QuickTime for Windows 2.0 Developer's Manual

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How to Use this Manual

This manual is designed to acquaint you with QuickTime for Windows concepts and get you writing QuickTime for Windows programs quickly.

To get the most out of it, you should:

- Read Section 1 to gain an understanding of QuickTime for Windows' overall purpose, possibilities and limitations.
- Proceed to Section 2 when you are ready to begin a tutorial using sample QuickTime for Windows programs.
- Use Section 3, the comprehensive *Programmer's Reference*, to look up detailed information on specific elements of the QuickTime for Windows API.

It is also recommended that you read the following introductory pages about the QuickTime for Windows documentation and the conventions used in this manual.

Preface

About the QuickTime for Windows Documentation

This document is the programmer's manual for developers of QuickTime for Windows-aware applications in the Microsoft Windows environment. Unlike the Macintosh version, the current release of QuickTime for Windows handles movies in play mode only. As a result, this manual focuses on an QuickTime for Windows entity known as the *Movie Controller*. All movies must be under the direct supervision of movie controllers, and most of the programmatic interface presented in the *Tutorial* and *Programmer's Reference* sections of this manual is devoted to supporting the creation and functionality of this entity.

This approach was taken because much of the existing documentation for QuickTime for Windows covers implementation areas not yet available to the Windows developer. General architectural overviews and design perspectives of QuickTime for Windows *are* covered, but material which could distract or otherwise prevent developers from running movies in their Windows programs as soon as possible has been kept to a minimum. If the developer wishes further information on how movies are created and edited, or about the internals of QuickTime for Windows itself, he or she should consult the Apple QuickTime documentation.

To get the greatest benefit from this manual, the developer should already be familiar with the Windows development tools and the Microsoft C programming language environment.

If you have QuickTime for Windows on CD-ROM, this manual is also available to you in electronic form on the CD. QuickTime for Windows help files are available whether you have installed from CD-ROM or diskettes. See subsection B of the overview for more information on QuickTime for Windows help files.

Conventions Used in this Manual

To alert the developer when special consideration should be given to certain areas in the text, the following conventions are employed:

Note Boxes

Important information is often called out in a note box:

Note: Text set off this way presents reminders or notes related to the topic.

Section I. QuickTime for Windows Overview

QuickTime for Windows Concepts

As a QuickTime for Windows developer, you will need to understand the various high level strategies and paradigms that QuickTime for Windows incorporates before you design and code your own QuickTime for Windows applications. These concepts fall into several categories: what QuickTime for Windows is, how programs incorporate it, what is normal QuickTime for Windows behavior and what is the responsibility of the application. This section gives you enough background on these concepts to proceed to the tutorial section and start writing your own QuickTime for Windows programs.

1. What is QuickTime for Windows?

QuickTime for Windows is a technology that lets your Microsoft Windows programs play QuickTime movies and view QuickTime pictures. QuickTime is Macintosh-based software that can create movies as well as play them. In addition to playing movies in the QuickTime format, QuickTime for Windows can also play MPEG files, if appropriate hardware is installed on the playback computer.

A movie playing in a Windows application can be directly manipulated by the user with a special control bar called a *movie controller*, usually found attached to the bottom of the movie window (see Figure 1, in the next page). Any Windows program can play one or more QuickTime for Windows movies, from sophisticated word processors and spreadsheets to standalone applications created specifically to play movies.

