define the file location of the clean up application. |

Disk Checking:

| | |
|-------------------------|---|
| Allow Disk Checking | Select this option to run the disk checking application before starting the actual installation. |
| Run Cleanup Application | Select this option to enable the user to turn off the disk checking operation from within the options dialog. |

| | |
|----------------------------|--|
| Edit... | Click to define the file location of Apple's "DFAServer" application. Currently, "DFAServer" version 1.0 is the only supported application for this option. |
| Driver Updating: | |
| Allow Drive Updating | Select this option to run the driver updating application before starting the actual installation. |
| Edit... | Click to define the file location of Apple's "Drive Setup" application. Currently, "Drive Setup" version 1.3 or later is the only supported application for this option. |
| Installation Reports: | |
| Allow Installation Reports | Select this option to show the installation reports checkbox inside the options dialog. |
| Default to On | Select this option to select the installation reports checkbox inside the options dialog by default. |
| Product Name | Enter the name of the product being installed. A folder with this name will be created inside the Installer Logs folder on root-level of the selected destination disk. |
| Help Window Text: | |
| Text Location: | Select Embedded Text to store the text inside the data file; otherwise, select Separate File to store the text in a text document. If you change the text location after defining the text or a file reference, this data will be deleted when saving the window, since only the text <i>or</i> a file reference is saved, not both. |
| Edit Help Text/File Ref... | Opens the text editor window if the text is stored in the data file; otherwise, opens the file reference window if stored in a separate text file. |
| First Picture ID | Enter the ID of the first 'PICT' resource embedded in the text. |
| Cancel | Closes the more installation plug-in options window, discarding any changes made in the window. |
| OK | Records the changes made in the window. |

Figure 8-11 Software component window

The items in the software component window are explained in detail below.

| | |
|------|---|
| Name | Enter the name of the software component as you wish it to appear to the user in the software component list. |
|------|---|

Interface Options:

| | |
|--|---|
| Included in default installation | Select this option to make this software component part of the recommended installation. The software component will appear initially selected in the customize mode panel. |
| Parasite to preceding | Select this option to signify that the software component is a parasite of the preceding software component. Parasites will be hidden from the user and run whenever the software component preceding it (either another parasite or a host) successfully completes. This feature enables a developer to patch the actions of previous software component. The first software component cannot be a parasite. |
| Show feature sets | Select this option when the Installer script provides multiple feature sets. (Installer Engine only) |
| Force restart after recommended installation | Select this option to require the computer be restarted after performing a recommended installation of the software component onto the currently booted volume. |
| Support dynamic custom hierarchy | Select this option to support an Installer Engine-based Installer script which has a dynamic custom hierarchy. See the document <i>Installer Script Guide</i> for more information about using a dynamic custom hierarchy to provide up-front custom selection. (Installer Engine only) |

Preflight Function:

| | |
|----------------|---|
| Code Rsrc Type | The resource type of the preflight code resource. |
| Code Rsrc ID | The resource ID of the preflight code resource. |

| | |
|---|---|
| Code Rsrc RefCon | A 4-byte value passed to the preflight code resource. |
| Installation Type: | |
| Allow recommended installation | Always select this option, except when you are using single Installer script mode and the the Installer script does not implement a recommended installation. |
| Allow customized installation | Select this option when an Installer script provides a customize option. (Installer Engine only) |
| Allow customized removal | Select this option when an Installer script provides a removal option. (Installer Engine only) |
| Billboards | |
| Billboards are pictures presented while the software component is installing. The actual 'PICT' resources are stored in the data file. If you supply a large number of pictures or the pictures you supply are very large, make the 'PICT' resource purgeable so Upgrader will not run out of memory. | |
| Continue looping through pictures checkbox | Select this option to continue looping through the specified pictures while the software component is installing/removing, presenting each picture for the number seconds specified. Otherwise, the pictures are spread across the duration of the installation. |
| Stop on default billboard picture | When not looping through pictures, select this option to stop on the default billboard picture. Otherwise, Upgrader stops on the last specified billboard. |
| Min. Seconds | The minimum number of seconds this picture should be display. This ensures the picture is displayed long enough for the user to read the picture. |
| Color PICT ID: | Enter the ID of the 'PICT' resource that you wish displayed in the progress window while this software component is running. This picture will be displayed when the monitor is displaying 256 or more colors/grays. The picture can be up to 190 pixels in height by 470 pixels in width. |
| BW PICT ID | Enter the ID of the 'PICT' resource that you wish displayed in the progress window while this software component is running. This picture will be displayed when the monitor is displaying less than 256 colors/grays. The picture can be up to 190 pixels in height by 470 pixels in width. |
| << Add | Adds a new billboard picture entry to the list. |
| Remove | Removes the selected billboard picture entry from list. |
| Host Feature ID List | |
| This list is only used when this component is a parasite and the host is an Installer Engine-based Installer script. | |

| | |
|--------------------------|---|
| Feature ID | <p>Enter the ID of a feature in the custom hierarchy of host software component, which if installed will also cause this parasite to be installed. This effectively allows a parasite installer to be connected to one or more individual features.</p> <p>NOTE</p> <p>If the feature is nested inside the custom hierarchy, you must also include all parent IDs of the feature.</p> |
| << Add | Adds a new billboard picture entry to the list. |
| Remove | Removes the selected billboard picture entry from list. |
| Edit Description Text... | Click to add or change the text displayed in the software component's information window. When text has been entered, an information button will appear on the software component's line. |
| KBytes for Rec. Install | <p>Enter the raw number of kilobytes (1 kilobyte = 1024 bytes) in the files being copied for this software component's recommended installation. The plug-in will approximate that amount space required by adding this value to the number of file forks multiplied by half the block size of the selected destination disk.</p> <p>See "Calculating Installation Sizes" later in this chapter to help you determine this value.</p> |
| # Forks for Rec. Install | <p>The number of file forks being copied for this software component's recommended installation. Most Macintosh files have either a data fork, resource fork, or both. The plug-in uses this value to better estimate the required disk space by calculating the extra space beyond the size of the files needed on the destination given its block size.</p> <p>See the section "Calculating Installation Sizes" to help you determine this value.</p> |
| Progress Time Multiplier | Enter a number from 1 to 200 to adjust the estimated time calculation relative to the other software components. The value is a percentage of an average Installer Engine-based installation. A value from 101 though 200 lengthens the estimated time shown in the progress dialog to account for an installer that takes longer than the average Installer Engine-based installation. |
| Application | <p>Click Edit to define the file location of the installer program. This can be any application, but the installation plug-in contains special handlers for the following applications: Apple's Installer Engine, Apple Software Restore, and MindVision's Installer.</p> <p>For more information about supported installers, see the section "Engines".</p> |

| | |
|----------|---|
| Document | <p>Click Edit to define the file location of a document required by the installer program.</p> <p>This field is used as follows:</p> <ul style="list-style-type: none"> - Installer Engine: an Installer script document that supports 68K- or PPC-based computers. If no file is defined for this field, but the aux. document field has been defined, then the installation plug-in automatically hides this software component when running on a 68K-based computer. - Apple Software Restore: a disk image file. - MindVision Installer: not used. |
| Aux Doc | <p>Click Edit to define the file location of an aux. document</p> <p>This field is used as follows:</p> <ul style="list-style-type: none"> - Installer Engine: an Installer script document to use when running on a PowerPC-based computer. If both document fields are defined, then the installation plug-in automatically selects the document based on the processor type. - Apple Software Restore: a preference file. - MindVision Installer: not used. |
| Remove | Deletes the software component entry. |
| Cancel | Closes the software component window without updating the software installer item. |
| OK | Updates the software component with the contents of the window. |

Installation Plug-in Reference

Global Data

Installation Plug-in Global Data

Data types read:

| | |
|-------------------------------|---|
| Destination disk | The volume refnum of the currently chosen destination disk. (Type: 'trgt', Data: 2-byte signed integer) |
| Clean install flag | If true, tells the Apple Installer (first software component only) that a clean install has been requested by the user. (Type: 'clin', Data: 1-byte Boolean) |
| Goto custom installation flag | If true, the installation plug-in goes straight to the custom installation panel. (Type: 'incu', Data: 1-byte Boolean) |

Data types set:

Restart required flag

A flag designating whether a forced restart is required or not.
(Type: 'rsrq', Data: 1-byte Boolean)

Resources

Installation Plug-in Preference Resource ('ippr')

```
#define      IPPrefFlags                                     \
    boolean   kDontRunCleanupApp, kRunCleanupApp;          \
    boolean   kDontAllowEasyUpgradeMode, kAllowEasyUpgradeMode; \
    boolean   kDontAllowCustomUpgradeMode, kAllowCustomUpgradeMode; \
    boolean   kHelpTextInRsrc, kHelpTextInFile;           \
    boolean   kDontUpdateDrivers, kUpdateDrivers;         \
    boolean   kDontCheckDisk, kCheckDisk;                 \
    boolean   kDontAllowUserToTurnOffCheckDisk, kAllowUserToTurnOffCheckDisk; \
    boolean   kDontRequireSelectionSetFile, kRequireSelectionSetFile; \
    boolean   kDontAllowReports, kAllowReports;           \
    boolean   kDontInitiallySelectReporting, kInitiallySelectReporting; \
    fill bit[6] /* Reserved */

#define      TaskFlags                                     \
    boolean   kOptionalSubTask, kRequiredSubTask;          \
    boolean   kDontSelectInitially, kSelectInitially;      \
    boolean   kStandAloneInstallerScript, kForceInstallWithPriorInstallerScript; \
    boolean   kReserved1, kReserved2;                     \
    boolean   kNoEasyInstallModeAvailable, kEasyInstallModeAvailable; \
    boolean   kNoCustomInstallModeAvailable, kCustomInstallModeAvailable; \
    boolean   kNoCustomRemoveModeAvailable, kCustomRemoveModeAvailable; \
    boolean   kDontShowFeatureSetsInCustomList, kShowFeatureSetsInCustomList; \
    boolean   kDontUseCompFeatureLookup, kUseCompFeatureLookup; \
    boolean   kDontRequireRestartForEasy, kRequireRestartForEasy; \
    fill bit[6] /* Reserved */

type 'ippr' {
    switch {
        case format3:
            key integer = 3; /* Format version */
            IPPrefFlags; /* Flags */
            longint; /* Revision Number */
            integer; /* General Strings STR# Rsrc ID */
            integer; /* Target selection plug-in name - 'STR' Rsrc ID */
            integer; /* Software component names list - STR# Rsrc ID */
            integer; /* DFA Server application ref - 'flrf' Rsrc ID */
            integer; /* Drive Setup application ref - 'flrf' Rsrc ID */
            integer; /* Cleanup application ref - 'flrf' Rsrc ID */
            integer; /* Cleanup application document ref - 'flrf' Rsrc ID */
            integer; /* Help text - 'flrf' or 'TEXT' Rsrc ID */
            integer; /* First help text picture - 'PICT' Rsrc ID */
            integer; /* Default color billboard picture - 'PICT' Rsrc ID */
            integer; /* Default BW billboard picture - 'PICT' Rsrc ID */
            integer; /* Easy Panel Styled Text - 'TEXT' Rsrc ID */
            integer; /* Background color panel - 'PICT' Rsrc ID */
            integer; /* Background BW panel - 'PICT' Rsrc ID */
            longint; /* Text Encoding value. */
            integer = $$CountOf ( RemapIDPairs );
            wide array RemapIDPairs{
                integer; /* Unsupported machine ID */
                integer; /* Supported machine ID */
            };
    };
}
```



```

integer = $$CountOf ( SubTask );
wide array SubTask{
    TaskFlags;          /* Software Component Flags */
    integer;             /* Installer application ref - 'flrf' Rsrc ID */
    integer;             /* Installer document ref - 'flrf' Rsrc ID */
    integer;             /* Installer aux.document ref - 'flrf' Rsrc ID */
    literal longint;     /* Preflight code resource type */
    integer;             /* Preflight code resource ID - 'pffn' Rsrc ID */
    longint;             /* Preflight code resource refcon */
    integer;             /* Billboard Rsrc ID - 'pdgs' Rsrc ID */
    longint;             /* Actual Kbytes copied for Easy Install */
    longint;             /* Number of file forks for Easy Install */
    integer;             /* Progress Time Multiplier */
    integer;             /* Component Info - 'TEXT' Rsrc ID */
    integer = $$CountOf ( HostFeatureIDs ); /* For parasite use only */
    wide array HostFeatureIDs{
        integer;        /* Host Feature ID */
    };
};
};
};
};

```

kDontRunCleanupApp/kRunCleanupApp flag

Use kDontRunCleanupApp to not run the clean up application. Use kRunCleanupApp to run the application specified in the Cleanup application ref field after any installations are complete.

kDontAllowEasyUpgradeMode/kAllowEasyUpgradeMode flag

Use kDontAllowEasyUpgradeMode to hide the easy installation panel. Use kAllowEasyUpgradeMode to allow the user to see the easy installation panel.

kDontAllowCustomUpgradeMode/kAllowCustomUpgradeMode flag

Use kDontAllowCustomUpgradeMode to hide the custom installation panel. Use kAllowCustomUpgradeMode to allow the user to see the custom installation panel.

kHelpTextInRsrc, kHelpTextInFile flag

Use kHelpTextInRsrc to specify that the Help Text Reference ID field points to a 'TEXT' resource. Use kHelpTextInFile to specify that the Help Text Reference ID field points to a 'flrf' resource.

kDontUpdateDrivers/kUpdateDrivers flag

Use kDontUpdateDrivers to not run the driver updating program. Use kUpdateDrivers to run the application specified in the Drive Setup application ref field after the user clicks Start in the installation panel.

kDontCheckDisk/kCheckDisk flag

Use kDontCheckDisk to not run the disk checking program. Use kCheckDisk to run the application specified in the DFAServer application ref field after the user clicks Start in the installation panel.

kDontAllowUserToTurnOffCheckDisk/kAllowUserToTurnOffCheckDisk flag

Use kDontAllowUserToTurnOffCheckDisk to hide the disk checking checkbox in the options dialog, thereby forcing the user to check the disk before each installation. Use kAllowUserToTurnOffCheckDisk to show the disk checking checkbox in the options dialog.

| | |
|--|---|
| kDontRequireSelectionSetFile/kRequireSelectionSetFile flag | Use kDontRequireSelectionSetFile to not require a selection set file to run. Use kRequireSelectionSetFile to require a selection set file be present in the same folder as the data file. This option allows an administrator to force the user to perform a custom tailored default installation, instead of the default installation the developer specified. Developers should never ship their data file with this option selected. |
| kDontAllowReports/kAllowReports flag | Use kDontAllowReports to hide the installation reports checkbox that would otherwise show in the options dialog. Use kAllowReports to show the installation reports checkbox inside the options dialog. When enabling reports, make sure to fill in the product name contained in the string list resource referenced by the plug-in string list ID field. |
| kDontInitiallySelectReporting/kInitiallySelectReporting flag | Use kDontInitiallySelectReporting to not select the installation reports checkbox inside the options dialog by default. Use kInitiallySelectReporting to select the installation reports checkbox inside the options dialog by default. |
| Revision Number | <p>A reference count maintained by the ModifierTool to ensure a selection set file for a particular revision of the preference resource. When a selection set is created, this revision number is stored in the selection set file. If upon loading a selection set the revision number in the selection set file does not match the number in the 'ippr' resource, the installation plug-in will refuse to load the selection set.</p> <p>If you don't use ModifierTool to create and modify the 'ippr' resource, make sure to increment this value for each revision of your 'ippr'. You can start with any value you wish.</p> |
| Plug-in string list Rsrc ID | <p>The ID of a 'STR#' resource containing text strings required by the plug-in.</p> <p>'STR#' resource string index definitions:</p> <ol style="list-style-type: none"> 1. Easy installation panel prompt 2. Custom installation panel prompt 3. Product name given to the installation report folder |
| Target selection plug-in ref ID | The ID of a 'STR ' resource containing the name of the Target Selection plug-in to go back to if the destination disk unexpectedly disappears. |
| Software component names list ref ID | The ID of a 'STR#' resource containing names of the software components as they are displayed to the user. Each name occupies a separate index, corresponding to the order in which the software components are list. |
| DFAServer application ref | The ID of a 'flrf' resource containing the file location of Apple's "DFAServer" application. |
| Drive Setup application ref | The ID of a 'flrf' resource containing the file location of Apple's "Drive Setup" application. |

| | |
|------------------------------------|---|
| Cleanup application ref | The ID of a 'flrf' resource containing the file location of an application to be run after any successful installation to perform clean up-type operations. It's normally best to perform all clean up operations within the software installers themselves, instead of referencing a separate application here. |
| Cleanup application document ref | The ID of a 'flrf' resource containing the file location of a document to be opened by the cleanup application. Use 0 if no document is necessary. |
| Help Text Reference ID | The ID of a 'TEXT' resource if the text is stored in the data file; otherwise, the ID of 'flrf' resource if stored in a separate text file. |
| Help Text First Picture ID | The ID of a 'PICT' resource containing the first picture to be embedded in the help text. |
| Default Color Billboard Picture ID | <p>The ID of the 'PICT' resource that you wish displayed in the progress window when the software component does not specify it's own. This picture will be displayed when the monitor is displaying 256 or more colors/grays.</p> <p>The picture can be up to 190 pixels in height by 470 pixels in width.</p> |
| Default BW Billboard Picture ID | <p>The ID of the 'PICT' resource that you wish displayed in the progress window when the software component does not specify it's own. This picture will be displayed when the monitor is displaying less than 256 colors/grays.</p> <p>The picture can be up to 190 pixels in height by 470 pixels in width.</p> |
| Easy Panel Styled Text | The ID of a 'TEXT' resource containing the text you wish displayed in the easy installation panel. A non-zero value in this field overrides the easy installation prompt text contained in the string list resource referenced by the plug-in string list ID field. |

NOTE

Unlike the unstyled easy installation prompt string stored in the string list, the destination disk cannot be inserted into the text referenced by this field.

| | |
|-----------------------------|--|
| Color Background Picture ID | <p>The ID of the 'PICT' resource that you wish displayed in the background of the window. This picture will be displayed when the monitor is displaying 256 or more colors/grays.</p> <p>The picture must be exactly 205 pixels in height by 506 pixels in width; otherwise, the picture will be scaled to fit the panel. ModifierTool does not provide a facility for adding, removing or changing 'PICT' resources inside the data file. Use your favorite resource editing program, such as ResEdit or Resorcerer, to add your pictures to the data file.</p> |
| BW Background Picture ID | The ID of the 'PICT' resource that you wish displayed in the background of the window. This picture will be displayed when the monitor is displaying less than 256 colors/grays. |
| Text Encoding Value: | The text encoding value for the localized language of the files |

being installed by the software component installers. See the “TextCommon.h” interface file included with MPW and Metrowerks for the appropriate text encoding value of the language being installed. Installer scripts that do not specify their own code in the ‘inpr’ will use this value. (Installer Engine only)