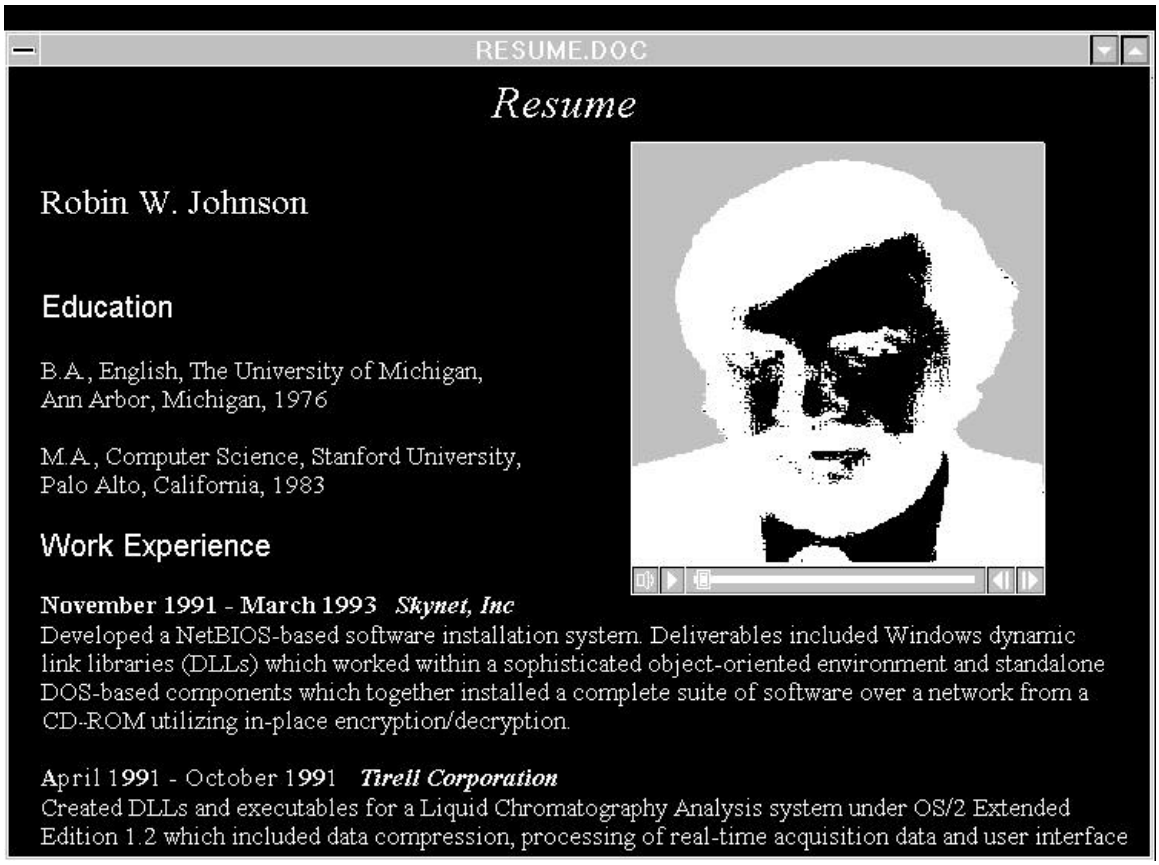


Figure 1. A QuickTime for Windows movie in a word processing document.

To make your Windows programs QuickTime for Windows-capable, you will have to modify their source code, recompile and relink them with the QuickTime for Windows libraries. This manual will guide you through that process.

2. Movies and Time

A traditional movie, whether stored on film, laser disc or tape, is a continuous stream of data. To the Windows developer, a QuickTime movie is a standard DOS file with an extension of .MOV. A movie file can contain text, MPEG, music (MIDI), and digitized visual and sound data along with sequencing information describing the order in which the movie data should be played. When the file is opened, the data is assigned a *movie object*. It is still not playable as a movie, however, until it is associated with a movie controller.

Movies may be played on Windows machines, but not saved. You must use Macintosh-based QuickTime software to edit movies. An individual movie frame may be copied to the Windows clipboard. Of course, movie files can be copied or renamed outside of QuickTime for Windows applications just like any other DOS files. Further information on Macintosh QuickTime movie files can be found in the QuickTime documentation.

A QuickTime movie is completely self-contained. All of its visual and sound data exists in a single DOS file, which is referenced by a QuickTime for Windows program through QuickTime for Windows API calls when the time comes to load it. Your application never works directly with movie data, as QuickTime for Windows routines allow your programs to manage movie characteristics while they are playing under Windows.