Remap Entry:

| | |
|------------------------|---|
| Unsupported machine ID | The gestalt ID of a machine that one or more of the specified Apple Installer-based Installer scripts were not designed to install on. (See the “Gestalt.h” file on the most recent ETO CD for a list of current gestalt 'mach' IDs.) |
| Supported machine ID | The gestalt ID of a machine that the unsupported machine ID should be remapped to. If a listed unsupported ID matches the ID of the machine, then its remapped ID is passed to the Apple Installer upon launch of each Installer script. The Installer script will then make decisions as if it is actually running on the older machine. See the document <i>Installer 4.0.7 Technical Guide</i> for more information about the remapping functionality. |

Software Component:

| | |
|--|--|
| kOptionalSubTask/kRequiredSubTask flag | Use kOptionalSubTask to not make this software component part of the default installation. Use kRequiredSubTask to make this software component part of the default installation. |
| kDontSelectInitially/kSelectInitially flag | Use kDontSelectInitially to have the software component default to unchecked in the custom installation panel. Use kSelectInitially to have the software component initially selected in the custom installation panel. |
| kStandAloneInstallerScript/kForceInstallWithPriorInstallerScript flag | Use kStandAloneInstallerScript for standard, non parasite software installers. Use kStandAloneInstallerScript to signify that the component is a parasite of the preceding item. Parasites will be hidden from the user and run whenever the software installer preceding it (another parasite or a host) successfully completes. This feature enables a developer to patch an installer. The first software component cannot be a parasite. |
| kNoEasyInstallModeAvailable/kEasyInstallModeAvailable flag | Use kNoEasyInstallModeAvailable when an Installer Engine-based Installer script does not provide a recommended installation. Use kEasyInstallModeAvailable for all other types of installer applications and Installer Engine-based Installer script provides a recommended installation. |
| kNoCustomInstallModeAvailable/kCustomInstallModeAvailable flag (Installer Engine only) | Use kNoCustomInstallModeAvailable when an Installer script does not provide a customize option. Use kCustomInstallModeAvailable to when an Installer script provides a customize option. |
| kNoCustomRemoveModeAvailable/kCustomRemoveModeAvailable flag (Installer Engine only) | Use kNoCustomRemoveModeAvailable when an Installer script does not provide a removal option. Use |

| | |
|--|---|
| | kCustomRemoveModeAvailable when an Installer script provides a removal option. |
| kDontShowFeatureSetsInCustomList/kShowFeatureSetsInCustomList flag (Installer Engine only) | Use kDontShowFeatureSetsInCustomList to not show easy feature sets. Use kShowFeatureSetsInCustomList to show easy feature sets when the Installer script supports multiple feature sets. See the document <i>Installer Script Guide</i> for more information about a easy feature sets. |
| kDontUseCompFeatureLookup/kUseCompFeatureLookup flag (Installer Engine only) | Use kDontUseCompFeatureLookup when the Installer script doesn't have a dynamic custom hierarchy. Use kUseCompFeatureLookup to support an Installer Engine-based Installer script which has a dynamic custom hierarchy. See the document <i>Installer Script Guide</i> for more information about using dynamic custom hierarchy to provide up-front custom selection. |
| kDontRequireRestartForEasy/kRequireRestartForEasy flag | Use kDontRequireRestartForEasy if the recommended installation does not require a restart. Use kRequireRestartForEasy to require the computer be restarted after performing a recommended installation of the software component onto the currently booted volume.. |
| Installer application ref | The ID of a 'flrf' resource containing the file location of the installer program. For more information about supported installers, see the section “Engines”. |
| Installer document ref | <p>The ID of a 'flrf' resource containing the file location of the installer document.</p> <p>This field is used as follows:</p> <ul style="list-style-type: none"> - Installer Engine: an Installer script document that supports 68K- or PPC-based computers. If no file is defined for this field, but the aux. document field has been defined, then the installation plug-in automatically hides this software component when running on a 68K-based computer. - Apple Software Restore: a disk image file. - MindVision Installer: not used. |
| Installer aux. document ref | <p>The ID of a 'flrf' resource containing the file location of the auxiliary installer document.</p> <p>This field is used as follows:</p> <ul style="list-style-type: none"> - Installer Engine: an Installer script document to use when running on a PowerPC-based computer. If both document fields are defined, then the installation plug-in automatically selects the document based on the processor type. - Apple Software Restore: a preference file. - MindVision Installer: not used. |
| Preflight code resource type | The resource type of the preflight code resource. |
| Preflight code resource ID | The resource ID of the preflight code resource. |
| Billboard resource ID | The ID of a 'pdgs' resource containing a definition of the |

| | |
|---------------------------------------|--|
| KBytes for Rec. Install | <p>pictures to display in the progress dialog during installation.</p> <p>The raw number of kilobytes (1 kilobyte = 1024 bytes) in the files being copied for this software component's recommended installation. The plug-in will approximate that amount space required by adding this value to the number of file forks multiplied by half the block size of the selected destination disk.</p> <p>See the section "Calculating Installation Sizes" to help you determine this value.</p> |
| Number of File Forks for Rec. Install | <p>The number of file forks being copied for this software component's recommended installation. Most Macintosh files have either a data fork, resource fork, or both. The plug-in uses this value to better estimate the required disk space by calculating the extra space beyond the size of the files needed on the destination given its block size.</p> <p>See the section "Calculating Installation Sizes" to help you determine this value.</p> |
| Progress Time Multiplier | <p>A number from 1 to 200 to adjust the estimated time calculation relative to the other software components. The value is a percentage of an average Installer Engine-based installation. A value from 101 through 200 lengthens the estimated time shown in the progress dialog to account for an installer that takes longer than the average Installer Engine-based installation.</p> |
| Component Info. | <p>The ID of a 'TEXT' resource containing the text you wish displayed in component information window. Use zero if you don't want to provide informational text.</p> |
| Host Feature ID List: | |
| Feature ID | <p>The ID of a feature in the custom hierarchy of host software component, which if installed will also cause this parasite to be installed. This effectively allows a parasite installer to be connected to one or more individual features.</p> |

NOTE

If the feature is nested inside the custom hierarchy, you must also include all parent IDs of the feature.

Billboard Resource ('pdgs')

```

#define    billboardPictureFlags                                \
    boolean    kDoNotLoop, kLoop;                               \
    boolean    kStopOnLast, kStopOnDefault;                     \
    fill bit[14]

type 'pdgs' {
    switch {
        case format0:
            key integer = 0;                                     /* Format version */
            switch {

```

```

case simplePictureDisplay:
    key literal longint = 'PICT';          /* Picture billboard type */
    billboardPictureFlags;                 /* Flags */
    integer = $$CountOf (pictureList);
    wide array pictureList {
        integer; /* Minimum seconds to display */
        integer; /* Color billboard picture - 'PICT' ID */
        integer; /* B&W billboard picture - 'PICT' ID */
        integer; /* Optional File Ref. - 'flrf' ID */
    };
};
};
};

```

kDoNotLoop/kLoop

Use kDoNotLoop to spread the pictures across the duration of the installation. Use kLoop to continue looping through the specified pictures while the software component is installing/removing, presenting each picture for the number seconds specified.

kStopOnLast/kStopOnDefault

Use kStopOnLast when not looping through pictures to stop on the last billboard picture. Use kStopOnDefault when not looping through pictures to stop on the default billboard picture.

Minimum seconds to display

The minimum number of seconds this picture should be display. This ensures the picture is displayed long enough for the user to read the picture.

Color billboard picture

The ID of the 'PICT' resource that you wish displayed in the progress window while this software component is running. This picture will be displayed when the monitor is displaying 256 or more colors/grays.

The picture can be up to 190 pixels in height by 470 pixels in width.

BW billboard picture

The ID of the 'PICT' resource that you wish displayed in the progress window while this software component is running. This picture will be displayed when the monitor is displaying less than 256 colors/grays.

The picture can be up to 190 pixels in height by 470 pixels in width.

Optional File Ref

Not supported.

Conclusion Plug-in

This chapter describes the Conclusion Plug-in.

About the Conclusion Plug-in

The conclusion plug-in displays an alert informing the user that the process is complete, but gives the user the option to go back and perform steps again, if necessary. Figures 9-1 and 9-2 show the conclusion plug-in alerts in the Install Mac OS 8 program.

Plug-in file name: Conclusion

Figure 9-1 Conclusion plug-in alert with default quit message

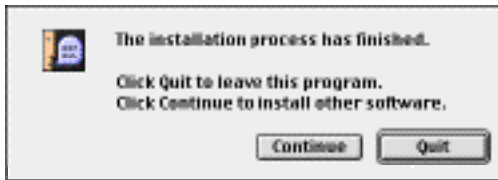
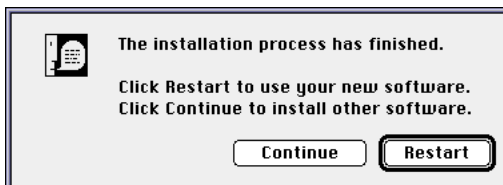


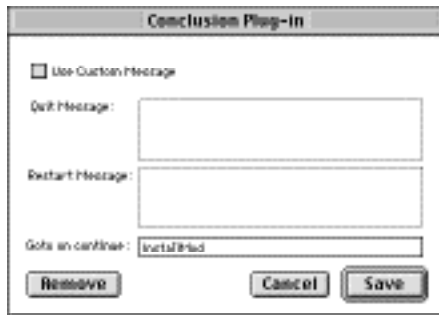
Figure 9-2 Conclusion plug-in alert with default restart message



Editing the Conclusion Plug-in

The conclusion editor is shown in Figure 9-3. This editor allows the developer or administrator to change the message shown in the conclusion alert and the plug-in to go back to when the user clicks Continue.

Figure 9-3 Conclusion editor window



The items in the conclusion plug-in editor window are explained in detail below.

Use Custom Message

Select this option to override the default text and use the text provided in the Quit Message and Restart Message field in the alert. You may want to provide your own custom messages if the default messages not appropriate in the context of your Upgrader-based program.

Quit Message

Enter the custom message that will show in the quit alert.

The default quit message is:

“The installation process has finished.
Click Quit to leave this program.
Click Continue to install other software.”

Restart Message

Enter the custom message that will show in the restart alert.

The default restart message is:

“The installation process has finished.
Click Restart to use your new software.
Click Continue to install other software.”

Goto on continue

The name of the plug-in to go back to when the user clicks Continue in the conclusion alert. This will usually be the preceding plug-in.

Remove

Deletes the conclusion plug-in resources from the data file and closes the editor window.

Cancel

Closes the editor window without updating the conclusion plug-in resources.

Save

Updates the conclusion plug-in resources in the data file with the contents of the window.

Conclusion Plug-in Reference

Global Data

Conclusion Plug-in Global Data

Data types read:

Restart required flag

A flag designating whether a forced restart is required or not. If this type is not defined, the conclusions plug-in uses the quit alert.

Conclusion Plug-in Preference Resource ('ccpr')

Resources

Conclusion Plug-in Preference Resource ('ccpr')

```
#define    CCPPrefFlags                                \
    boolean    kDefaultMessage, kCustomMessageProvide;    \
    fill bit[15]                                /* Reserved */

type 'ccpr' {
    switch {
        case format1:
            key integer = 1;                /* Format version */
            CCPPrefFlags;                /* Flags */
            integer;                /* Plug-in ref when continuing - 'STR ' Rsrc ID */
            integer;                /* Plug-in string list - 'STR#' Rsrc ID */
    };
};
```

kDefaultMessage/kCustomMessageProvide flag

Use kDefaultMessage to use the built-in restart and quit alert text. Use kCustomMessageProvide to override the default text and use the text provided in the data file.

Plug-in reference when continuing

The ID of a 'STR ' resource containing the name of the plug-in to advance to when the user clicks the Continue button in the conclusion alert. This will usually be the preceding plug-in.

Plug-in string list Rsrc ID

The ID of a 'STR#' resource containing text strings required by the plug-in.

'STR#' resource string index definitions:

1. Custom restart message text
2. Custom quit message text

Writing Upgrader Plug-ins

About the Upgrader Plug-in

Existing Upgrader-based programs can be extended and new Upgrader-based programs can be created by writing new plug-in files. Programmers familiar with writing applications using the Macintosh Toolbox in order to display dialogs and interact with users should feel very comfortable writing new plug-ins. The Upgrader API extends and simplifies the common panel management tasks that most plug-in writers will need to perform.

An Upgrader plug-in is a file that the Upgrader application loads and executes in the order specified by the data file. Most plug-in developers will find that they need to accomplish the following tasks:

1. Design the visual appearance of your plug-in.
2. Define the information to be stored in the data file.
3. Create a new plug-in project or duplicate an existing project.
4. Create the resources specific to your plug-in (making sure to include the plug-in format resource).
5. Write and compile your plug-in code.
6. Write a ModifierTool Editor and resource definition files so others can easily edit your data file resources.

Human Interface Guidelines

Your plug-in will be more easily integrated into existing Upgrader-based programs or mixed with other plug-ins if your panels follow some basic design guidelines. The Upgrader panel-based human interface shares characteristics with other assistant-type programs developed by Apple and others. An assistant gains its ease of use from proper division of a larger task into steps that are manageable by a wide range of audiences.

A few fundamental rules govern the Upgrader-based programs developed so far:

- Use of a non-resizable window that fits all monitors shipped by Apple.
- Panels are divided into three areas: top header contains graphic and panel title, bottom footer contains navigation buttons and content area is specific to the task step.
- Each panel has common navigation buttons, although the Continue button can be renamed to denote the action to be performed.

- If a panel performs an action, then it automatically continues to the next panel. Otherwise, the user should be notified the action failed and possibly be given the option to skip this step.

In addition to deciding how many panels a single plug-in should use, you may need to split an overly complex plug-in into multiple plug-ins. This approach gives administrators an easier way to address a wider range of specialized purposes.

Data File Resources

Administrators will be able to reuse your plug-in more easily if you carefully divide your resources between the data file and the plug-in file. The easiest way to help make this decision is to place yourself in the administrator's position.

Most plug-ins store the following information in the data file:

- All file references
- Any text that might need to be tailored to the context of a different Upgrader-based program or a specific use of the original program
- Values that are compared to environmental parameters to make decisions (such as a machine ID or system version)
- Any name of other plug-ins used in branching

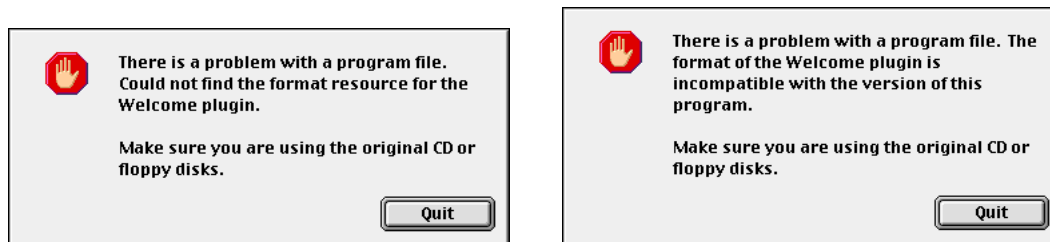
Always supply a resource definition file containing definitions of new resources that you store in the data file. This will be required by administrators using the Rez MPW tool. To make the information stored in the data file modifiable by the widest number of administrators, we suggest that you create a ModifierTool Editor. As an alternate, supply a template file for use with Resorcerer.

The Plug-in File

When the Upgrader application locates the plug-in file, it looks for two resources: the plug-in file format resource ('pfmt' ID=1) and the 68K code resource to execute ('PLUG' ID=0). The file will contain other resources required by the plug-in itself.

The Upgrader application uses the plug-in file format resource to ensure the plug-in is compatible with the version of Upgrader before trying to run it. Figure 10-1 shows the alerts you will receive from the Upgrader application upon loading a plug-in file with a missing or incorrect format resource.

Figure 10-1 Alert presented when format of plug-in is not found or is incorrect



You can create the format resource using Resorcerer or a resource compiler. Constants in the UpgraderPluginTypes.r file define the version number compatible with the latest version of the Upgrader application.

Upgrader application versions and the plug-in versions they support:

Upgrader Versions

1.1 - 1.2.1

Plug-in File Versions Supported

0.2

Listing 10-1 shows the plug-in file format resource for use with a resource compiler.

Listing 10-1 Plug-in format resource using resource compiler

```
#include "UpgraderPluginTypes.r"

resource ('pfmt', 1) {
    kLatestPluginFileFormatVersion;
}
```

After the plug-in file has been verified as compatible, the Upgrader application looks for the code resource to execute. The current version of the Upgrader application requires that the code resource be created using a development environment that supports A4-based globals. Since Apple's MPW development tools do not, we have adopted the Metrowerks CodeWarrior development environment to present our examples.

The Plug-in Project

Your plug-in project will usually contain everything necessary to build your plug-in, so once it is set up, you can concentrate on writing the code that will implement your panels. While it's easier to start from the example Metrowerks projects provided in the Upgrader SDK, we describe the creation of a new project here in case you do not have access to the SDK.

NOTE

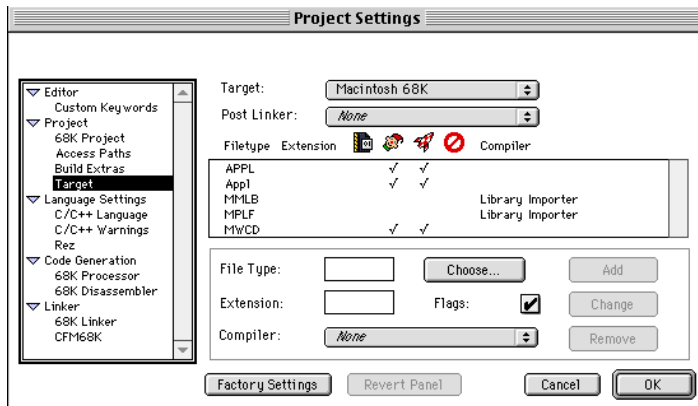
The example projects discussed here are based on release 10 of the Metrowerks CodeWarrior development tools. The latest release will most likely work with minor modifications to your project, but the screen shots provided may look different than the version you are using.

Project Settings

After you have created a new project, choose Project Settings from the Edit menu to display the Project Settings window. Specific settings are required in order to build the plug-in file, so please follow these instructions:

Click "Target" to show the preference panel in Figure 10-2.

Figure 10-2 Target options in the Project Settings window.

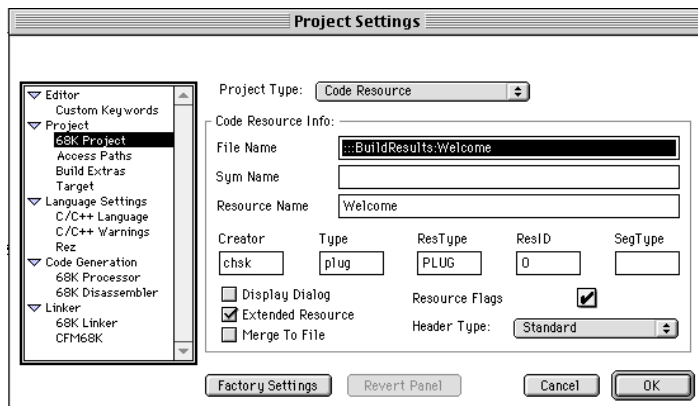


In the Target preference panel, make these changes:

1. Select Macintosh 68K from the Target pop-up menu

Click “68K Project” to show the preference panel in Figure 10-3.

Figure 10-3 68K Projects options in the Project Settings window.

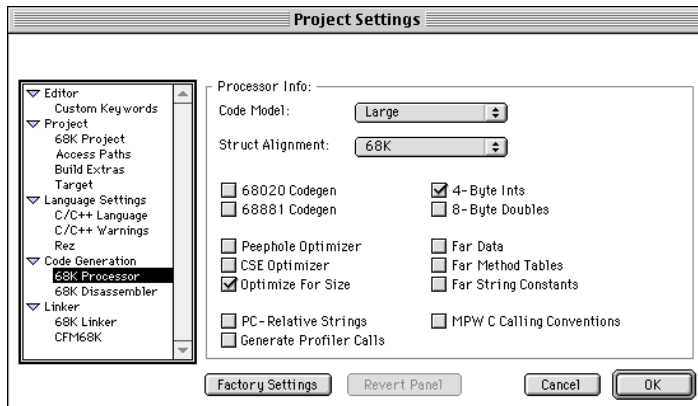


In the 68K Project preference panel, make these changes:

1. Select “Code Resource” from the Project Type pop-up menu .
2. Set Creator to “chsk”.
3. Set Type to “plug”.
4. Set ResType to “PLUG”.
5. Set ResID to “0”.
6. Select Extended Resource option.

Click “68K Processor” to show the preference panel in Figure 10-4.

Figure 10-4 68K Processor options in the Project Settings window

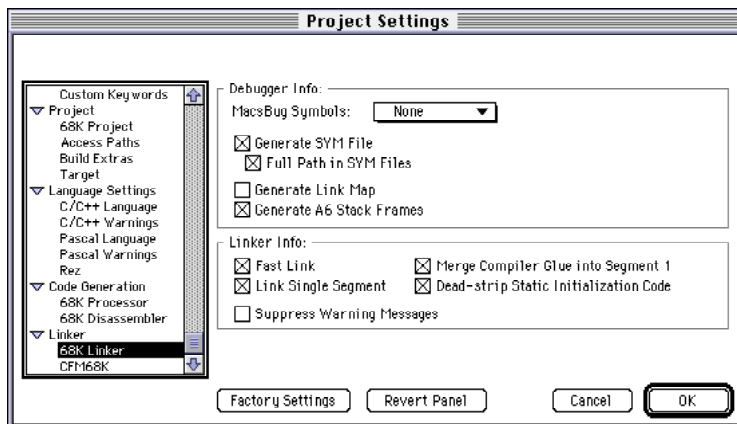


In the 68K Processor preference panel, make these changes:

1. Select Large from the Code Model pop-up menu.
2. Select the 4-Byte Ints option.

Click “68K Linker” to show the preference panel in Figure 10-5.

Figure 10-5 68K Linker options in the Project Settings window



In the 68K Linker preference panel, make these changes:

1. Select the Link Single Segment option.

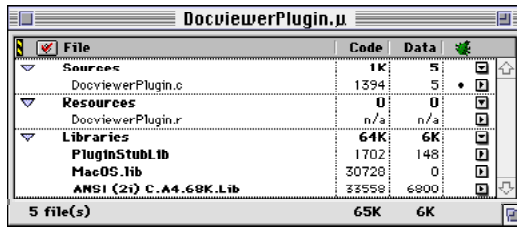
You may also need to add additional paths in the Access Path preference panel depending on where you place the interface and library files provided in the SDK.

Project Files

A new project starts empty, so you'll need to add files to the project. For a small plug-in project, you might need a single code file, a single resource file, and three or more library files.

Figure 10-6 shows the project window of a small plug-in project

Figure 10-6 Project window



The files have been grouped into three segments to make organization easier: a segment for the source files, a segment for the resource files, and a segment for libraries.

The source files can be C-based, C++-based or a combination. If you allocate objects in C++ using the new operator, please read the section “Memory Issues”. You’ll need to include the file “UpgraderPlugin.h” in order to call Upgrader-provided routines.

The resource files can be either “.r” files that must be compiled when your project is built or precompiled resource files that will be copied directly into the plug-in file. If you use “.r” files, then you’ll need to include the file “UpgraderPluginTypes.r” from within your “.r” file to have access to the plug-in format resource definition. If you use Resorcerer to create your resource file then you’ll want to use the private template file provided in the SDK.

NOTE

Resources stored in the plug-in file should have IDs between 2,000 and 10,000 to avoid conflicts with IDs of resources of the same type stored in the data file.

The library files will be a combination of libraries that come with the Metrowerks development kit and the “PluginStubLib” library file provided in the Upgrader SDK. Make sure to use the libraries that support A4-based globals when given a choice.

Files provided in the SDK that must be included in your project:

| <u>File Name</u> | <u>File Description</u> |
|-----------------------|---|
| UpgraderPlugin.h | A header file to be included by your “.c” or “.cp” files to have access to the Upgrader API routines, error definitions and various enumerations, constants and structures. This file may also be included by “.r” files to gain access to certain constants. The information contained in this file is detailed in the section “Upgrader API Reference”. |
| UpgraderPluginTypes.r | A resource description file to be included by “.r” files which need the plug-in format resource definition. |
| PluginStubLib | A library file to be added to the project that implements the Upgrader APIs routines. |

Memory Management

When the plug-in code resource is loaded and executed, your code is essentially running as if it’s part of the Upgrader application. Memory allocations that you make will, by default, be allocated from the Upgrader’s heap. Special care must be taken to allow the Upgrader’s memory management strategy to coexist with that of your plug-in.

We explore two important areas of memory management to keep in mind while writing your plug-in: ensuring enough memory is available and preventing memory leaks.

Plug-in Memory Allocation

The Upgrader application is shipped with a partition of 750K. This should handle most plug-ins, but you may need to instruct another developer or administrator using your plug-in to increase the Upgrader application's partition size based on two main factors: memory needs of the plug-in requiring the most heap space, and the size of data file resources preloaded to support ejectable media. The preloaded resources are the responsibility of the person creating the data file, but the memory required by the plug-in while it is running is the responsibility of the plug-in developer. See the section "Partition Size" in chapter 2 for the equation the developer should use to calculate the appropriate partition.

You should calculate the amount of memory your plug-in requires for all modes of operation, then check that this amount of memory is available within your initialization routine. If you don't have enough memory to continue, tell the user to increase the partition size and then call `PSQuitShell`. As a general rule, you should leave at least 50K free at all times to enable the Upgrader application to handle your API calls. Make sure to add this 50K to your free memory check during your initialization routine. If your plug-in sets more than 1K of global data then add this amount to the other memory requirements of your plug-in.

You should document the total memory requirements of your plug-in so other developers and administrators using your plug-in can calculate an appropriate partition size.

Preventing Memory Leaks

When the Upgrader calls your termination routine, you must deallocate any memory that was allocated either directly or indirectly by you during the run of your plug-in. The easiest way to determine if your plug-in is leaking memory during invocation is to use a heap inspector, such as the "HT" command in MacsBug or a separate application like Zone Ranger. If the number of handles and pointers increase after each run of your plug-in, then you know something is not being deallocated and further investigation is required.

One common, and frustrating, memory leak is the memory pools allocated by the `new` operator. If you are allocating objects in C++ using the default `new` operator, you will need to compile and link with modified versions of the memory allocation routines and explicitly dispose of this memory from within your termination routine. You can find additional information on this subject on the CodeWarrior CD.

Using the Upgrader API

As a plug-in developer, you will implement plug-in-defined routines and call Upgrader-provided routines to present panels and handle interaction with the user.

NOTE

At the present time, the Upgrader API is only callable from 68K code and must be compiled and linked using a development environment that support A4-based globals. Unfortunately, this means that the APIs are not compatible with the standard MPW compiler.

Setting Up Plug-in-Defined Routines

The Upgrader expects three routines to be defined by your plug-in, which the Upgrader application will call at specific times. An initialization routine, `InitializePluginModule`, is assumed to be the entry point into the code resource and should be your main routine. A termination routine, `TerminatePluginModule`, is called whenever the plug-in gives up control to another plug-in, or the Upgrader quits. An event handler, `HandleEventForPluginModule`, is called for each user event.

You'll need to register your event handler and termination routines using the `PSRegisterHandler` routine from within your initialization routine. Listing 10-2 presents an example of how the `InitializePluginModule` routine should begin (the error checking after the call to `PSRegisterHandler` is omitted for clarity).

Listing 10-2 Registering plug-in-defined routines

```
void InitializePluginModule ( void          *inPSTable,
                               SInt32       inRefCon,
                               Boolean      inEnterAtBeginning )
{
#pragma unused ( inRefCon, inEnterAtBeginning)    // these parameters are never used

    EnterPlugin();

    SetupPlugin(inPSTable);

    (void) PSRegisterHandler(kEventHandlerID,
                           (UnivProcPtr)HandleEventForPluginModule);

    (void) PSRegisterHandler(kTerminationHandlerID,
                           (UnivProcPtr) TerminatePluginModule);

    // ... etc.

    ExitPlugin();
}
```

In order to allow the plug-in access to its A4-based global variables, two routines are provided: `EnterPlugin` and `ExitPlugin`. These routines must bracket any code inside a routine called from the Upgrader application or system that accesses a plug-in global variable.

Listing 10-3 shows how to use `EnterPlugin` and `ExitPlugin` routines.

Listing 10-3 Ensuring access to global variables using `EnterPlugin` and `ExitPlugin` routines

```
Boolean      HandleEventForPluginModule ( EventRecord *inEvent )
{
    Boolean    wasHandled;

    EnterPlugin();

    // ... etc.

    ExitPlugin();

    return wasHandled;
}
```

Managing Panels

The term *panels* in Upgrader is taken to mean the various windows that plug-ins display. Help windows are also implemented as panels, but are set up, shown and hidden with a different set of routines. Panels are described in plug-ins as 'DITL' resources in the plug-in (corresponding 'DLOG' resources are not required).

There are two types of Upgrader panel, *global* panels and *custom* panels. The Global panel is the panel which is shared among all plug-ins. The motivation for sharing a common panel is that when a new plug-in is loaded, rather than completely removing the previous panel and drawing a new panel, one panel can be used and the 'DITL' can simply be swapped, making for a faster and cleaner transition between plug-ins. Custom panels are specific to one plug-in and are only displayed while that plug-in is running and then removed when the Upgrader moves on to the next plug-in.

The Global panel is created with a call to `PSSetupNewPanel`, and the custom panel is created with a call to `PSNewCustomPanel`. `PSSetupNewPanel` will check first to see if the Global panel has already been created and if so, only changes the panel's contents. If the Global panel is not currently being displayed, a new Global panel is created. `PSNewCustomPanel` creates a new panel each time it is called.

WARNING

Never use Upgrader routines to manage the content of a window that you have created using `GetNewDialog`, `NewDialog` or any other Dialog Manager routine.

Managing Panel Contents

The following routines are available to plug-in writers for creating panel items; `PSSetPanelItem`, `PSGetPanelItem`, `PSNewStyledStringItem`, `PSNewStyledTextItem` and `PSNewUserItem`. See the section "Using the Document Viewer" for information about the `PSNewDocViewerItem` routine and creating a DocViewer item in a panel.

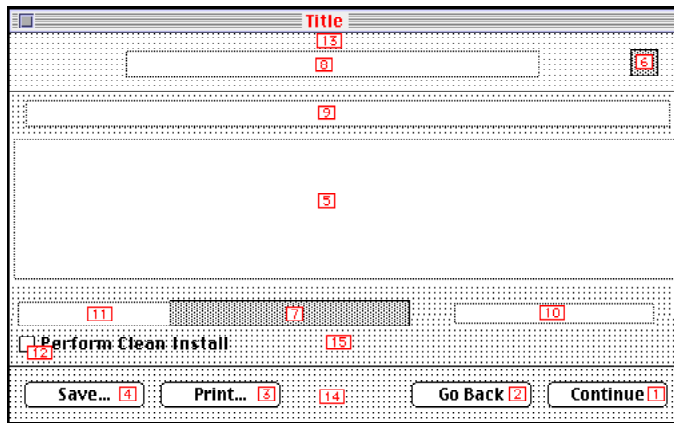
Items which can be placed on the panel include:

- Standard dialog items - All standard dialog items, i.e. anything which can be placed on a 'DITL' can also be used on an Upgrader panel. The two exceptions to this are static text items and edit text items.
- Custom panel items - Upgrader predefined "custom" panel items are created using standard user items and provided routines (see `SetPanelItem`, etc.). The two custom panel items are DocViewer items and static text items. The plug-in writer may also create his/her own custom item using a user item and writing routines to handle it.

Items which are automatically handled by the shell include the default button, the Continue button and the Go Back button (see the description of `PSSetPanelItemAction` for information on how the plug-in writer can instruct the shell to handle these). The Help button is not automatically handled by the shell, the plug-in writer must handle this.

Figure 10-7 shows an example 'DITL' set up with a collection of items.

Figure 10-7 Example 'DITL' defining a panel's contents



| <u>Item Number</u> | <u>Item</u> |
|--------------------|---|
| 1 | Control item - Continue button (default button) |
| 2 | Control item - Go Back button |
| 3 | Control item - Print button |
| 4 | Control item - Save button |
| 5 | User item (used for a DocViewer item) |
| 6 | PICT (used for a Help button) |
| 7 | Control item - pop-up menu |
| 8 | User item - used for static text |
| 9 | User item - used for static text |
| 10 | User item - depends on value of pop-up menu |
| 11 | User item - used for static text |
| 12 | Control item - checkbox |
| 13 | PICT (used for the title bar) |
| 14 | PICT (used for the button bar) |
| 15 | PICT (background PICT) |

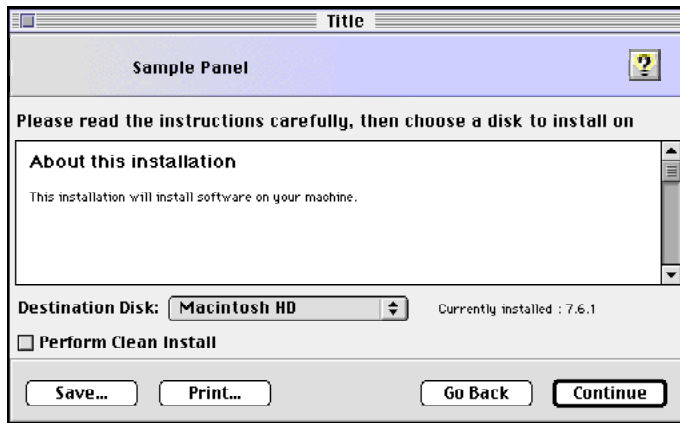
The global panel provided with the shell may have one or a combination of the following targetable panel items:

- User items (e.g. item numbers 5, 8, 9, 10, 11)
- PICTs (e.g. item numbers 6, 13, 14, 15)
- Controls (e.g. item numbers 1, 2, 3, 4, 7, 12)

Note that the shell handles setting the window title. PICTs are handled offscreen in Upgrader, so the plug-in writer has the choice of an item appearing transparently over a picture (e.g. item numbers 6, 8, 9, 10, 11) or opaquely (e.g. item number 5, the DocViewer item). See `PSNewUserItem` below for further information on how this can be done.

Figure 10-8 shows the resultant panel.

Figure 10-8 Example panel as displayed to the user

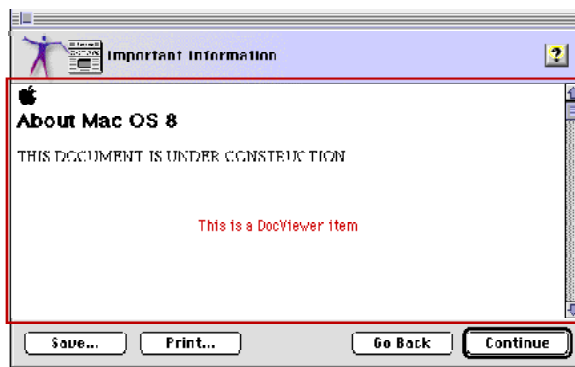


Using the Document Viewer

A DocViewer item is used to view text and/or pictures in an Upgrader panel. The plug-in writer can create a DocViewer item with a user item, and the DocViewer library routines can then be used to handle the item. Upgrader takes care of adding a vertical scroll bar for the DocViewer and resizing the DocViewer item and its contents if the panel is resizable (for example, the help panel supplied with Upgrader has a size box). The shell also handles activate, deactivate and update events for the DocViewer. Plug-in writers simply need to place user items on the panels they are creating and specify the location of any text and/or pictures to be placed in the DocViewer item, via the DocViewer routines detailed below.

Figure 10-9 shows a panel with a DocViewer item.

Figure 10-9 Panel with DocViewer item



Four Upgrader routines allow the plug-in writer to interact with the DocViewer item:

PSNewDocViewItem, PSHandleDocScroll, PSSaveDoc and PSPrintDoc. PSNewDocViewItem is used to create the a DocViewer item on a panel. PSSaveDoc is used to save the DocViewer's contents (if the standard file package is available). PSPrintDoc is used to print the DocViewer's contents (if a printer is available). And PSHandleDocScroll is used to handle mouse clicks in the DocViewer item, including its scroll bar.

A DocViewer item expects to find a 'STR#' resource of ID 1000 in the plug-in file. See Listing 10-4 for an example of this resource.

Listing 10-4 'STR#' resource required in the plug-in file when using DocViewer items

```
resource 'STR#' (1000) {
    {
        $"CA",           // non-breaking space, used as the PICT delimiters
        "",              // (unused but must be present)
        "untitled",      // default "Save As" field in standard Save dialog
    }
};
```

Listing 10-5 presents the code for setting up a DocViewer item (error-checking is omitted for clarity):

Listing 10-5 Code for setting up a DocViewer item

```
ShellErr      theErr = noErr;
DocInfoHandle docViewerHandle;
DocViewerType docType;
Handle        itemHandle;
Rect          itemRect;
PanelItemType itemType;
short         prefsFlags, prefsTextID, prefsPICTBaseResID;

/*
do first:
read prefsFlags, prefsTextID, prefsBasePICTResID from wherever
they should be read (e.g. plug-in resource fork/data file)
*/

(void) PSGetPanelItem(gMyPluginPanel, kDocViewerItemNumber,
    &itemType, &itemHandle, &itemRect);

if ((prefsFlags & kMainTextInFile) == kMainTextInFile)
    docType = kDocFileType;
else
    docType = kDocResType;

docViewerHandle = PSNewDocViewerItem(gMyPluginPanel, &itemRect,
    docType, prefsTextID, prefsPICTBaseResID);
if (docViewerHandle != NULL)
    (void) PSSetPanelItem(gMyPluginPanel, kDocViewerItemNumber,
        docType, (Handle) docViewerHandle, &itemRect);
else
    theErr = kCannotLoadNeededResourceErr;
```

Listing 10-6 shows code for handling scrolling in a DocViewer item. This is generally called from `HandleEventForPluginModule` (error-checking is omitted for clarity):

Listing 10-6 Code for handling DocViewer item events

```
WindowPtr    whichWindow;
short        windowPart;
Point        localPt = inEvent->where;
PanelItemType itemType;
Handle       itemHandle;
Rect         itemRect;
Boolean      wasHandled = false;

windowPart = FindWindow(localPt, &whichWindow);
if (whichWindow == gMyPluginPanel) {
    switch (windowPart) {
        case inContent:
            PSGetPanelItem(gMyPluginPanel, kDocViewerItem, &itemType, &itemHandle, &itemRect);

            GlobalToLocal(&localPt);
            if (PtInRect(localPt, &itemRect)) {
                (void) PSHandleDocScroll(gMyPluginPanel, localPt, kDocViewerItem);
                wasHandled = true;
            }
            else {
                /* do:
                 deal with mouseclicks elsewhere on the panel
                 */
            }
            break;

            // ... etc.
    }
}
```

Navigation

Upgrader will usually have several plug-ins; to navigate between them Upgrader provides routines that allow the user to proceed to the next or return to the previous plug-in. The default plug-in sequence is defined in the sequence resource. See the description of the `PSGoToNextPlugin` routine for information on how this default sequence may be overridden.