Movies are instantiated and later freed by using QuickTime for Windows functions. `OpenMovieFile` opens the file containing the movie, just like any DOS file. `NewMovieFromFile` extracts movie data from the opened file and assigns a movie object to that data. This object is the means by which the movie will be played. `CloseMovieFile` closes the file normally. `DisposeMovie` frees the movie object.

```
MovieFile mfMovie;
Movie mMovie;
•
•
OpenMovieFile ("MYMOVIE.MOV", &mfMovie, OF_READ);
NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
CloseMovieFile (mfMovie);
•
•
DisposeMovie (mMovie);
```

Understanding time management of media is essential to understanding QuickTime for Windows routines and data structures. QuickTime for Windows defines *time coordinate systems* that anchor a movie to a common temporal reality--the second. A time coordinate system contains a time scale scored in time units. The number of units that pass per second quantifies the scale. For example, a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

A time coordinate system also contains a duration, which is the length of the movie in number of time units it contains. Particular points in a movie can be identified by a time value, which is the number of time units to that point.

The last of QuickTime for Windows time-related concepts is the idea of rate. A movie's rate is expressed as a multiple of its time scale. For instance, in a movie with a time scale of 2 played at rate of 2.5, five time units would pass in one second.

3. Tracks in Movies

A movie can contain one or more tracks. Each track represents a single stream of data in a movie and is associated with a single media. The media has control information that refers to the actual movie data.

All of the tracks in a movie use movie’s time coordinate system. That is, the movie’s time scale defines the basic time unit for each of the movie’s tracks. Each track begins at the beginning of the movie, but that track’s data might not begin until some time value other than 0. This intervening time is represented by blank space - in an audio track the blank

space translates to silence; in a video track the blank space generates no visual image. Each track has its own duration. This duration need not correspond to the duration of the movie. The movie's duration always equals the maximum duration of all the tracks.

A track is always associated with one media. The media contains control information that refers to the data that constitutes the track. The track contains a list of references that identify portions of the media that are used in the track. In essence, these references are an edit list of the media. Consequently, a track can play the data in its media in any order and any number of times.

QuickTime for Windows supports a movie with up to five different tracks. There can be multisound tracks of each type of supported media. The currently available media are Video, Sound, Text, Music (MIDI) and MPEG. Any given movie may contain any combination of these tracks. For example, a movie might contain only a sound track.

QuickTime for Windows provides calls for working with the individual tracks in a movie. For example, `GetMovieTrackCount` provides a count of all tracks in the movie. `GetMovieIndTrack` allows you to obtain a reference to a track with a specified index, whereas `GetMovieIndTrackType` allows you to obtain a reference to a track of a particular media type, such as text. You can use `SetTrackEnabled` to selectively enable and disable tracks. You can use `GetTrackMatrix` to determine where in a movie the track is spatially located. `PtInTrack` tests to see if a given point intersects a track and is useful for performing hit testing operations on individual tracks.

4. Active and Inactive Movies

Movies have active and inactive states. The most distinctive feature of an inactive movie is that it simply cannot be played. QuickTime for Windows accomplishes this by not giving the movie any time slices from its internal scheduler. Visually the movie appears to be paused, but any attempt to start it will fail until the movie is activated.

You can make a movie active when you load it from a file, or change its state later. In the code fragment below, the movie is made inactive by setting the fifth parameter of `NewMovieFromFile` to `0`. Using `newMovieActive` instead makes it active:

```
MovieFile mfMovie;
Movie mMovie;
•
•
NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, newMovieActive, NULL);
```


To set the movie's state dynamically, you can use the routine `SetMovieActive`:

```
Movie mMovie;
Boolean bState;
•
•
SetMovieActive (mMovie, bState);
```

A movie's state can be queried via the function `GetMovieActive`.

Note: It is good QuickTime for Windows style to keep a movie inactive until you are ready to play it, since active movies receive cycles from QuickTime for Windows' scheduler and are a drag on the system unless ready for play. You should therefore use normally `0` instead of `newMovieActive` when calling `NewMovieFromFile`, and subsequently `SetMovieActive` once you are ready to play the movie.