Upgrader uses an internal plug-in history stack to determine the previous plug-in. This stack ensures the plug-in always returns to the most recently visited plug-in. This stack-based approach to determining the previous plug-in is used instead of simply examining the sequence resource and finding the default previous plug-in, since in the case where Upgrader has overridden the default plug-in sequence, the default previous plug-in will not be the one most recently visited.

NOTE

Normally when the user uses `PSGoToNextPlugin` to proceed to the next plug-in the details of the new plug-in are added in to the internal Upgrader plug-in history stack. But in the case where the plug-in that Upgrader is moving on to is one which has already been visited (i.e. Upgrader finds an earlier reference to the plug-in in the history stack), Upgrader will instead use the reference to the plug-in already contained in the history stack and discard all references to plug-ins after this point in the history stack.

Using this method is less disorientating to the Upgrader user than the simpler alternative where the history stack could grow to a large size if the default plug-in sequence is overridden a number of times.

Here's an example to help clarify how the history list works. The following is the default plug-in sequence:

1 -> 2 -> 3 -> 4 -> 5

For this example plug-in 4 will not always be a necessary step, it could be a license agreement that plug-in 3 could decide doesn't need to be shown to the user.

If plug-in 4 is in fact skipped and Upgrader moves straight on to plug-in 5, the history stack would look like the following:

1 -> 2 -> 3 -> 5

So in this example if `PSGoToPreviousPlugin` is called from plug-in 5, Upgrader will return to plug-in 3.

Following on with the same example, if plug-in 5 has an option where it is necessary to go to another plug-in, for example if the plug-in wants the user to go back to plug-in 2 to perhaps reset the destination disk. In this case the stack will *not* grow as follows:

1 -> 2 -> 3 -> 5 -> 2 (will not happen)

What will occur, is the stack gets unrolled back to the first instance of plug-in 2 and so the stack will simply look as follows:

1 -> 2

NOTE

There will be cases where the plug-in writer does not want a plug-in added to the plug-in history list since it may only need to be run once. An example would be a plug-in which checks that the machine on which Upgrader is running is capable of running the software that is to be installed. To indicate to Upgrader that a plug-in is of this type, use the `onlyRunOnce` plug-in flag when filling-in details of the plug-in to the sequence resource.

Managing the Help Window

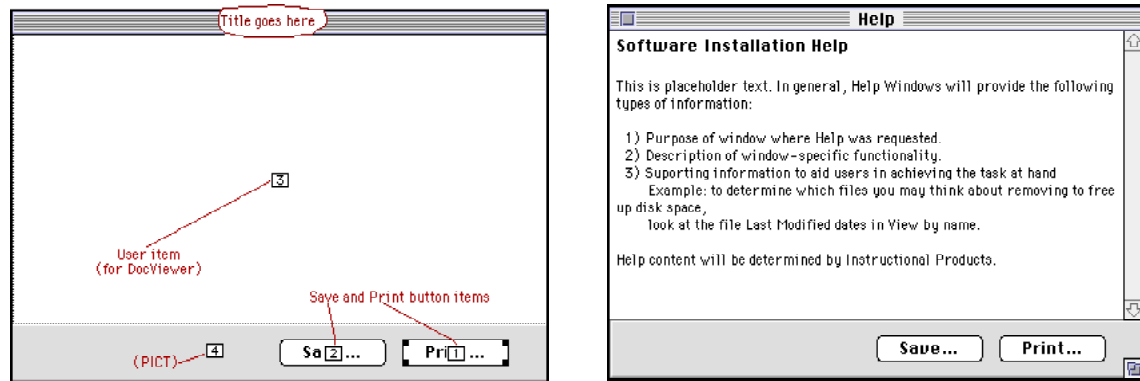
Support for help panels is supplied in Upgrader to allow for the easy inclusion of simple, standard help windows in a plug-in. The help API calls provided with Upgrader do not have to be used. Similarly, the default help panel ('DLOG'/'DITL' ID of 1050) provided with the Shell doesn't have to be used, however if plug-in writers wish to design their own panels, the following item numbers must be used:

```
enum {
    kHelpPrintButton = 1,          // Print Button item number
    kHelpSaveButton,              // Save Button item number
    kHelpDocItem                // User item number for DocViewer
};
```

The help panel provided with the shell has the following targetable panel items:

- User item (for the DocViewer item, i.e. the help panel contents)
- Print button (see `PSCheckEnvironment` for more details)
- Save button (see `PSCheckEnvironment` for more details)

Figure 10-10 Help window in Resorcerer and as shown to the user



See the section “Using the Document Viewer” for further information on where DocViewer items are read from, stored, etc.

Four help routines are available to plug-in writers to setup the help window, display it, close it and handle events for it: `PSSetupHelpWindow`, `PSDisplayHelpWindow`, `PSCloseHelpWindow`, and `PSHandleHelpWindowEvent`.

Listing 10-7 demonstrates calling `PSHandleHelpWindowEvent` from inside `HandleEventForPluginModule` (error-checking is omitted for clarity):

Listing 10-7 Example code for handling help window events

```
Boolean HandleEventForPluginModule( EventRecord *inEvent )
{
    Boolean    wasHandled = false;
    WindowPtr  theWindow;

    EnterPlugin();

    switch (inEvent->what) {
        /* do:
         *   handle any other plug-in-specific cases in here
         */

        case mouseDown:
            (void) FindWindow(inEvent->where, &theWindow);
            if (theWindow == gMyPluginHelpPanel)
                wasHandled = PSHandleHelpWindowEvent(gMyPluginHelpPanel, inEvent);
            break;

        case osEvt:
            // --- this deals with resume events only
            if(((unsigned long) inEvent->message >> 24) == suspendResumeMessage){
                if ((inEvent->message & resumeFlag) != 0) {
                    // --- if there is a print button on the current panel, use this code
                    ControlHandle    printButtonControl;
                    EnvironmentType  environmentFlags;
                    short             printButtonHilite = 255;
                    GrafPtr          savedPort;
                    PanelItemType    userItemType;
                    Rect              itemRect;

                    GetPort(&savedPort);
                    SetPort(gMyPluginPanel);
```

```

        (void) PSCheckEnvironment(&environmentFlags);
        (void) PSGetPanelItem(gMyPluginPanel, kPrintButtonItem,
                               &itemType, (Handle *) &printButtonControl, &itemRect);

        if ((environmentFlags & kPrinterAvailableMask) == 0)
            printButtonHilite = 255;
        else
            printButtonHilite = 0;

        if (FrontWindow() == gMyPluginPanel)
            HiliteControl((ControlHandle) printButtonControl, printButtonHilite);

        // --- Note: this line should not be removed
        SetCRefCon((ControlHandle) printButtonControl, printButtonHilite);

        SetPort(savedPort);

        // --- let the Shell have a go at the standard help panel resume events
        (void) PSHandleHelpWindowEvent(gMyPluginHelpPanel, inEvent);
    }
}
break;

default:
break;
}

ExitPlugin();

return wasHandled;
}

```

Exchanging Data with other Plug-ins

Plug-ins can use the Global Data routines to store (PSSetGlobalData) and retrieve (PSGetGlobalData) data that persist between invocations of a plug-in. Publicly defined global data types allow plug-ins to communicate with one another. A plug-in's documentation should describe which global data types it reads and which it sets. Privately defined global data types allow a single plug-in to store information until its next invocation.

NOTE

Don't confuse global data with global variables. Global variables are identifiers you define within your code that have global scope but are only valid while the plug-in is running and disappear when the plug-in terminates.

Referencing Files

If a plug-in needs to access a file other than the data file or plug-in file, it should use a file reference resource ('flrf') to store the path to this file. The Upgrader API provides two routines for resolving a 'flrf' resource: PSLaunchFile and PSMakeFSSpecFromFileRefID. Use the PSLaunchFile routine to launch an application specified by a file reference resource ID. Otherwise, use PSMakeFSSpecFromFileRefID to obtain an FSSpec to a file specified by its file reference resource ID.

See the section "Upgrader Application Reference" for a detailed description of the file reference resource.

Displaying Alerts

The Upgrader API provides two routines (`PSAlert` and `PSErrorAlert`) for displaying auto-sized dialogs for the purpose of displaying errors or other simple alerts containing a text message. Common alert dialogs are provided in the Upgrader, but the plug-in writer can define new dialogs and store these within the plug-in file.

The `PSAlert` routine is used to display an alert when you have a text string to display and the ID of a 'DLOG' resource to display the text within. The 'DLOG' resource can be one of the predefined dialogs contained in the Upgrader application, or one that you define in your plug-in file.

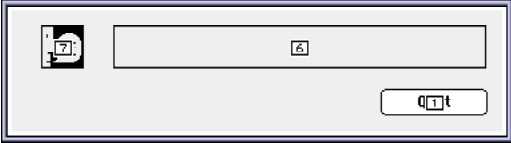
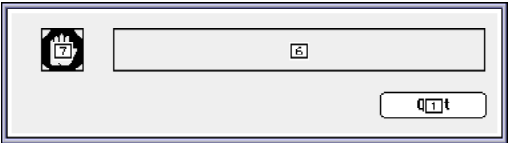
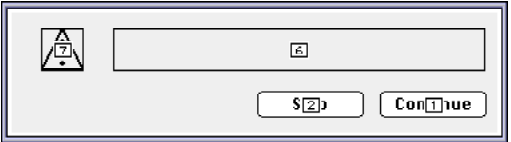
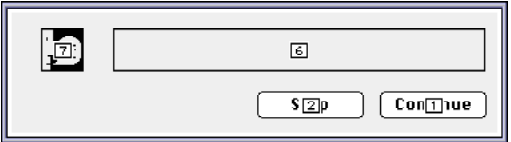
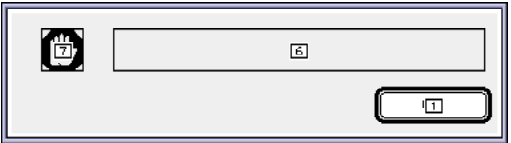
The `PSErrorAlert` routine is used in conjunction with a 'ners' resource to look up the text message and dialog based on either a Upgrader-defined error number or a error number defined by your plug-in.

Displaying Upgrader-Defined Error Alerts

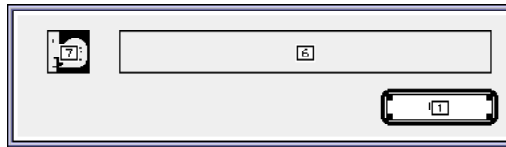
You can call the Upgrader routine `PSErrorAlert` to display one of the Upgrader-defined error numbers that you might have received as the result of calling a Upgrader routine. See the section “Summary of the Upgrader API” for a listing of the Upgrader-defined error numbers available for use with the `PSErrorAlert` routine.

Table 10-1 shows the dialogs supplied with the Upgrader application to be used with the `PSAlert` routine and when defining your own error numbers to be used with the `PSErrorAlert` routine.

Table 10-1 Dialogs supplied in the Upgrader application

| <u>Dialog ID</u> | <u>Dialog Layout</u> |
|--|--|
| <code>kStopDLOGID (600)</code> |  |
| <code>kStopAndQuitDLOGID (526)</code> |  |
| <code>kSkipOrContinueDLOGID (520)</code> |  |
| <code>kStopOrContinueDLOGID (506)</code> |  |
| <code>kStopOKDLOGID (519)</code> |  |

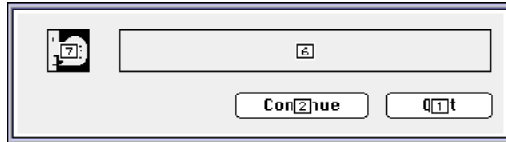
kNoteOKDLOGID (508)



kRestartOrContinueDLOGID (514)



kQuitOrContinueDLOGID (507)



Displaying Plug-in-Defined Errors

The 'ners' resource connects the message to be displayed with the dialog to be shown by referencing the 'DLOG' resource ID and the index within a 'STR#' resource. When a plug-in writer wants to display messages that are specific to a plug-in this is done by creating a 'ners' resource ID 500 in the plug-in file, and also creating a 'STR#', containing the error messages, with ID 520. The individual messages are then added to the 'STR#' resource, making sure that they correspond to the indices for each error message number in the 'ners' resource.

NOTE

'ners' resources must always use the resource ID 500 and the 'STR#' reference from a 'ners' resource must always have a resource ID of 520.

If none of the 'DLOG's available in the shell are suitable, a 'DLOG' resource can also be added to the plug-in file. See `PSAlert` and `PSErrorAlert` for more information.

Listing 10-8 shows an example 'ners' resource as it might appear in a ".r" file, which connects the error number defined by the plug-in with the message and dialog to be displayed.

Listing 10-8 An example 'ners' 500 resource used in conjunction with a 'STR#' 520 resource

```
resource 'ners' (500, nonpurgeable) {
    {
        1000,  1, kStopDLOGID,
        1001,  2, kStopDLOGID,
    }
};

resource 'STR#' (520, nonpurgeable) {
    {
        "Unable to determine if your computer is compatible with this program.";
        "This program cannot run on your computer.";
    }
};
```

Supporting Multiple Source Disks

The main motivation for preloading resources is to eliminate extra disk swaps when the user is installing from multiple disks. Upgrader overrides the normal method of preloading resources (by selecting the preload attribute for the necessary resource) to ensure that all the various resources from all the Upgrader files are preloaded when necessary. There are a number of situations when plug-in resource preloading should be considered:

- If Upgrader is launched from a server and there is a possibility of the connection to the server being lost. If this happens, Upgrader will display an alert and then quit, calling the current plug-in's termination handler. The resources required to display this error message will already be preloaded but it is possible that resources will also be required by the plug-in, possibly to update a panel or for use in the plug-in's termination routine.
- If Upgrader is running from floppy disks or some other ejectable media and there is a possibility of the plug-in requiring a file on a different floppy (this is most likely to be the case if the plug-in uses `PSLaunchFile` to open another application). There is also the possibility that the data file and the plug-in are on different floppy disks.

Since plug-ins usually have some of their resources in the data file and some in the plug-in file itself, plug-in writers must ensure that both sets of resources in both are preloaded when necessary.

- For plug-in resources in the data file, each plug-in should have a 'RES#' resource in the data file that contains the list of all the resources in the data file relevant to the plug-in. Upgrader will find this list using the "Data file preload list" element in the plug-in's section of the 'tsqc' resource. The Upgrader will only preload these resources if it determines that the plug-in's volume is different volume to the data file's.
- For plug-in resources in the plug-in file that the plug-in writer decides are necessary to preload, another 'RES#' resource must be created (and placed in the plug-in file). The plug-in itself will have to determine if it is necessary to preload these and if so preload them using Upgrader routine `PSCollect`.

Listing 10-9 shows a simple example of one as it would look in a .r file:

Listing 10-9 An example 'RES#' resource

```
resource 'RES#' ( 3500, nonpurgeable ) {
    {
        'wppr', 3500,
        'STR#', 3500,
        'TEXT', 3502,
    }
};
```

See the section "Upgrader Application Reference" for a detailed description of the 'RES#' resource.

Upgrader API Reference

Plug-in-Defined Routines

There is one required entry points to the plug-in code resource, `InitializePluginModule` and two other optional entry point routines, `HandleEventForPluginModule` and `TerminatePluginModule`.

InitializePluginModule

```
void InitializePluginModule ( void    *inPSTable,  
                             SInt32    inRefCon,  
                             Boolean    inEnterAtBeginning );
```

DESCRIPTION

This is the main entry point of the plug-in, initially called by the Shell. This routine must first do some standard initialization and then may perform any initialization tasks that the plug-in itself needs.

PARAMETERS

| | |
|---------------------------------|--|
| <code>inPSTable</code> | An internal data structure that will be used by <code>SetupPlugin</code> to allow the plug-in to access the Upgrader library routines. |
| <code>inRefCon</code> | The RefCon value stored in the sequence resource for this plug-in. The standard use of this parameter is to pass the ID of the preference resource to the plug-in in the low-word so multiple preference resources can be used with a single plug-in file. |
| <code>inEnterAtBeginning</code> | True if the user is entering the plug-in from the previous plug-in. |

HandleEventForPluginModule

```
Boolean HandleEventForPluginModule ( EventRecord *inEvent );
```

DESCRIPTION

This routine will be called each time through the Upgrader's event loop. The plug-in will decide whether or not to handle the event passed in itself and handle the event if it's a plug-in event. A boolean is returned by the plug-in to indicate whether or not the event was handled (TRUE if the plug-in handled the event itself).

The Upgrader shell has defined a special event type (`kMenuSelectionEvent`) for passing the menu selection to plug-ins. Plug-ins interested in handling menu selection of their own menus should look this event type in the "what" field of the event record. The result of the shell's call to `MenuSelect` is in the "message" field. As with other events, the plug-in should return TRUE if the menu is one of it's own and it handled the event.

PARAMETERS

| | |
|----------------------|--|
| <code>inEvent</code> | A pointer to the event which is due for processing |
|----------------------|--|

RETURNS

TRUE if the routine (and/or child routines) handled the event and/or no further processing is required by the Shell, FALSE if the event wasn't handled or if the event needs further handling by the Shell.

SPECIAL CONSIDERATIONS

- It is important to set the return value to be TRUE if the event was handled by `HandleEventForPluginModule`, since the Shell handling of the event may be unpredictable if it is being handled a second time.
- For resume events, the plug-in *must* return FALSE to the Shell to allow the Shell a turn at processing the event.

TerminatePluginModule

```
void TerminatePluginModule ( void );
```

DESCRIPTION

The exit point of a plug-in. Performs any tidying-up tasks needed by the plug-in when it quits. This gets called by the Shell when the application quits, when moving to the next plug-in, or when a serious error occurs.

Setup Routines

EnterPlugin

```
EnterPlugin();
```

DESCRIPTION

This routine must be called on entry to any routine in the plug-in that may be called directly from the Upgrader, such as initial entry point, termination entry point, event entry point and any callback routines, including both System callbacks and Upgrader callbacks (e.g. user item draw procedures, etc.). It allows the plug-in to access its global variables.

SPECIAL CONSIDERATIONS

- This macro saves-off the current A4 world.

SEE ALSO

CodeWarrior documentation for more information on `EnterCodeResource`.