---

5. The Movie Controller

As noted above, the user interface to a QuickTime for Windows movie is the Movie Controller. Any movie played in a Windows application must be associated with one. Normally, a movie controller appears as a bar-shaped collection of controls attached to the bottom edge of a movie (see Figure 1, above). Each of the individual elements in a movie controller dictates a specific action for a movie:

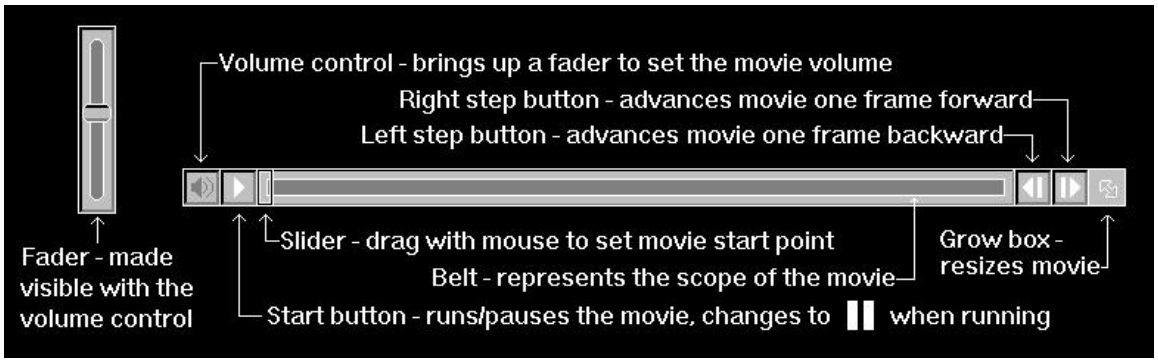


Figure 2. The Movie Controller.

Under certain circumstances, some movie controller elements may not be present. For example, your application might need to restrict the operation of a controller by not displaying the step buttons. Or, the user could use the grow box to shrink it to the point where the controller itself must hide some of its elements, based on the available space it has to work with. A movie controller instance is created and later freed with the routines `NewMovieController` and `DisposeMovieController`:


```
RECT rcMovie;
Movie mMovie;
MovieController mcController;
•
•
mcController = NewMovieController (mMovie, &rcMovie, mcTopLeftMovie,
   hwndParent);
•
•
DisposeMovieController (mcController);
```

In Windows terms, a movie and its associated controller have a common parent window, generally the application in whose client area they both appear. When adding movie controllers to your applications, you can think of them as custom controls that are subject to the same conventions and programmatic considerations as standard Windows controls. You should note that while destroying a window that contains a movie controller causes `DisposeMovieController` to be called internally, this is simply a safety feature. You should dispose your movie controllers explicitly as a matter of course.

Although the Movie Controller is clearly designed to accept mouse input, it has a keyboard interface as well. The following table applies to any movie controller with an enabled keyboard interface:

Key	**Action**
Return/Space	Toggles Play/Pause state
Right Arrow	Step forward one frame
Left Arrow	Step backward one frame
Up Arrow	Increase volume (when sound is enabled)
Down Arrow	Decrease volume (when sound is enabled)
Home	Go to start of movie
End	Go to end of movie
Ctrl + Home	Go back to next selection time*
Ctrl + End	Go forward to next selection time*
Ctrl + Right Arrow	Play forward
Ctrl + Left Arrow	Play backward
Shift + (Return or Space)	Plays and selects while playing, until shift is released
Shift + Right Arrow	Extends selection criteria through the next frame
Shift + Left Arrow	Extends selection criteria through the previous frame
Shift + Home	Go to start of movie, extending selection back to start
Shift + End	Go to end of movie, extending selection to end
Ctrl + Shift + Home	Go back to next selection time, extending selection*
Ctrl + Shift + End	Go forward to next selection time, extending selection*

**Selection times* are the start and end points of either the movie or the current selection (if any).

The focus of this manual will be the Movie Controller. The API is rich enough, however, to allow movies to be handled in a wide variety ways to make your QuickTime for Windows programs robust and interesting to use.

6. Initialization and Termination of QuickTime for Windows Programs

Initializing your applications to play movies is essentially a three-step process. First, links to QuickTime for Windows must be established. Second, you have to allocate QuickTime for Windows memory for your application. Finally, you must add a routine to your application's main window procedure.

```
OSErr oserrResult;
•
•
if ((oserrResult = QTInitialize (NULL)) != QT_OK)
   {
   /* Take appropriate action, e.g. a message box saying movies won't */
   /* play but the program will continue to run. */
   }

if (EnterMovies () != noErr)
   {
   /* Take appropriate action, e.g. a message box saying movies won't */
   /* play but the program will continue to run. */
   }
```

Establishing links to QuickTime for Windows is accomplished by calling the routine `QTInitialize`. Normally, this is done automatically when the first QuickTime for Windows call is executed, but it is good style to call it yourself. This prevents resource leaks. This function takes one parameter, the address of a variable which is filled with QuickTime for Windows version data that might be useful if your application depends on it. (Please refer to Section III, *Programmer's Reference*, for further information on this topic). If no error condition is returned, you must call `EnterMovies` to allocate QuickTime for Windows memory for your application. If either `QTInitialize` or `EnterMovies` returns an error, such as incorrect Windows version or sub-386 CPU, your application will run normally but all subsequent movie-related calls will be ignored by QuickTime for Windows.

It is only necessary to call `QTInitialize` once in each of your applications. If a particular application employs DLLs that make QuickTime for Windows API calls, each DLL can initialize itself by calling `QTInitialize` explicitly. This is recommended as good QuickTime for Windows style and can be done in `LibMain`:


```
int FAR PASCAL LibMain (HINSTANCE hInst, WORD wDataSeg,
   WORD wHeapSize, LPSTR lpszCmdLine)
   {
   OSErr oserrResult;
   •
   •
   if ((oserrResult = QTInitialize (NULL)) != QT_OK)
      {
      /* Take appropriate action, e.g. a message box saying movies */
      /* won't play but the program will continue to run. */
      }
   •
   •
   return 1;
   }
```

Calling `EnterMovies` is necessary to play movies (your program might display just QuickTime for Windows pictures, in which case the only initialization required is `QTInitialize`). `EnterMovies` only needs to be called once by your program (or its DLLs) to initialize it for playing movies--subsequent calls to `EnterMovies` are ignored by QuickTime for Windows.

The final piece of code required to make movies run is `MCIsPlayerMessage`, a function that must be placed in the application's window procedure. For each movie controller that your program creates, there must be a separate call to this routine in the movie controller's parent window procedure.

`MCIsPlayerMessage` processes all messages coming into the window procedure, but only messages directed to its associated controller receive attention. Movies are started and stopped, and their states and attributes changes based on messages routed to their controllers via this `MCIsPlayerMessage`.

```
LONG FAR PASCAL WndProc (HWND hWnd, UINT uiMessage, WPARAM wParam,
   LPARAM lParam)
   {
   if (MCIsPlayerMessage (mcController, hWnd, uiMessage, wParam,
      lParam))
      return 0;

   switch (uiMessage)
      {
      /* cases */
      }
   return DefWindowProc (hWnd, uiMessage, wParam, lParam);
   }
```

Now that we have established the paradigm for what keeps movies running, we can make an exception to it. You don't always have to use `MCIsPlayerMessage`, especially if your program functions in an unusual way. There are essentially two QuickTime for Windows API calls that handle movie playing in this case: `MCIdle` and `MCKey`.

You can refer to Section III, *Programmer's Reference*, for further information on how these routines work. If your program can accommodate `MCIsPlayerMessage`, however, it is highly recommended that you code it that way.

At this point, your application as a whole is considered initialized under QuickTime for Windows, even though no movies or movie controllers have yet been instantiated.

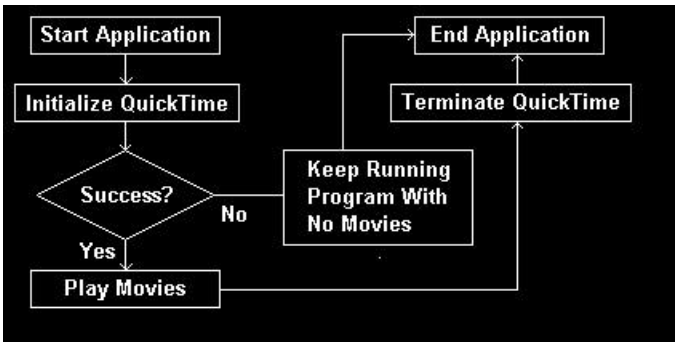


Figure 3. Initialization and Termination of QuickTime for Windows Programs.