ExitPlugin

```
ExitPlugin();
```

DESCRIPTION

This routine must be called just before exiting any routine that may be called directly from the Shell, such as initial entry point, termination entry point, event entry point and any callback routines, including both System callbacks and Upgrader callbacks (e.g. user item draw procedures, etc.). It removes access to the plug-in's global variables. A call to `ExitPlugin` should match a previous call to `EnterPlugin` in the same routine.

SPECIAL CONSIDERATIONS

- This macro restores the current A4 world.

SEE ALSO

CodeWarrior documentation for more information on `ExitCodeResource`.

NOTE

It is important that before `EnterPlugin` is called and after `ExitPlugin` is called, the routine must not try to access global variables. One place where it is easy to use global variables incorrectly is if a `Str255` is declared in the variable declaration section. CodeWarrior stores strings as globals. Another potential error would be to try returning the value of a global from a routine after the call to `ExitPlugin` has been made. See code listings 10-10 and 10-11 for an illustration of this.

Listing 10-10 shows an example of the incorrect use of `EnterPlugin` and `ExitPlugin`:

Listing 10-10 Incorrect use of the `EnterPlugin` routine

```
SInt16      gSomeGlobalVariable;

Boolean      HandleEventForPluginModule ( EventRecord *inEvent )
{
    Str255      myString = "\pThis is my string";
    Boolean      wasHandled = true;

    gSomeGlobalVariable = 0;

    EnterPlugin();

    // ... etc.

    ExitPlugin();

    return wasHandled;
}
```

Listing 10-11 shows an example of the correct use of `EnterPlugin` and `ExitPlugin`:

Listing 10-11 Correct use of the `EnterPlugin` routine

```
SInt16      gSomeGlobalVariable;

Boolean      HandleEventForPluginModule ( EventRecord *inEvent )
{
    Str255      myString;
    Boolean      wasHandled = true;

    EnterPlugin();

    MyPStringCopy(myString, "\pThis is my string");
    gSomeGlobalVariable = 0;

    // ... etc.

    ExitPlugin();

    return wasHandled;
}
```

SetupPlugin

The `SetupPlugin` routine is primarily used in plug-ins to allow access to the Upgrader routines. It also

allows access to the Upgrader's QuickDraw globals which are needed for any plug-in drawing procedures. This routine needs only to be called once and this will always be from the `InitializePluginModule` routine.

```
void SetupPlugin ( void *shellFunctions );
```

DESCRIPTION

Performs several internal initialization routines for the plug-ins, one of which sets up an internal table of all the Upgrader routines available to the Shell. So, this routine must be called by the plug-in in `InitializePluginModule` before any other Upgrader routines are called.

PARAMETERS

| | |
|-----------------------------|---|
| <code>shellFunctions</code> | A table of all the routines available to the plug-in, the structure of this is not available to the plug-ins. |
|-----------------------------|---|

SPECIAL CONSIDERATIONS

- This must be called before any other Upgrader routines are called.
- This routine must be preceded with a call to `EnterPlugin` and ultimately succeeded by a call to `ExitPlugin`.

PSRegisterHandler

```
ShellErr PSRegisterHandler ( HandlerIDType      inHandlerType,  
                           UniversalProcPtr    inHandlerProcPtr );
```

DESCRIPTION

Gives the Upgrader the necessary access to the plug-in's `HandleEventForPluginModule` and `TerminatePluginModule` plug-in entry point routines.

PARAMETERS

| | |
|-------------------------------|--|
| <code>inHandlerType</code> | <code>kEventHandlerID</code> if registering the <code>HandleEventForPluginModule</code> routine, or <code>kTerminationHandlerID</code> if registering the <code>TerminatePluginModule</code> routine |
| <code>inHandlerProcPtr</code> | A pointer to the plug-in's <code>HandleEventForPluginModule</code> or <code>TerminatePluginModule</code> routine |

RETURNS

| | |
|---------------------------------------|---|
| <code>noErr</code> | The routine was successfully registered with the Shell |
| <code>kUnknownPluginHandlerErr</code> | <code>inHandlerType</code> was not recognized or handled by the Shell |

SPECIAL CONSIDERATIONS

- Support for `UniversalProcPtrs` for PPC code is not provided in Upgrader.

NOTE

It is important to call `SetupPlugin` before `PSRegisterHandler` is called, as the plug-in won't have any access to the Upgrader routines including

Panel Handling Routines

Several routines are available to the plug-in writer to handle Upgrader panels and these are now detailed.

PSSetupNewPanel

```
ShellErr PSetupNewPanel ( SInt16    inPanelItemsRsrcID,  
                          PanelPtr   *outPanelPtr );
```

DESCRIPTION

This is used to setup the contents of a global panel based on the contents of the specified 'DITL'. If the global panel is not already open then it creates the panel, if the panel is already open it changes the contents of the panel.

PARAMETERS

| | |
|--------------------|---|
| inPanelItemsRsrcID | A 'DITL' resource ID which specifies the contents of the panel |
| outPanelPtr | If successful, returns a PanelPtr to the panel. On failure (panel couldn't be opened or changed), returns NULL. |

RETURNS

| | |
|--------------|---|
| noErr | The panel was correctly set up |
| kInternalErr | If the global PanelPtr is NULL and we are attempting to change its contents |
| MemError | Standard memory error |
| ResError | Standard resource error |

SPECIAL CONSIDERATIONS

- This routine does not display the panel or its new contents, call PShowPanel to do this.

PSNewCustomPanel

```
ShellErr PSNewCustomPanel ( short    inPanelItemsRsrcID,  
                            DVFlags   inFlags,  
                            PanelPtr   *outPanelPtr );
```

DESCRIPTION

Sets up the contents of a new custom panel based on the 'DITL' specified. This routine will always create a new window for the panel.

PARAMETERS

| | |
|--------------------|--|
| inPanelItemsRsrcID | A 'DITL' resource ID which specifies the contents of the panel |
| inFlags | Always kGrowWindow, which causes PSNewCustomPanel to load a resizable window (with a Grow Box) |

| | |
|--------------------------|---|
| <code>outPanelPtr</code> | On success, returns a <code>PanelPtr</code> to the panel. On failure (panel couldn't be opened or changed), returns <code>NULL</code> . |
|--------------------------|---|

RETURNS

| | |
|---------------------------|---|
| <code>noErr</code> | The new custom panel was correctly set up |
| <code>kInternalErr</code> | If the global <code>PanelPtr</code> is <code>NULL</code> and we are attempting to change its contents |
| <code>MemError</code> | Standard memory error |
| <code>ResError</code> | Standard resource error |

SPECIAL CONSIDERATIONS

- This routine does not display the panel or its new contents, call `PSShowPanel` to do this.
- The Shell automatically handles the growing of panels, i.e., it will move buttons, resize `DocView`s, etc.

PSUpdatePanel

```
ShellErr PSUpdatePanel ( PanelPtr inPanelPtr );
```

DESCRIPTION

Redraws the specified panel. This is normally called in response to an update event for the current panel. Most plug-ins will not need to directly call this routine and should return `FALSE` in `HandleEventForPluginModule`, thereby forcing the Shell to handle the update event. In the event that is is needed to be explicitly called, it should be bracketed with calls to `BeginUpdate` and `EndUpdate` in the calling routine.

PARAMETERS

| | |
|-------------------------|---|
| <code>inPanelPtr</code> | A pointer to the panel which is to be drawn |
|-------------------------|---|

RETURNS

| | |
|------------------------|---|
| <code>noErr</code> | The panel was drawn correctly |
| <code>paramErr</code> | An illegal parameter was passed to <code>NewGWorld</code> |
| <code>cDepthErr</code> | An invalid pixel depth was passed to <code>NewGWorld</code> |
| <code>QDErr</code> | Standard <code>QuickDraw</code> error |

SPECIAL CONSIDERATIONS

- This routine assumes that suitable bracketing with `BeginUpdate` and `EndUpdate` calls is provided in the calling routine.
- It is the responsibility of the calling routine to erase the regions of the window that need to be redrawn.

SEE ALSO

Inside Macintosh: Imaging with QuickDraw 6-16 for more information on `NewGWorld`.

PSActivatePanel

```
ShellErr PSActivatePanel ( PanelPtr inPanelPtr,  
                          Boolean    inShouldActivate );
```

DESCRIPTION

This routine is used to activate or deactivate panels, depending on the value of `inShouldActivate`. Most plug-ins will not need to directly call this routine and should return `FALSE` in `HandleEventForPluginModule`, thereby forcing the Shell to handle the activate/deactivate event. Typically, a plug-in might call this directly before displaying a dialog box to deactivate the panel and then to reactivate the panel when the dialog box is closed.

PARAMETERS

| | |
|-------------------------------|---|
| <code>inPanelPtr</code> | A pointer to the panel to be activated |
| <code>inShouldActivate</code> | If <code>TRUE</code> , activate the panel, if <code>FALSE</code> , deactivate the panel |

RETURNS

| | |
|--------------------|-----------------------------------|
| <code>noErr</code> | Always returns <code>noErr</code> |
|--------------------|-----------------------------------|

SPECIAL CONSIDERATIONS

- This routine sets the current port to the panel window.

PSDisposePanel

```
void PSDisposePanel ( PanelPtr inPanelPtr );
```

DESCRIPTION

Removes a panel from the screen, disposes of its window and releases the memory occupied by all structures associated with the panel.

PARAMETERS

| | |
|-------------------------|--|
| <code>inPanelPtr</code> | A pointer to the panel to be disposed of |
|-------------------------|--|

SPECIAL CONSIDERATIONS

- There is no need to explicitly dispose of/hide the global panel if the next plug-in is going to change its contents or hide it.
- This should not be called by a plug-in to close the global panel, `PSHidePanel` should be called instead.
- This should only be used in conjunction with panels created with `PSNewCustomPanel`.

PSShowPanel

```
ShellErr PSShowPanel ( PanelPtr inPanelPtr );
```

DESCRIPTION

Shows the panel if it was hidden, else brings it to the front.

PARAMETERS

| | |
|-------------------------|------------------------------------|
| <code>inPanelPtr</code> | A pointer to the panel to be shown |
|-------------------------|------------------------------------|

RETURNS

| | |
|--------------------|-----------------------------------|
| <code>noErr</code> | Always returns <code>noErr</code> |
|--------------------|-----------------------------------|

PSHidePanel

```
void PSHidePanel ( PanelPtr inPanelPtr );
```

DESCRIPTION

Hides the specified panel.

PARAMETERS

| | |
|-------------------------|-------------------------------------|
| <code>inPanelPtr</code> | A pointer to the panel to be hidden |
|-------------------------|-------------------------------------|

PSGetPanelItemHit

```
Boolean PSGetPanelItemHit (   PanelPtr      inPanelPtr,  
                             EventRecord    *inPanelEvent,  
                             short           *outItemHit );
```

DESCRIPTION

Call this routine in response to a mousedown event in a panel to find which item on the panel was hit by the user.

PARAMETERS

| | |
|---------------------------|---|
| <code>inPanelPtr</code> | A pointer to the panel in which the mousedown occurred |
| <code>inPanelEvent</code> | The event record for the mousedown event |
| <code>outItemHit</code> | On return, the item number of the item that was hit on the panel (if an item on the current panel was clicked), else <code>outItemHit</code> is undefined |

RETURNS

TRUE if an active control item on this panel was clicked, FALSE otherwise.

PSSetPRefCon

```
void PSSetPRefCon (      PanelPtr    inPanelPtr,  
                        long         inRefCon );
```

DESCRIPTION

Sets the panel's refCon.

PARAMETERS

| | |
|------------|---|
| inPanelPtr | A pointer to the panel whose refCon is to be set |
| inRefCon | A long value which can be used by the plug-in for its own use |

SPECIAL CONSIDERATIONS

- This is needed since the panel module uses the standard window's refCon to store information.

PSGetPRefCon

```
long PSGetPRefCon ( PanelPtr inPanelPtr );
```

DESCRIPTION

Gets the panel's refCon.

PARAMETERS

| | |
|------------|---|
| inPanelPtr | A pointer to the panel whose refCon we wish to retrieve |
|------------|---|

RETURNS

The value of the refCon stored in the panel record's refCon field, or 0 (zero) if inPanelPtr is not a valid panel pointer.

SPECIAL CONSIDERATIONS

- This is needed since the panel module uses the standard window's refCon to store information.

PSSetPanelItemAction

```
ShellErr PSSetPanelItemAction ( PanelPtr    inPanelPtr,  
                                short         inItemNumber,  
                                PanelActionType inActionType );
```

DESCRIPTION

Sets the “action” attributes for a specified panel item. These attributes are drawing the default button and handling the Continue, Go Back, or Quit buttons. The main motivations for using this routine are ease of plug-in development and the standardization of plug-in behavior. Constants for specifying panel item actions are defined in the “UpgraderPlugins.h” file.

The following details the keys mapping:

| Key | Mapped To |
|--------|----------------|
| Return | Default button |
| Enter | Default button |
| Escape | Go Back button |
| Clear | Go Back button |

PARAMETERS

| | |
|---------------------------|--|
| <code>inPanelPtr</code> | A pointer to the panel containing the item whose action attributes are to be set |
| <code>inItemNumber</code> | The panel item number of the item whose action attributes are to be set |
| <code>inActionType</code> | The action attributes to be set for the specified item |

RETURNS

| | |
|--|---|
| <code>noErr</code> | The action attributes were set for the specified item |
| <code>kItemTypeMismatchErr</code> | The specified item was not a control item |
| <code>kPanelItemNotFoundInListErr</code> | The specified item was not found on the panel |

Example, setting panel button actions:

```
// setting the default button:
(void) PSSetPanelItemAction(gMyPluginPanel, kContinueButtonItem, kDefaultButtonMask);

// setting the Continue button:
(void) PSSetPanelItemAction(gMyPluginPanel, kContinueButtonItem, kContinueButtonMask);

// setting the Go Back button:
(void) PSSetPanelItemAction(gMyPluginPanel, kGoBackButtonItem, kGoBackButtonMask);
```

Panel Content Routines

Following are the routines for handling Upgrader panels.

PSSetPanelItem

```
ShellErr PSSetPanelItem ( PanelPtr      inPanelPtr,
                          short          inItemNumber,
                          PanelItemType inItemType,
                          Handle         inItemHandle,
                          Rect           *inItemRect );
```

DESCRIPTION

This routine works like `SetDialogItem`. It can be used to change the type or data of a specified panel item, or can be used to move the item on the panel (by changing its boundary rectangles).

PARAMETERS

| | |
|---------------------------|--|
| <code>inPanelPtr</code> | A pointer to the panel containing the item to change |
| <code>inItemNumber</code> | The panel item number of the item to change |
| <code>inItemType</code> | A value which represents the type of item in the <code>inItemNumber</code> parameter. |
| <code>inItemHandle</code> | A pointer to the draw procedure for a user item, or a handle to the item to be changed for all other items |
| <code>inItemRect</code> | The display rectangle (in the panel's local coordinates) of the item to be changed |

RETURNS

| | |
|---|-----------------------------------|
| <code>noErr</code> | The item was changed successfully |
| <code>kCantChangePanelItemToSpecifiedTypeError</code> | The item couldn't be changed |

SPECIAL CONSIDERATIONS

- This routine disposes of the previous data associated with the panel item.

SEE ALSO

Inside Macintosh: Macintosh Toolbox Essentials 6-121 for more information on `inItemType`.

PSGetPanelItem

```
ShellErr PSGetPanelItem ( PanelPtr      inPanelPtr,
                          short          inItemNumber,
                          PanelItemType *outItemType,
                          Handle         *outItemHandle,
                          Rect           *outItemRect );
```

DESCRIPTION

Returns the item specific data associated with a panel item.

PARAMETERS

| | |
|----------------------------|---|
| <code>inPanelPtr</code> | A pointer to the panel |
| <code>inItemNumber</code> | The panel item number of the item we want to retrieve information about |
| <code>outItemType</code> | On return, the type of the requisite item |
| <code>outItemHandle</code> | On return, the handle of the requisite item |
| <code>outItemRect</code> | On return, the encompassing rect of the requisite item |

RETURNS

| | |
|--|--|
| <code>noErr</code> | The required information was retrieved |
| <code>kPanelItemNotFoundInListErr</code> | The item was not found on the panel |

PSNewStyledStringItem

```
TEHandle PSNewStyledStringItem ( Rect      *inItemRect,
                                short      inSTRListRsrcID,
                                short      inStringListItem,
                                short      inFontNum,
                                short      inFontStyle,
                                short      inFontSize );
```

DESCRIPTION

Creates a new monostyled text item which can then be added to the panel with a call to `PSSetPanelItem`. The contents of a monostyled text item are loaded from a 'STR#' resource.

PARAMETERS

| | |
|-------------------------------|---|
| <code>inItemRect</code> | The encompassing rect of the styled string item on the panel |
| <code>inSTRListRsrcID</code> | The resource ID of the 'STR#' which the string is to be read from |
| <code>inStringListItem</code> | The index into the 'STR#' of the string required |
| <code>inFontNum</code> | The number of the font to draw the text in |
| <code>inFontStyle</code> | The style of the font to draw the text in |
| <code>inFontSize</code> | The size of the font to draw the text in |

RETURNS

On success, returns a handle to the newly created styled string item. On failure, returns NULL.

SPECIAL CONSIDERATIONS

- Assumes that `inStringListItem` is greater than 0

PSNewStyledTextItem

```
TEHandle PSNewStyledTextItem (      Rect  *inItemRect,
                                   short  inTEXTRsrcID );
```

DESCRIPTION

Creates a new multi styled text item which can then be added to the panel with a call to `PSSetPanelItem`. The contents of a styled text item are loaded from a 'TEXT' and optional 'styl' resource.

PARAMETERS

| | |
|---------------------------|--|
| <code>inItemRect</code> | The encompassing rect of the styled text item on the panel |
| <code>inTEXTRsrcID</code> | The resource ID of the 'TEXT' and 'styl' resources to use |

RETURNS

On success, returns a handle to the newly created styled text item. On failure, returns NULL.

SPECIAL CONSIDERATIONS

- Assumes that the 'TEXT' and 'styl' resources have the same resource ID.

- Assumes that `inItemRect` is specified in local co-ordinates of the current grafport.

PSNewUserItem

```
PanelUserItemHandle PSNewUserItem ( UserItemProcPtr  inUserItem,
                                   Boolean             inTransparent );
```

DESCRIPTION

Creates a new user item which can then be added to the panel with a call to `PSSetPanelItem`. User items can be used to create the writer's own item on a panel, as with normal dialogs. Upgrader also provides routines for setting user items to DocViewer and static text items.

PARAMETERS

| | |
|----------------------------|--|
| <code>inUserItem</code> | A pointer to the user item draw procedure |
| <code>inTransparent</code> | TRUE if the panel background (color, 'PICT's etc.) is to show through the user item. FALSE if the item's background is whatever the user draw procedure sets |

RETURNS

On success, returns a handle to the newly created user item on the panel. On failure, returns NULL.

SPECIAL CONSIDERATIONS

- Assumes that `inUserItem` is a valid user item procedure.

Sample code for creating a custom drawing procedure for a user item (error-checking is omitted for clarity):

```
ShellErr          theErr = noErr;
Handle            userItemHandle;
Rect              userItemRect;
PanelItemType     userItemType;
UserItemUPP       drawUPP = NULL;

// --- use      DisposeRoutineDescriptor(drawUPP)    later to kill it

drawUPP = NewUserItemProc(DrawingProcedureName);
if (drawUPP != NULL) {
    userItemHandle = PSNewUserItem(drawUPP, true);
    if (userItemHandle != NULL) {
        (void) PSGetPanelItem(gMyPluginPanel, kUserItemNumber,
                              &userItemType, &userItemHandle, &userItemRect);

        (void) PSSetPanelItem(gMyPluginPanel, kUserItemNumber,
                              userItemType, userItemHandle, &userItemRect);
    }
}
```

Document Viewer Routines

PSNewDocViewerItem

```
DocInfoHandle PSNewDocViewerItem ( PanelPtr      inPanelPtr,
                                   Rect           *inItemRect,
                                   DocViewerType   inDocViewerType,
                                   short           inTextRsrcID,
                                   short           inBasePICTRsrcID );
```

DESCRIPTION

Creates a new DocViewer item which can then be added to the panel with a call to `PSSetPanelItem`. The contents can be read from 'TEXT'/'styl' resources or from a SimpleText file, based on the value of the `inDocViewerType` parameter.

PARAMETERS

| | |
|-------------------------------|---|
| <code>inPanelPtr</code> | A pointer to the panel which will contain the new DocViewer item |
| <code>inItemRect</code> | The encompassing rect of the DocViewer item |
| <code>inDocViewerType</code> | <code>kDocResType</code> if the contents of the DocViewer item are to be loaded from resources, or <code>kDocFileType</code> if they are to be loaded from a SimpleText formatted file |
| <code>inTextRsrcID</code> | The 'TEXT' resource ID if <code>kDocResType</code> , or the 'flrf' resource ID for the file containing the text, if <code>kDocFileType</code> |
| <code>inBasePICTRsrcID</code> | For <code>kDocResTypes</code> this is the base resource ID of the first 'PICT' embedded in the text. For <code>kDocFileTypes</code> , <code>inBasePICTRsrcID</code> is ignored. (It is set to 1000 internally, which is the SimpleText standard). |

RETURNS

On success, returns a handle to the newly created DocViewer item on the panel. On failure, returns NULL.

SPECIAL CONSIDERATIONS

- See *Appendix A* information on embedding 'PICT's into a DocViewer item.

PSHandleDocScroll

```
ShellErr PSHandleDocScroll ( PanelPtr      inPanelPtr,
                             Point         inLocalPt,
                             short         inDocItem );
```

DESCRIPTION

Handles scrolling in the DocViewer object.

PARAMETERS

| | |
|-------------------------|--|
| <code>inPanelPtr</code> | The panel which contains the DocViewer object |
| <code>inLocalPt</code> | The point, in local coordinates, where the mouse was clicked in the DocViewer item. (Normally taken from the mousedown |

| | |
|------------------------|--|
| <code>inDocItem</code> | event record) The panel item number of the DocViewer object |
|------------------------|--|

RETURNS

| | |
|--|---|
| <code>noErr</code> | The scrolling was handled correctly |
| <code>kPanelItemNotFoundInListErr</code> | The DocViewer item was not found on the panel |

SPECIAL CONSIDERATIONS

- Auto scrolling is not supported.

PSSaveDoc

```
void PSSaveDoc ( PanelPtr    inPanelPtr,
                 short       inDocItem );
```

DESCRIPTION

Saves a DocViewer item to disk as a read only SimpleText format file. The standard Save dialog box is displayed, in which the user can optionally enter a path and filename for the DocViewer item. Default filenames for the standard Save dialog box can be provided for by putting a 'STR#' resource in the plug-in's resource fork, with an ID of 1000 and the following fields:

```
resource 'STR#' (1000) {
    {
        $"CA",          // non-breaking space, used as the PICT delimiters
        "",             // (unused but must be present)
        "untitled",     // default "Save As" field in standard Save dialog
    }
};
```

PARAMETERS

| | |
|-------------------------|--|
| <code>inPanelPtr</code> | Pointer to the panel which contains the DocViewer item to save |
| <code>inDocItem</code> | Panel item number of the DocViewer item |

SPECIAL CONSIDERATIONS

- If the Standard File Package is not available, this routine should not be called, especially when booting from floppy disks. See the description of `PSCheckEnvironment` for information on how to check for the availability of the Standard File Package.

PSPrintDoc

```
ShellErr PSPrintDoc ( PanelPtr      inPanelPtr,  
                    short          inDocItem );
```

DESCRIPTION

Prints a DocViewer item. The standard Print Job Dialog box is displayed. If the option key is held down when this call is made then the page setup dialog will be displayed.

PARAMETERS

| | |
|-------------------------|---|
| <code>inPanelPtr</code> | Pointer to the panel which contains the DocViewer item to print |
| <code>inDocItem</code> | Panel item number of the DocViewer item |

RETURNS

| | |
|--|---|
| <code>noErr</code> | Printing completed successfully |
| <code>kPanelItemNotFoundInListErr</code> | The DocViewer item was not found on the panel |
| <code>PrError</code> | Standard printing error |
| <code>MemError</code> | Standard memory error |

Navigation Routines

Three “navigation” routines are available to plug-in writers: `PSGoToPreviousPlugin`, `PSGoToNextPlugin` and `PSQuitShell`. In the normal course of events (i.e. if the plug-in has setup the Go Back/Continue buttons actions the Shell will take care of going to the next or previous plug-in, as defined in the sequence list or history list, when the user clicks on either the Go Back or Continue buttons (or their equivalents) on a panel. However, if the plug-in writer wishes to override the normal plug-in sequence for any reason, these routines can be used.

PSGotoPreviousPlugin

```
ShellErr PSGoToPreviousPlugin( void );
```

DESCRIPTION

Go to the current plug-in’s previous plug-in as defined by the plug-in history list. This routine calls the plug-in termination routine, `TerminatePluginModule`. `PSGotoPreviousPlugin` is called by the Shell when the user clicks on the Go Back button, or its equivalent, if there is a permitted previous plug-in to go to.

RETURNS

| | |
|--------------------|-----------------------------------|
| <code>noErr</code> | Always returns <code>noErr</code> |
|--------------------|-----------------------------------|

The following is a rough guide to the flow of control when the user clicks Go Back (or some equivalent):

```
Plug-in: Go Back  
        -> causes ->  
Shell: PSGotoPreviousPlugin()  
        -> causes ->  
Plug-in: TerminatePluginModule()
```

-> causes ->
Shell: checks the history list and loads the previous plug-in (if permitted)

PSGotoNextPlugin

```
ShellErr PSGotoNextPlugin( ResourceID inStrRsrcID );
```

DESCRIPTION

Go to the current plug-in's next plug-in as defined by the plug-in sequence list, or go to the plug-in specified by name. This routine can either be called explicitly by a plug-in, in which case the 'STR ' containing the plug-in name to branch to is passed, or by the Shell (when the user clicks on the Continue button, or its equivalent), in which the name of the plug-in is taken from the plug-in sequence list maintained by the Shell. PSGotoNextPlugin calls the plug-in termination routine, TerminatePluginModule.

PARAMETERS

| | |
|-------------|---|
| inStrRsrcID | kUseDefaultNextModuleName if using the default next plug-in as defined by the sequence list, else the resource ID of the 'STR ' containing the name of the plug-in to branch to |
|-------------|---|

RETURNS

| | |
|-----------------------------|--|
| noErr | Went to the next plug-in successfully |
| kUnknownPluginNameErr | Trying to go forward from the last plug-in (no more plug-ins in the sequence list) |
| kNextPluginSameAsCurrentErr | Trying to call the same plug-in as we're currently in |
| MemError | Standard memory error |

The following is a rough guide to the flow of control when the user clicks Continue (or some equivalent):

Plug-in: Go Forward

-> causes ->

Shell: PSGotoNextPlugin(kUseDefaultNextModuleName)

-> causes ->

Plug-in: TerminatePluginModule()

-> causes ->

Shell: checks the sequence list and loads the next plug-in (if permitted)

The following is a rough guide to the flow of control when the plug-in explicitly calls PSGotoNextPlugin:

Plug-in: PSGotoNextPlugin(resIDofPluginNameStr)

-> causes ->

Plug-in: TerminatePluginModule()

-> causes ->

Shell: loads the plug-in specified in the 'STR ' referenced in PSGotoNextPlugin

PSQuitShell

```
ShellErr PSQuitShell( Boolean inCanAllowUserToContinue );
```

DESCRIPTION

Instructs the Upgrader Shell to quit after returning from the current handler.

PARAMETERS

| | |
|---------------------------------------|---|
| <code>inCanAllowUserToContinue</code> | If <code>inCanAllowUserToContinue</code> is <code>TRUE</code> , the Shell will check whether or not a restart is necessary as soon as the Upgrader quits (most likely because system software has been installed). The global data type 'rsrq' (boolean) can be set to flag whether a restart or a quit is needed. If a restart is necessary a two button dialog will be displayed, one button to allow the user to cancel the quit instruction and continue with the Upgrader and the other button to allow the user to restart. If <code>inCanAllowUserToContinue</code> is <code>FALSE</code> , the Shell will check whether a restart is necessary as soon as the Upgrader quits but in this case will not display a dialog. If a restart is necessary it will simply restart. Under most situations <code>inCanAllowUserToContinue</code> will be set to <code>TRUE</code> by the plug-ins. It should only be set to <code>FALSE</code> in cases where a serious error has occurred and it would be unsafe to allow the Upgrader to continue. |
|---------------------------------------|---|

RETURNS

| | |
|--|---|
| <code>noErr</code> | There were no problems and the user did not select Continue if PSQuitShell displayed the Continue/Restart alert |
| <code>kUserContinuingAfterRestartMsgNum</code> | PSQuitShell displayed the Continue/Restart alert and the user selected Continue. |

SPECIAL CONSIDERATIONS

- Upgrader does not quit immediately when this instruction is called, instead it sets a global to indicate that Upgrader is to quit as soon as possible. When control is returned to the Upgrader's event loop, the global will be checked and the current plug-in's termination routine is called. Other internal clean-up routines are then called before Upgrader finally quits. It is safe to call this routine from anywhere in the plug-in including the termination routine. (If it is called from within a plug-in termination routine Upgrader will not call the termination routine again).

Help Window Routines

PSSetupHelpWindow

```
OSErr PSSetupHelpWindow ( DocLocationType inLocation,
                          short             inRsrcID,
                          short             inBasePICTRsrcID,
                          Str255           inHelpPanelTitleStr,
                          PanelPtr         *outHelpPanelPtr );
```

DESCRIPTION

Called by a plug-in to setup the help window associated with that plug-in. If this is the first time that the routine has been called, it will create the `PanelPtr` and return it in `outHelpPanelPtr`.

PARAMETERS

| | |
|----------------------------------|---|
| <code>inLocation</code> | Location of Help panel contents. This will be either <code>kReadFromResourceFile</code> , if the help panel DocViewer items contents are being read from a resource, or <code>kReadFromSimpleTextFile</code> , if the contents are being read from a SimpleText format file. |
| <code>inRsrcID</code> | 'TEXT'/'styl' resource ID if <code>inLocation</code> is <code>kReadFromResourceFile</code> or the 'flrf' resource ID if <code>inLocation</code> is <code>kReadFromSimpleTextFile</code> |
| <code>inBasePICTRsrcID</code> | The resource ID of the first 'PICT' (if any) referenced in the text, if <code>inLocation</code> is <code>kReadFromResourceFile</code> . If <code>inLocation</code> is <code>kReadFromSimpleTextFile</code> , this parameter is ignored (as it's always set to 1000 internally). |
| <code>inHelpPanelTitleStr</code> | A pascal string containing the help panel title. There is no default title supplied, so if this parameter is not explicitly setup before being passed, the panel title will be some junk |
| <code>outHelpPanelPtr</code> | On return, a pointer to the help panel, or NULL if it couldn't be created |

RETURNS

| | |
|---|---|
| <code>noErr</code> | The help panel was successfully setup |
| <code>kInternalErr</code> | If the global help <code>PanelPtr</code> is NULL and we are attempting to change its contents |
| <code>kPanelItemNotFoundInListErr</code> | Invalid item number |
| <code>kCantChangePanelItemToSpecifiedTypeErr</code> | The item couldn't be changed |
| <code>MemError</code> | Standard memory error |
| <code>ResError</code> | Standard resource error |

SPECIAL CONSIDERATIONS

- The 'TEXT' and 'styl' resources used to specify the text contents of the help panel (in the event of `inLocation` is `kReadFromResourceFile`) must have the same resource ID.

PSDisplayHelpWindow

```
void PSDisplayHelpWindow ( PanelPtr inHelpPanelPtr );
```

DESCRIPTION

Called by a plug-in to display the help window, or if it is already there, to bring it to the foreground. Also checks to see if (a) a printer is available, (b) the standard file package and list package are available and enables or disables the print and/or save buttons appropriately. See the description of `PSCheckEnvironment` for more information about checking for print/save capabilities.

PARAMETERS

| | |
|-----------------------------|-----------------------------|
| <code>inHelpPanelPtr</code> | A pointer to the help panel |
|-----------------------------|-----------------------------|

SPECIAL CONSIDERATIONS

- Assumes that `inHelpPanelPtr` is an initialized, valid pointer to the current help panel.

PSCloseHelpWindow

```
void PSCloseHelpWindow ( PanelPtr inHelpPanelPtr );
```

DESCRIPTION

Closes the help window, if `inHelpPanelPtr` is not NULL. This only hides the window, as it might be needed by another plug-in. As it's only hidden, its location and size are retained and don't need to be saved-off for use by another plug-in (the help panel is redisplayed by a future plug-in in the same state and position it was in before it was hidden).

PARAMETERS

| | |
|-----------------------------|-----------------------------|
| <code>inHelpPanelPtr</code> | A pointer to the help panel |
|-----------------------------|-----------------------------|

SPECIAL CONSIDERATIONS

- This is called by `PSHandleHelpWindowEvent` in response to the user clicking the Close button (or some equivalent action) on the help panel, therefore it does not need to be called by a plug-in in the normal course of events.
- The plug-in does not need to dispose of the help panel, as the shell takes care of it.

PSHandleHelpWindowEvent

```
Boolean PSHandleHelpWindowEvent ( PanelPtr      inHelpPanelPtr,
                                EventRecord    *inEvent );
```

DESCRIPTION

Called by a plug-in in its event handler after determining that the event occurred in the help window to handle help window events. This is also called in the plug-in's resume event to give the shell a turn at handling the resume event for the help panel.

PARAMETERS

| | |
|-----------------------------|--|
| <code>inHelpPanelPtr</code> | A pointer to the Help panel |
| <code>inEvent</code> | A pointer to the latest event's record |

RETURNS

TRUE if the event was handled by this routine, FALSE otherwise.

SPECIAL CONSIDERATIONS

- Assumes that `inHelpPanelPtr` is an initialized, valid pointer to the current help panel.
- Deals with mousedown events and resume events for the help panel.

Global Data Routines

PSSetGlobalData

```
ShellErr PSSetGlobalData ( GlobalDataType inGlobalDataType,
                           GlobalDataPtr   inGlobalDataPtr,
                           Size             inDataSize );
```

DESCRIPTION

Writes the value of the specified Global Data to the global list. If this Global Data doesn't exist, then it first creates it before updating the Global Data.

PARAMETERS

| | |
|-------------------------------|---|
| <code>inGlobalDataType</code> | A four character constant identifying the Global Data |
| <code>inGlobalDataPtr</code> | A pointer to the data to set |
| <code>inDataSize</code> | The number of bytes of data to write for this global |

RETURNS

| | |
|-------------------------------------|--|
| <code>noErr</code> | The global was successfully stored |
| <code>kGlobalDataOutOfMemErr</code> | There wasn't enough memory to add a new global |

SPECIAL CONSIDERATIONS

- If the Global Data item already exists, then the data is overwritten, so it is the responsibility of the plug-in to ensure that the new data is the same type and length as the original, or else there might be a crash.

PSGetGlobalData

```
ShellErr PSGetGlobalData ( GlobalDataType inGlobalDataType,
                           GlobalDataPtr   inGlobalDataPtr,
                           Size             inMaxDataSize,
                           Size             *outActualDataSize );
```

DESCRIPTION

Reads the value of the specified global from the global list.

PARAMETERS

| | |
|--------------------------------|---|
| <code>inGlobalDataType</code> | A four character constant identifying the global |
| <code>inGlobalDataPtr</code> | A pointer to a buffer to copy the data into |
| <code>inMaxDataSize</code> | The number of bytes of data to read for this global |
| <code>outActualDataSize</code> | On return, the actual size of the stored global |

RETURNS

| | |
|------------------------------------|---|
| <code>noErr</code> | The global was retrieved successfully |
| <code>kUnknownGlobalDataErr</code> | The global was not found or doesn't exist |

SPECIAL CONSIDERATIONS

- It is the responsibility of the plug-in to allocate sufficient memory for the buffer before data is copied into it.

Error Alert Routines

PSErrorAlert

```
SInt16 PSErrorAlert ( SInt16      inErrNum,
                      Boolean      inIsStandardShellErr,
                      ConstStr255Param inParam0,
                      ConstStr255Param inParam1,
                      ConstStr255Param inParam2,
                      ConstStr255Param inParam3,
                      SInt16      inDefaultButton,
                      SInt16      inCancelButton );
```

DESCRIPTION

Displays the text associated with the `inErrNum` in the related dialog, which is resized if necessary.

PARAMETERS

| | |
|-----------------------------------|---|
| <code>inErrNum</code> | The error number of the error which occurred |
| <code>inIsStandardShellErr</code> | If TRUE, the error text, dialogs etc., are contained in the Shell. If FALSE, they are contained in the plug-in's resource fork |
| <code>inParam0</code> | Pascal string to replace ^0 in the dialog (or an empty pascal string if none) |
| <code>inParam1</code> | Pascal string to replace ^1 in the dialog |
| <code>inParam2</code> | Pascal string to replace ^2 in the dialog |
| <code>inParam3</code> | Pascal string to replace ^3 in the dialog |
| <code>inDefaultButton</code> | The item number of the default button on the dialog |
| <code>inCancelButton</code> | The item number of the cancel button on the dialog |

RETURNS

The item number of the item the user selected on the dialog. Constants are defined for these return values in the "UpgraderPlugins.h" file.

SPECIAL CONSIDERATIONS

- Depending on the 'DLOG', there may or may not be, some or any ^0, ^1, ^2, ^3 strings to fill, so `inParam0`, `inParam1`, `inParam2` and `inParam3` therefore may or may not be required, depending on the 'DLOG' used. These parameters should be set to an empty string if not needed.
- If `inDefaultButton` is 0 (zero) then there is no default button set on the dialog. Similarly, if or `inCancelButton` is 0, there is no cancel button set on the dialog.

PSAlert

```
SInt16 PSAlert ( short      inDLOGID,
                  DocumentType inWhichFileContainsDLOG,
                  ConstStr255Param inAlertText,
                  ConstStr255Param inParam0,
                  ConstStr255Param inParam1,
                  ConstStr255Param inParam2,
                  ConstStr255Param inParam3,
                  SInt16      inDefaultButton,
                  SInt16      inCancelButton );
```

DESCRIPTION

General purpose alert display routine which displays `inAlertText` in the dialog `inDLOGID`, which is resized if necessary to fit the text. The plug-in developer may also create his/her own alert dialogs.