Graceful termination of QuickTime for Windows programs that play movies is almost a mirror image of initialization. At some point in your program's termination activity, the routines that deallocate QuickTime for Windows memory and sever links to the QuickTime for Windows libraries must be called.

```
•
•
ExitMovies ();      // Deallocate QuickTime for Windows memory
QTTerminate ();     // Sever links to QuickTime for Windows
```

Although `QTTerminate` is probably called automatically when your program or DLL terminates, it is still good style to issue the call explicitly. In some cases, you may want to call it way before the normal end of your application (e.g., when system memory is at a premium and your program is finished playing movies).

If your program uses DLLs with QuickTime for Windows routines, each DLL can call `QTTerminate`. This is the recommended approach and can be done in the `WEP` function:

```
int FAR PASCAL WEP (int nParam)
   {
   •
   •
   QTTerminate ();     // Sever links to QuickTime for Windows
   return 1;
   }
```


QuickTime for Windows programs that do not call `EnterMovies` (e.g. those that display only individual QuickTime for Windows pictures) do not have to call `ExitMovies`. Like `EnterMovies`, you only need to call `ExitMovies` once during the life of your program.

7. Associating Movies with Movie Controllers

As noted earlier, a movie must be associated with a controller before it can be played. Several routines in the QuickTime for Windows API perform this operation. For an initial association, `NewMovieController` is commonly used, as we saw earlier.

For existing controllers, a good choice is `MCNewAttachedController`. You need to supply parameters for the existing movie and movie controller objects, the window handle of the parent application and the upper left corner of the movie rectangle.

```
Movie mMovie;
MovieController mcController;
POINT ptUpperLeft;
•
•
MCNewAttachedController (mcController, mMovie, hWnd, ptUpperLeft);
```

`MCSetMovie` takes the same parameters and lets you set the movie object to NULL (second parameter) if you want to specifically disassociate the controller from the movie.

```
Movie mMovie;
MovieController mcController;
POINT ptUpperLeft;
•
•
MCSetMovie (mcController, mMovie, hWnd, ptUpperLeft);
```

When a controller is associated with a movie, the movie object reference is recorded in the controller's data structure. A movie controller can be associated with many movies during its existence, but only one at a time (see figure 4, below). Movie data structures contain no elements which link them with movie controllers.

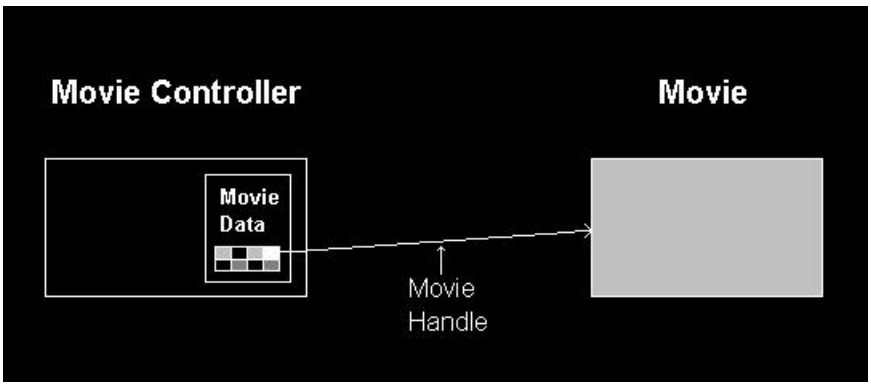


Figure 4. Association of Movies and Movie Controllers.

Once a movie is associated with a controller, it starts playing immediately (assuming it has a non-zero play rate, which is normally the case). To make a movie paused when first visible and associated with a new controller, you can use `MCDoAction` with an action of `mcActionPlay` and a play rate of 0. It is good style to do this as soon as possible after performing the association.

```
Movie mMovie;
MovieController mcController;
RECT rcMovie;
•
•
mcController = NewMovieController (mMovie, &rcMovie,
   mcTopLeftMovie + mcScaleMovieToFit, hWnd);
MCDoAction (mcController, mcActionPlay, 0);
```

If you want to play *n* cases of the same movie simultaneously, you have to open the file *n* times to get *n* unique movie objects, then associate *n* controllers.