PARAMETERS

| | |
|--------------------------------------|---|
| <code>inDLOGID</code> | Resource ID of the 'DLOG' resource |
| <code>inWhichFileContainsDLOG</code> | <code>kUpgraderFile</code> if the 'DLOG' resource is in the Shell, <code>kClientDataFile</code> if the 'DLOG' is in the data file, or <code>kCurrentPluginResFile</code> if the 'DLOG' is in the plug-in's resource fork |
| <code>inAlertText</code> | Pascal string containing the text to be displayed on the dialog |
| <code>inParam0</code> | Pascal string to replace ^0 in the dialog (or an empty pascal string if none) |
| <code>inParam1</code> | Pascal string to replace ^1 in the dialog |
| <code>inParam2</code> | Pascal string to replace ^2 in the dialog |
| <code>inParam3</code> | Pascal string to replace ^3 in the dialog |
| <code>inDefaultButton</code> | Item number of the default button on the dialog |
| <code>inCancelButton</code> | Item number of the cancel button on the dialog |

RETURNS

The item number of the item the user selected on the dialog. Constants are defined for these return values in the "UpgraderPlugins.h" file.

SPECIAL CONSIDERATIONS

- Depending on the 'DLOG', there may or may not be, some or any ^0, ^1, ^2, ^3 strings to fill, so `inParam0`, `inParam1`, `inParam2` and `inParam3` therefore may or may not be required, depending on the 'DLOG' used. These parameters should be set to an empty string if not needed.
- If `inDefaultButton` is 0 (zero) then there is no default button set on the dialog. Similarly, if or `inCancelButton` is 0, there is no cancel button set on the dialog.
- If the plug-in writer designs his/her own alert box, there must be five buttons on the panel, irrespective of the number of buttons (the maximum number of supported buttons is five) the writer wishes to use. Any buttons not used should be hidden.

Utility Routines

This section details helpful utility routines available to plug-in writers. The various utility routines for the Upgrader includes `PSCheckEnvironment`, to check for Print/Save options, `PSReadFontInfo`, to read font information from an 'finf' resource, two more, `PSAlert` and `PSErrorAlert` to put up and

handle an alert box/error alert box and also `PSCollect` , to preload any resources listed in a 'RES#' resource.

PSCheckEnvironment

```
OSErr PSCheckEnvironment ( EnvironmentType *outEnvironment );
```

DESCRIPTION

Perform a check on the machine's runtime environment to verify the availability of certain facilities. Those supported at the moment are checks for

- **Printing** - checks to see if an active printer is selected or available
- **Saving** - checks to see if the List Manager Package and Standard File Manager Package are available

These checks are handy later on if the plug-in writer needs to enable/disable a Print/Save button on a panel, for example the help panel has both a Print and a Save button. This routine should be called on a resume event to check for a printer becoming available. In the event of booting from a floppy disk, the standard file and list package may not be available, so it might not be possible to save items.

PARAMETERS

| | |
|-----------------------------|---|
| <code>outEnvironment</code> | On return, a pointer to an <code>EnvironmentType</code> indicating whether or not printing and/or saving is available |
|-----------------------------|---|

RETURNS

| | |
|--------------------|-----------------------------------|
| <code>noErr</code> | Always returns <code>noErr</code> |
|--------------------|-----------------------------------|

SPECIAL CONSIDERATIONS

- The masks for checking availability of printing and saving are as follows:

| | | |
|--------------------|---|--|
| Printing Available | : | <code>kPrinterAvailableMask</code> |
| Saving Available | : | <code>kStandardFilePackageAvailableMask</code> |

PSReadFontInfo

```
Boolean PSReadFontInfo ( short    inLocation,  
                        short    inRsrcID,  
                        short    inFontItem,  
                        short    *outFontFace,  
                        short    *outFontStyle,  
                        short    *outFontSize );
```

DESCRIPTION

Read-in font information from a font information ('finf') resource and return it in `outFontFace`, `outFontStyle` and `outFontSize`.

PARAMETERS

| | |
|-------------------------|--|
| <code>inLocation</code> | One of: <code>kFontInfoInClientDataFile</code> , if the resource is in |
|-------------------------|--|

| | |
|--------------|--|
| | the data file, kFontInfoInPluginFile, if the resource is in the plug-in, or kFontInfoInShell, if the resource is in the Upgrader application |
| inRsrcID | The resource ID of the 'finf' resource |
| inFontItem | The index into the 'finf' resource for the required font |
| outFontFace | On return, the loaded font number |
| outFontStyle | On return, the loaded font style (face) |
| outFontSize | On return, the loaded font size |

RETURNS

TRUE if the font was read successfully, FALSE if there was a problem

SPECIAL CONSIDERATIONS

- outFontFace, outFontStyle and outFontSize are undefined if either the 'finf' resource or the index into the resource weren't found.

NOTE

A 'finf' resource has the following definition (taken from *Fonts.r*)

```
type 'finf' {
    integer = $$CountOf(Fonts);           // Number of fonts
    array Fonts {
        integer;                          // Font Number
        unsigned hex integer plain;      // Font Style
        integer;                          // Font Size
    };
};
```

PSLaunchFile

```
Boolean PSLaunchFile ( SInt16          inAppFileRefRsrcID,
                       SInt16          inDocFileRefRsrcID,
                       AEDescList      *inOptionalOpenParams,
                       Boolean          inLaunchAppInFront,
                       ProcessSerialNumber *outApplicationPSN );
```

DESCRIPTION

Launches the specified file or application. If launching a file, the application the file is to be launched with must also be specified.

PARAMETERS

| | |
|----------------------|--|
| inAppFileRefRsrcID | The 'flrf' resource (see section 3.3 for more details), containing the application to be launched |
| inDocFileRefRsrcID | The 'flrf' resource of the document to be launched, or 0 (zero) if only an application launch |
| inOptionalOpenParams | A list of optional parameters sent in the 'odoc' AppleEvent |
| inLaunchAppInFront | If kLaunchAppInFront, launch the application in front of all other applications, if kLaunchAppInBack, launch the application in the background |
| outApplicationPSN | On success, the process serial number of the launched application is returned. This can be used to communicate with |

the launched application, or terminate the launched application. On failure, this parameter is undefined.

RETURNS

TRUE if no errors occurred, else FALSE.

PSMakeFSSpecFromFileRefID

```
Boolean PSMakeFSSpecFromFileRefID ( SInt16      inFileRefID,
                                     Boolean      inShowErrorAlert,
                                     FSSpec       *outFoundFile );
```

DESCRIPTION

Returns an FSSpec to a file defined by a 'flrf' resource. This allows plug-in writers to store references to files using the standard 'flrf' resource, and find them during runtime.

PARAMETERS

| | |
|-------------------------------|--|
| <code>inFileRefID</code> | The ID of a 'flrf' resource (see section 3.3 for more details) containing the file to be found |
| <code>inShowErrorAlert</code> | If true, displays an alert if the file cannot be found. |
| <code>outFoundFile</code> | On success, a FSSpec describing the location of the found file. |

RETURNS

TRUE if no errors occurred, else FALSE.

PSCollect

```
void PSCollect ( SInt16 inResListRsrcID );
```

DESCRIPTION

Given a resource list resource, or 'RES#', this routine goes through the list of resources and loads any of the resources in the list which aren't already in memory. It also makes them non-purgeable.

PARAMETERS

| | |
|------------------------------|--|
| <code>inResListRsrcID</code> | The resource ID of the 'RES#' resource |
|------------------------------|--|

PSStartWaitCursor

```
void PSStartWaitCursor ( SInt16      inCursorID,
                        SInt16      inDelayTicks );
```

DESCRIPTION

Starts the wait cursor after the specified number of ticks. For example, if you pass a value 120 in `inDelayTicks`, the cursor will not change to a wait cursor if you call `StopWaitCursor` within two seconds

PARAMETERS

| | |
|---------------------------|---|
| <code>inCursorID</code> | Resource ID of a 'acur' resource. Currently, only two animated cursors are supported: 128 for standard watch, and 129 for classic counting fingers. |
| <code>inDelayTicks</code> | The number of ticks to wait before starting the wait cursor. |

PSStopWaitCursor

```
void PSStopWaitCursor ( void );
```

DESCRIPTION

Stops an animated wait cursor started by a call to `PSStopWaitCursor` and returns the cursor to an arrow.

Resources

These resources are contained in the plug-in file.

The Error Mapping Resource ('ners')

One of the services the Upgrader provides to plug-ins is the ability to display error messages in automatically resizable dialog boxes. The routines which provide this functionality are `PSErrorAlert` and `PSAlert`. `PSErrorAlert` makes use of 'ners' resources, which are used to identify individual error numbers with the error string to be displayed and the error dialog to display it in.

```
type 'ners' {  
    wide array {  
        integer;           // Internal error number  
        integer;           // Index in 'STR#' ID = 500 resource  
        integer;           // Dialog to display; 'DLOG' Rsrc ID  
    };  
};
```

The first integer will be the error number for which you want to display a message. The second integer is the index of a 'STR#' resource ID that the string is stored. The third integer contains the 'DLOG' ID of the error dialog in which the error message is to be displayed.

The Plug-in Format Resource ('pfmt')

The plug-in file format resource defines the version of the plug-in file, so the Upgrader can determine if it can execute the plug-in file or not.

```
type 'pfmt' {  
    byte    PluginMajorRevisionNumber;           // The major version number  
    byte    PluginMinorRevisionNumber;           // The minor version number  
}
```


Summary of the Upgrader API

Constants

| Constant | Value | Comment |
|---|-------------------------|--|
| <u>PSErrorAlert /PSAlert constants:</u> | | |
| Dialog IDs , needed by plug-ins to define their own private 'ners' resources: | | |
| StopOrContinueDLOGID | 506 | <i>note with Stop & Continue buttons</i> |
| kQuitOrContinueDLOGID | 507 | <i>note with Continue & Quit buttons</i> |
| kNoteOKDLOGID | 508 | <i>note with OK button</i> |
| kRestartOrContinueDLOGID | 514 | <i>note with Continue & Restart</i> |
| kInsertDiskDLOGID | 515 | <i>disk swap icon</i> |
| kStopOKDLOGID | 519 | <i>stop with OK button</i> |
| kSkipOrContinueDLOGID | 520 | <i>caution with Skip & Continue</i> |
| kNoteQuitDLOGID | 600 | <i>note with Quit button</i> |
| kStopAndQuitDLOGID | 526 | <i>stop with Quit button</i> |
| kEmptyString | (ConstStr255Param) "\p" | |
| kOKButtonIndex | 1 | <i>Default/selected button</i> |
| kContinueNotSkipBtnIndex | 1 | <i>Skip or continue</i> |
| kSkipNotContinueBtnIndex | 2 | |
| kQuitButtonIndex | 1 | <i>Continue or Quit</i> |
| kContinueNotQuitBtnIndex | 2 | |
| kRestartButtonIndex | 1 | <i>Continue or Restart</i> |
| kContinueNotRestartBtnIndex | 2 | |
| kYesButtonIndex | 1 | <i>Yes or no</i> |
| kNoButtonIndex | 2 | |
| kStandardShellError | TRUE | <i>Look in the Shell for the error</i> |
| kPluginError | FALSE | <i>Look in the plug-in for the error</i> |
| kUpgraderFile | 0 | |
| kClientDataFile | 1 | |
| kCurrentPluginResFile | 2 | |
| <u>PSQuitShell constants:</u> | | |
| kDontAllowUserToContinue | FALSE | |
| kAllowUserToContinue | TRUE | |
| <u>PSGotoNextPlugin constant:</u> | | |
| kUseDefaultNextModuleName | 0 | |
| <u>PSNewCustomPanel constant:</u> | | |

| | | |
|-------------|------|--------------------------|
| kGrowWindow | 0x02 | <i>inFlags parameter</i> |
|-------------|------|--------------------------|

PSReadFontInfo constants:

Built-in 'finf' resource IDs for the fontInfo field of StyledStringDesc:

| | |
|------------------|-----|
| kUpgraderFonts | 128 |
| kLargeTextStyle | 0 |
| kMediumTextStyle | 1 |
| kSmallTextStyle | 2 |
| kAlertTextStyle | 3 |

The file from which the 'finf' resource is to be read:

| | |
|---------------------------|---|
| kFontInfoInClientDataFile | 0 |
| kFontInfoInPluginFile | 1 |
| kFontInfoInShell | 2 |
| kFontInfoInAnyFile | 3 |

PSGotoNextPlugin constant:

| | |
|---------------------------|---|
| kUseDefaultNextModuleName | 0 |
|---------------------------|---|

PSLaunchFile constants:

| | | |
|-------------------|-------|---|
| kLaunchAppInFront | TRUE | <i>Launch the file or app frontmost</i> |
| kLaunchAppInBack | FALSE | <i>Launch the file or app in the background</i> |

PSStartWaitCursor constants:

| | | |
|----------------------------|-----|------------------------------------|
| kWatchWaitCursor | 128 | <i>Use in inCursorID parameter</i> |
| kCountingFingersWaitCursor | 129 | <i>Use in inCursorID parameter</i> |

HandleEventForPluginModule constants:

| | | |
|---------------------|------|-------------------------------------|
| kMenuSelectionEvent | 2087 | <i>"what" field when menu event</i> |
|---------------------|------|-------------------------------------|

PSRegisterPluginHandler constants:

| | |
|-----------------------|--------|
| kEventHandlerID | 'ehID' |
| kTerminationHandlerID | 'thID' |

Format Resource constants:

| | |
|---------------------------|--------|
| kSequenceResourceType | 'tsqc' |
| kClientDataFormatRsrcType | 'cfmt' |
| kPluginFormatRsrcType | 'pfmt' |

Error List Resource constant:

kErrorListRsrcType 'ners'

PSNewDocViewerItem / PSSetPanelItem constants:

| | | |
|--------------|--------|--|
| kDocResType | 'DOCV' | <i>'TEXT'/'styl'/'PICT's stored in resources</i> |
| kDocFileType | 'DOCF' | <i>SimpleText file (optional 'styl'/'PICT' in resource fork)</i> |

PSSetPanelItem constants:

| | | |
|-------------------|--------|---|
| kControlType | 'CNTL' | |
| kIconType | 'ICON' | |
| kUserItemType | 'USER' | <i>User panel item for drawing custom items</i> |
| kStyledTextType | 'STXT' | <i>'TEXT' and 'styl' resource pairs</i> |
| kStyledStringType | 'SSTR' | <i>'STR#', index and 'finf'</i> |
| kPICTType | 'PICT' | |

Global Data Identifiers:

Selected volume's vRefNum set by Target Selection plug-in (SInt16):

kTargetDiskVolRefNumDataType 'trgt'

Flag to signal to Shell and plug-ins that a restart is required (Boolean):

kForceRestartOnQuitDataType 'rsrq'

PSCheckEnvironment constants:

| | |
|-----------------------------------|------------|
| kPrinterAvailableMask | 0x00000001 |
| kStandardFilePackageAvailableMask | 0x00000002 |

PSSetupHelpPanel constants:

| | |
|-------------------------|-------|
| kReadFromResourceFile | TRUE |
| kReadFromSimpleTextFile | FALSE |

PSSetPanelItemAction constants:

| | |
|---------------------|--------|
| kContinueButtonMask | 0x0001 |
| kGoBackButtonMask | 0x0002 |
| kQuitButtonMask | 0x0004 |
| kDefaultButtonMask | 0x0010 |

PSShowPanel / PSHidePanel constants:

Pass one of these if the current global panel is unknown (e.g. if the plug-in doesn't display a panel):

| | |
|--------------|----------------------|
| kGlobalPanel | (void *) 0xFFFFFFFF |
| kHelpPanel | (void *) 0xFFFFFFFFE |

Data Types

Typedefs:

| | | |
|---------|---------------|----------------------|
| typedef | OSType | GlobalDataType; |
| typedef | Ptr | GlobalDataPtr; |
| typedef | OSErr | ShellErr; |
| typedef | OSType | HandlerIDType; |
| typedef | SInt16 | ResourceID; |
| typedef | WindowPtr | PanelPtr; |
| typedef | UInt8 | DVFlags; |
| typedef | unsigned long | PanelItemType; |
| typedef | PanelItemType | DocViewerType; |
| typedef | short | DocumentType; |
| typedef | Byte | DocLocationType; |
| typedef | unsigned long | EnvironmentType; |
| typedef | UInt16 | PanelActionType; |
| typedef | Handle | PanelUserItemHandle; |

Plug-in-Defined Routines

```
void InitializePluginModule( void          *inPSTable,
                             SInt32         inRefCon,
                             Boolean        inEnterAtBeginning );

Boolean HandleEventForPluginModule( EventRecord *inEvent );

void TerminatePluginModule( void );
```

Upgrader Plug-in Routines

```
void SetupPlugin( void *shellFunctions );

ShellErr PSRegisterHandler( HandlerIDType   inHandlerType,
                           UniversalProcPtr inHandlerProcPtr );

ShellErr PSHandleDocScroll( PanelPtr      inPanelPtr,
                           Point          inLocalPt,
                           short          inDocItem );

void PSSaveDoc( PanelPtr      inPanelPtr,
                short          inDocItem );

ShellErr PSPrintDoc( PanelPtr inPanelPtr,
                    short      inDocItem );

ShellErr PSSetGlobalData( GlobalDataType inGlobalDataType,
                         GlobalDataPtr   inGlobalDataPtr,
                         Size             inDataSize );

ShellErr PSGetGlobalData( GlobalDataType inGlobalDataType,
                         GlobalDataPtr   inGlobalDataPtr,
                         Size             inMaxDataSize,
```

```

                                Size                *outActualDataSize );

ShellErr PSSetupNewPanel( Sint16      inPanelItemsRsrcID,
                           PanelPtr    *outPanelPtr );

ShellErr PSNewCustomPanel( short      inPanelItemsRsrcID,
                           DVFlags    inFlags,
                           PanelPtr    *outPanelPtr );

ShellErr PSUpdatePanel( PanelPtr inPanelPtr );

void PSDisposePanel( PanelPtr inPanelPtr );

ShellErr PSShowPanel( PanelPtr inPanelPtr );

void PSHidePanel( PanelPtr inPanelPtr );

Boolean PSGetPanelItemHit( PanelPtr      inPanelPtr,
                           EventRecord    *inPanelEvent,
                           short          *outItemHit );

ShellErr PSSetPanelItem( PanelPtr      inPanelPtr,
                           short        inItemNumber,
                           PanelItemType inItemType,
                           Handle       inItemHandle,
                           Rect         *inItemRect );

ShellErr PSGetPanelItem( PanelPtr      inPanelPtr,
                           short        inItemNumber,
                           PanelItemType *outItemType,
                           Handle       *outItemHandle,
                           Rect         *outItemRect );

void PSSetPrefCon( PanelPtr  inPanelPtr,
                   long       inRefCon );

long PSGetPrefCon( PanelPtr inPanelPtr );

ShellErr PSSetPanelItemAction( PanelPtr      inPanelPtr,
                               short          inItemNumber,
                               PanelActionType inActionType );

TEHandle PSNewStyledStringItem( Rect      *inItemRect,
                               short       inSTRListRsrcID,
                               short       inStringListItem,
                               short       inFontNum,
                               short       inFontStyle,
                               short       inFontSize );

TEHandle PSNewStyledTextItem( Rect  *inItemRect,
                              short inEXTRsrcID );

PanelUserItemHandle PSNewUserItem( UserItemProcPtr inUserItem,
                                   Boolean           inTransparent );

DocInfoHandle PSNewDocViewerItem( PanelPtr      inPanelPtr,
                                  Rect          *inItemRect,
                                  DocViewerType inDocViewerType,

```

```

                                short      inTextRsrcID,
                                short      inBasePICTRsrcID );

ShellErr PSActivatePanel( PanelPtr          inPanelPtr,
                          Boolean           inShouldActivate );

ShellErr PSGoToPreviousPlugin( void );

ShellErr PSGoToNextPlugin( ResourceID inStrRsrcID );

ShellErr PSQuitShell( Boolean inCanAllowUserToContinue );

OSErr PSSetupHelpWindow( DocLocationType  inLocation,
                          short            inRsrcID,
                          short            inBasePICTRsrcID,
                          Str255          inHelpPanelTitleStr,
                          PanelPtr        *outHelpPanelPtr );

void PSDisplayHelpWindow( PanelPtr inHelpPanelPtr );

void PSCloseHelpWindow( PanelPtr inHelpPanelPtr );

Boolean PSHandleHelpWindowEvent( PanelPtr      inHelpPanelPtr,
                                EventRecord    *inEvent );

OSErr PSCheckEnvironment( EnvironmentType *outEnvironment );

Boolean PSReadFontInfo( short inLocation,
                       short inRsrcID,
                       short inFontItem,
                       short *outFontFace,
                       short *outFontStyle,
                       short *outFontSize );

Boolean PSLaunchFile( SInt16          inAppFileRefRsrcID,
                      SInt16          inDocFileRefRsrcID,
                      AEDescList      *inOptionalOpenParams,
                      Boolean          inLaunchAppInFront,
                      ProcessSerialNumber *outApplicationPSN );

Boolean PSMakeFSSpecFromFileRefID ( SInt16      inFileRefID,
                                   Boolean       inShowErrorAlert,
                                   FSSpec       *outFoundFile );

SInt16 PSErrorAlert( SInt16          inErrNum,
                     Boolean          inIsStandardShellErr,
                     ConstStr255Param inParam0,
                     ConstStr255Param inParam1,
                     ConstStr255Param inParam2,
                     ConstStr255Param inParam3,
                     SInt16          inDefaultButton,
                     SInt16          inCancelButton );

SInt16 PSAlert( short      inDLOGID,
                 DocumentType inWhichFileContainsDLOG,
                 ConstStr255Param inAlertText,
                 ConstStr255Param inParam0,
                 ConstStr255Param inParam1,

```

```

        ConstStr255Param    inParam2,
        ConstStr255Param    inParam3,
        SInt16              inDefaultButton,
        SInt16              inCancelButton );

void PSCollect( SInt16 inResListRsrcID );

```

Result Codes

The following are the errors numbers and constants defined in the Shell:

| Error Name | Number | Description |
|--|--------|--|
| <u>DocViewer Errors:</u> | | |
| kCantCreateDocumentErr | 7000 | Unable to create the DocViewer object. |
| kInvalidDocRecordErr | 7001 | Returned if the inDocData parameter to any of theDocViewer routines is NULL. |
| kInvalidFileSpecErr | 7002 | Returned from PSNewDocViewerItem if the Upgrader couldn't resolve the file path while attempting to read from a SimpleText file. |
| <u>General Shell error numbers that may be returned to plug-ins:</u> | | |
| kUnknownPlugInHandlerErr | 1001 | Returned from PSRegisterHandler if an invalid HandlerIDType parameter was passed. |
| kCouldNotFindResourceMsgNum | 1003 | General resource warning for plug-in use, not returned by any Upgrader routine to plug-ins. |
| kMemoryErrorMsgNum | 1004 | General memory warning for plug-in use, not returned by any Upgrader routine to plug-ins. |
| <u>Errors Returned byPSQuitShell:</u> | | |
| kUserContinuingAfterRestartAlertMsgNum | 1030 | User selected Continue from Continue/Restart displayed during a call to PSQuitShell. |
| <u>Plug-in sequence errors:</u> | | |
| kUnknownPluginNameErr | 1040 | Returned from PSGoToNextPlugin if the plug-in specified by inStrResID was invalid. |
| kNextPluginSameAsCurrentErr | 1041 | Returned from PSGoToNextPlugin if the plug-in specified by inStrResID is the |

same as the plug-in that the call was made from.

Global data manager errors:

| | | |
|----------------------------|------|--|
| kUnknownGlobalDataErr | 2000 | Returned from PSGetGlobalData if the type specified by parameter inGlobalDataType could not be found. |
| kGlobalDataOutOfMemErr | 2001 | Returned from PSSetGlobalData if memory could not be allocated for the inGlobalDataPtr parameter. |
| kUnsupportedPrefsFormatErr | 2010 | Message used by plug-ins when they find the preference resource for the plug-in is of a unsupported format , not returned by any Upgrader routine to plug-ins. |
| kNoPrefsErr | 2011 | Message used by plug-ins when they can't find the preference resource for the plug-in , not returned by any Upgrader routine to plug-ins. |

Panel manager errors:

| | | |
|------------------------------|------|--|
| kPanelItemNotFoundInListErr | 2050 | Message indicating that an item could not be located in the panels item list, returned from PSHandleDocScroll, PSPrintDoc, PSUpdatePanel, PSGetPanelItem and PSSetPanelItemAction. |
| kCannotLoadNeededResourceErr | 2051 | General purpose resource message that plug-ins may use, is returned from PSSetupNewPanel and PSNewCustomPanel if problems occur loading resource referenced from the panel's 'DITL ' list. |
| kNoDataAvailableForItemErr | 2052 | Error number indicating that PSGetPanelItem failed to find information for the inItemNumber parameter, no message is defined for this in the Upgrader. |
| kInternalErr | 2053 | General purpose error message that may be used by plug-ins, returned by PSSetupNewPanel and PSNewCustomPanel if problems occurred while changing the panel list. |
| kItemTypeMismatchErr | 2055 | Error number returned by PSNewDocViewerItem if the inDocViewerType parameter is not of type kDocResType or kDocFileType. |

kCantChangePanelItemToSpecifiedTypeErr

2058 Error number returned by
PSSetPanelItem if the inItemType
parameter is one that the Upgrader doesn't
support, no message is defined for this in the
Upgrader.

Writing ModifierTool Editors

About ModifierTool Editors

ModifierTool provides the ability to modify Upgrader-based programs, such as the Install Mac OS 8 program used to install Mac OS 8. ModifierTool is designed to edit an existing Upgrader data file or create a new data file from scratch.

An editor is simply a PPC code fragment that is executed to present windows to edit the resources contained in the data file that are owned by the plug-in. The editor can be written using MPW, Metrowerks or other development environment, but the examples and utility files provided on the SDK use Metrowerks PowerPlant framework to make editor creation fast and easy. We encourage developers to use the file reference and text editors provided on the SDK so users can edit these common data types in a consistent way.

Writing a ModifierTool Editor

The best way to start an editor for a new plug-in is to duplicate an editor project for a similar plug-in. You'll find that most editors have the same basic resource reading/writing and display item setting and getting routines.

Editor Entry Point

When the editor is loaded and executed, the ModifierTool application turns over complete control to the editor until it is finished. The editor should show modal or movable modal windows only, because if the user is allowed to switch back to the ModifierTool window, the main window will not handle the user interaction.

Listing 11-1 shows the entry point of the editor. You'll find this definition and other helpful routines in the "EditorUtilities.h" and "EditorUtilities.cp" files.

Listing 11-1 Editor parameter block definition

```
struct EditorLibProcParamBlock
{
    SInt16          fFormatNum;
    QDGlobals*      fQDGlobals;
    SInt16          fFileRefNum;
    SInt16          fPreferenceRsrcID;
    SInt16          fResListRsrcID;
};
typedef struct EditorLibProcParamBlock *EditorLibProcParamBlockPtr;

extern "C" { typedef SInt32 (*EditorLibProcPtr)( EditorLibProcParamBlockPtr
inEditorLibProcParamBlockPtr ); }
```

Field descriptions

| | |
|-------------------|---|
| fFormatNum | The format of the EditorLibProcParamBlock structure. The only format currently defined is format 1. |
| fQDGlobals | A pointer to the ModifierTool application's QuickDraw globals. |
| fFileRefNum | The file refnum of the data file resource fork. Upon launch of the editor the current resource file is set to the editor's resource fork. |
| fPreferenceRsrcID | The lo-word of the RefCon value stored in the plug-in entry in the sequence resource. If this value is 0, then use the hard coded preference resource ID used by the plug-in. |
| fResListRsrcID | The ID of the 'RES#' resource that will contain the list of resources stored in the data file owned by the plug-in. The editor should update this resource whenever the user saves changes. |

Upon entry, the editor should locate and read its preference resource then display a movable modal editing window. When the editing is finished, the editor should return one of four possible results:

| | |
|-------------------|---|
| 0 | The changes were saved and everything is great. |
| 1 | The user canceled the editing session, and any changes were discarded. |
| 2 | The user wishes to remove this plug-in. On return to the ModifierTool, the plug-in entry will be deleted. |
| -1 through -32768 | An internal error occurred. Your editor should display an alert telling the user what the problem was before returning this result. |

Updating Plug-in Resources

When the user wishes to save the changes he or she has made to the plug-in, the user should click Save in your editor window, which will cause your preference resource and the appropriate referenced resources to be saved. If the plug-in entry was just created by the user, and you need to create new referenced resources, then make sure to create these resources with IDs between 10,000 and 20,000. The routine `GetUniqueIDForResType` supplied in "EditorUtilities.cp" can help you generate these new IDs.

WARNING

Resources stored in the data file should never be shared between plug-ins. All referenced resources should have IDs between 10,000 and 20,000.

Two additional routines supplied in “EditorUtilities.cp” can help you update 'STR ' and 'STR#' resources. Use `WriteStringResource` to update a 'STR ' resource and `WriteStringListResourceIndex` to update an individual string index within a 'STR#' resource. The `WriteStringListResourceIndex` is not designed for speed, so if you need to update large 'STR#' resources, you may want to consider rewriting this routine.

When called, your editor is passed the ID of the preload list resource which you should update when saving changes. This resource is used to support running from a multiple disk set, such as floppies. The routines `ResetResListResource` and `AppendToResListResource` are provided in “EditorUtilities.cp” to help with this updating task. To use these routines, call `ResetResListResource` once to reset the list to zero entries, then call `AppendToResListResource` for each resource the your plug-in owns in the data file.

Removing Plug-in Resources

Because of the modular nature of `ModifierTool` and its editors, removing a plug-in entry is a joint effort between the editor and the `ModifierTool` application. When the user clicks `Remove` in your editor window, you should delete the preference resource and all referenced resources. The `ModifierTool` will remove the preload resource for you when it deletes the plug-in entry from the Upgrader-owned sequence resource.

The routine `DeleteResource` is provided in “EditorUtilities.cp” to help with deleting your resources.

Appendix A: Adding Pictures to SimpleText Documents

The following is an excerpt from *Technical Note: 1005: The Compleat Guide to SimpleText*.

So how do you use SimpleText to create Release notes? It's easy. Get those creative juices flowing, grab a cup of strong coffee (or your favorite highly-caffeinated beverage), and read on.

Write the Text

You can handle this part yourself. Use any word processor or text editor that supports saving to text-only files (i.e., those files of type "TEXT"). You can even use SimpleText if you so desire. Don't put carriage returns after each line either, since SimpleText automatically wraps lines, just like a real word processor (the SimpleText window conforms to the size of the current screen, so don't depend on the breaks you see either). Don't worry about non-breaking space characters at this point either; you'll get a chance to add them later. Just think about what pictures you want (if you want them at all) and in what order you want them. When you are finished with the text, save it as a text-only file. If your word processor gives you the option of putting carriage returns after lines or after paragraphs, choose the after paragraphs option.

SimpleText now lets you use different fonts, sizes and styles in your documents. No longer are you held captive to only one font. Be brave, spice up your document, this is a Mac, not a VT100. Just remember that people actually have to read this document, so don't make it so cluttered with fonts and sizes that it's illegible. Also stick to the standard fonts like Times, Helvetica, and Geneva, since if the font is not installed on the reader's system, the text will end up in Geneva.

Draw the Pictures

First make a backup of your Scrapbook file (you should find it in your System Folder) if it contains anything you consider important. After backing it up, throw away the original copy (this makes things much easier later on in the process), but don't worry, if you made a backup you can use it to restore the original when finished. If you prefer, you can just rename the Scrapbook file, which effectively makes a backup copy.

Unfortunately, the ideal method for creating a picture involves both a paint program and a draw program. Once you are finished with your pictures, save them to a document, then do one of the following:

If you used a painting program to draw your pictures

1. Select your picture with a Lasso tool to ensure that only the minimum size of the image is copied. This takes up less space on disk and centers the picture in the document.
2. Copy the picture then paste it into the Scrapbook.
3. Repeat these steps for each individual picture you wish to include in the document.

If you used a draw program to draw your pictures

1. Copy each of your pictures into the Scrapbook.
2. Launch a paint program, then copy each picture from the Scrapbook into the paint program.
3. Once every picture is in a paint document, open the Scrapbook and clear each of your pictures from the Scrapbook. The Scrapbook should say "Empty Scrapbook" when you are finished (unless you did not start with a fresh Scrapbook).
4. Follow the procedure in the steps for a painting program to copy and paste each of your pictures back into the Scrapbook. At this point, regardless of which program you originally used to create your pictures, they should all be in the Scrapbook and in bitmap form (after being copied with a Lasso tool from a paint program). Because of a quirk in the Printing Manager and PostScript(R), you have to perform a few more steps.
5. Launch a draw program, then copy each picture from the Scrapbook into the draw program.
6. Once every picture is in a draw document, open the Scrapbook and clear each of your pictures from the Scrapbook. The Scrapbook should say "Empty Scrapbook" when you are finished (unless you did not start with a fresh Scrapbook).
7. Copy each picture back to the Scrapbook. This process makes the pictures "transparent" when printed, and this is important to avoid a problem with white, horizontal stripes running through your pictures.

Adding the Pictures

Launch ResEdit and open the text-only SimpleText document (you may want to work on a backup copy). SimpleText saves every document with a resource fork that holds the font information, so ResEdit should not warn you about the file not having a resource fork unless you created the document with a program other than SimpleText.

Open your Scrapbook file (the one with all the pictures in it). Its ResEdit window should contain a 'PICT' resource along with some others. Select 'PICT' (don't double-click), and copy this resource to the SimpleText document by bringing its window to the front and selecting Paste from the Edit menu. If you

do this step correctly, your pictures and text should all be in the same document. Save the SimpleText document so you don't have to do this step again and close the Scrapbook.

Now you need to put the pictures into the proper numerical order so they show up in the correct order in the SimpleText document. Numbering starts at 1000 (i.e., first picture should be 1000, second picture 1001, etc.). To order these pictures, double-click on the 'PICT' in the SimpleText document's window. You should get another window which contains each of the pictures you copied into this document. Use the scroll bar until you find the first picture you want to appear in the document. Select it (by clicking on it once), and choose the Get Info or Get Resource Info option to get information on the resource. ResEdit displays an information window about the selected resource with space to enter a name and an ID (there is already a random ID number assigned). Change the ID to 1000 and give the picture a name too (i.e., "Figure 1", etc.). Near the bottom of this window you can see the resource attributes. Be sure that the "Purgeable" attribute is checked, then close the window. Repeat this process for each succeeding picture, giving each a successive number (i.e., 1001, 1002, 1003, etc.). When you are finished with all of the pictures, save the file and quit ResEdit.

That's the difficult part; the rest is icing. Go get some more coffee or whatever it is you are drinking.

Edit the Text to Make It Look Pretty With the Pictures

Launch SimpleText and open your document. Find the location where you want to place the first picture and position the text cursor there. Enter a carriage return or two (more if you want more space before the picture) then a non-breaking space character (Option-Space Bar, remember), which will be invisible.

Now resize the window, and voilà, when the window redraws, your picture will be just below the non-breaking space character. Now enter as many carriage returns as necessary to provide space for the picture. When you enter the first carriage return, SimpleText will erase the picture, so you will need to resize the window again to verify your spacing, clicking the zoom box works well.

Once you have enough room for the first picture (you probably want to leave an extra blank line or two after it too), move on to the next desired picture location and repeat the process. Continue this process (and don't forget to save the document along the way) until you have placed all of the pictures. When you finish placing the pictures, you should save the document again and try printing it on both an ImageWriter and LaserWriter if possible. You may wish to tweak the picture spacing or location to keep them from crossing printed-page boundaries.

When you are satisfied with the results, Quit SimpleText.

Making the File Read-Only

Make a copy of the file (to save a step if you decide to edit it again) then launch ResEdit. Now choose Get Info from the File menu and change the file type from 'TEXT' to 'ttrt' (the lowercase is significant) and check to make sure the creator type is 'ttrt'. Now quit ResEdit and save the changes to the document when prompted.

That's all there is to it.

A Few Hints On Creating Good Documents With Pictures

The following hints should help to make your SimpleText document creation faster and more efficient as well as make the final document as nice as possible for the user.

- Always use the Lasso tool in paint programs to select pictures to appear in SimpleText documents; it makes them smaller.

- Keep pictures as small and simple as possible; the document takes up less room on disk and scrolling is faster.
- If two pictures appear on top of each other, you probably have two non-breaking space characters on the same line. Simply delete one to fix it. It is generally a good idea to put non-breaking space characters on a line by themselves with a blank line before it. In addition, always leave room for an extra line after the picture so you do not have the picture running into the text which follows it.
- If you need to use the non-breaking space character as a non-breaking space, you can.
- Since SimpleText assigns the numbered 'PICT' resources to the non-breaking space characters in the document, you can simply skip a resource number to use a non-breaking space character as a non-breaking space in the text. For example, if you had four non-breaking spaces in the document and you wanted pictures at the first, second, and fourth, you would number your 'PICT' resources 1000, 1001, and 1003. The third non-breaking space character would normally have 'PICT' resource 1002 assigned to it, but since there is not a resource with this ID, it simply acts as a non-breaking space in the document.
- Don't worry about how horrible everything looks when you are editing; users will not be able to edit your document (unless they have read this Note), so they will not see the awful flashing, disappearing pictures, etc.
- Make the document read-only even if you do not use pictures. Distributing read-only documents to users gives the consistent impression that Release Notes are not to be modified.
- If your pictures are not appearing as you think they should, and if you cannot figure out what might be wrong by following the sequence in this Note, then try the following: Open the document with ResEdit. Click once on the 'PICT' list and choose Open Picker by ID from the Resource menu of ResEdit 2.x. You should get a window with a list of all of your pictures, in order, and numbered sequentially from 1000. If this is not what you get, then you have missed a step along the way and need to make sure all your pictures are in the resource and numbered sequentially.