Movie controllers remain associated with movies regardless of their states. If a controller is made invisible or inactive, for instance, it stays associated with its movie. Conversely, movies continue to play even if the states of their associated controllers are changed while they are playing. If either one of an associated pair is destroyed, the other is not affected.

Association implies nothing about the proximity of movies and their controllers on the screen. It is simply the means by which any movie can be plugged in to any controller and played.

8. Playing Movies through a Movie Controller

A movie associated with a controller is ready for playing (if the movie is active). While the basic apparatus for this activity appears simple and straightforward, there are many subtleties in the relationship of the movie controller to the movie. In one sense, the Movie Controller is simply a human interface. In another, it is the mechanism through which large amounts movie data are focused and made meaningful to the user.

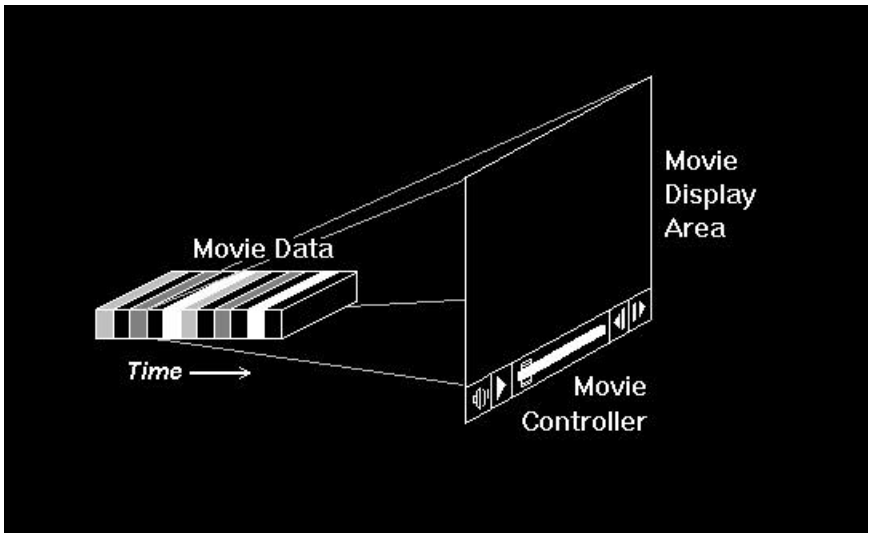


Figure 5. Relationship of Movie Controller to Movie Data

Individual elements of the controller calibrate this mechanism by determining movie sound volume, movie start point, movie display size, etc. Most of these elements change their appearance depending on the values they represent. One element, the volume fader, does not appear at all until specifically called up.

An important distinction needs to be made here: The visual representation of a movie is the sequence of images which flow through a rectangular area on your screen, even though the movie is actually the chunk of movie *data* sitting in memory. It is the Movie Controller, acting as a movie projector, that is the connection between the movie data and its presentation (i.e. it tells the movie to start and stop playing but also specifies the attributes of the area in which the movie will appear).

A movie is started by the function `MCDoAction` with the `mcActionPlay` action parameter and an appropriate play rate. This can happen automatically when a movie controller's play button is clicked, or explictly at any appropriate place in your program.

```
Movie mMovie;
MovieController mcController;
LFIXED lfxRate;
•
•
lfxRate = GetMoviePreferredRate (mMovie);
MCDoAction (mcController, mcActionPlay, lfxRate);
```

As a movie plays, a synchronized stream of data in the form of still image frames is sent to the specified movie display area according to the settings held by the movie controller. Similarly, blocks of movie sound data are sent to your system's sound driver after being synchronized with the visual data.

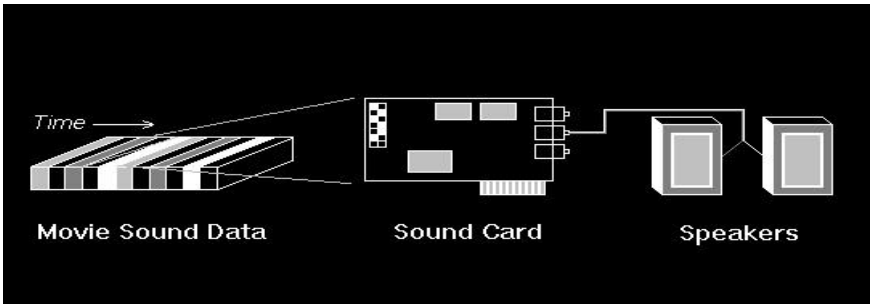


Figure 6. Movie Sound Data Handling

9. Attached and Detached Movie Controllers

Until now, we have only been concerned with one type of movie controller--the attached variety. A controller's underlying autonomy, however, is demonstrated by the fact that it can be visually detached from a movie and still play it. Detached controllers can be repositioned anywhere on the screen and still remain associated with their movies, just as if they were still physically attached. They may be disabled, hidden and resized in their detached state as well.

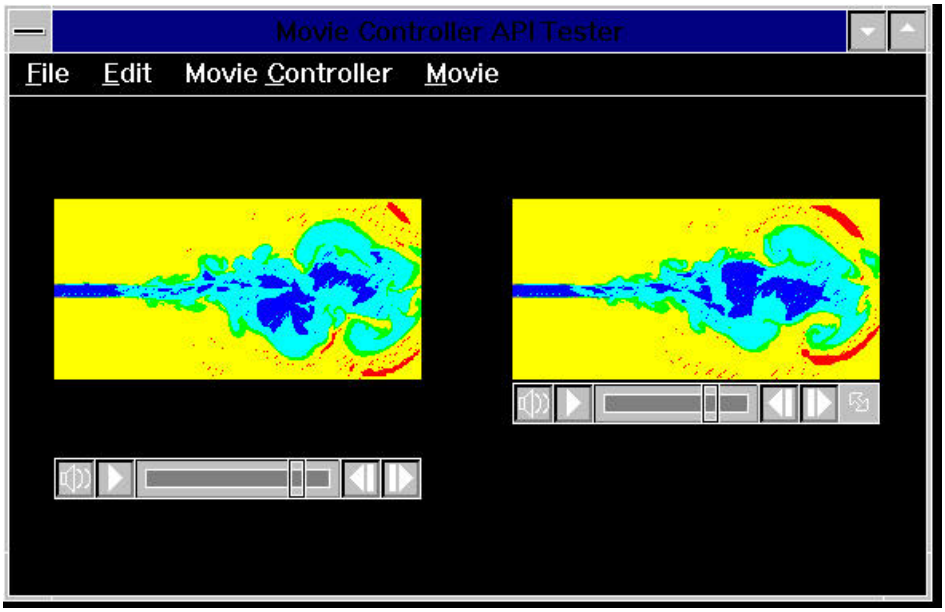


Figure 7. Detached and Attached Controllers

Detachment is a two-step process if you want the controller visually separated from the movie. The most commonly used routines are `MCSetControllerAttached` with its last parameter set `FALSE` (resets the attachment flags) and `MCPositionController` (specifies new coordinates):


```
MovieController mcController;
RECT rcMovie, rcController;
•
•
MCSetControllerAttached (mcController, FALSE);
MCPositionController (mcController, &rcMovie, &rcController, 0L);
```

Once detached, a movie controller can be easily re-attached via another call to the function `MCSetControllerAttached`, this time with `TRUE` as the last parameter. The controller will move back to its normal attached position beneath the movie it controls.

You can query the attachment state of a controller using `MCIsControllerAttached` and also resize it independently from its movie after it has been detached, as we will see in subsection A, part 10. A detached controller cannot resize its associated movie.

Note: A detached controller cannot be in a different window than that of its movie.

Although attached movie controllers are the most straightforward way to direct the operation of your movies, it is easy to conceive of interesting ways to use detached controllers. For instance, they could have specific meanings or implications in a customized user interface, or they could control movies which have been built into other graphical objects without getting in the way.

Detachment can be viewed as simply an attribute of an associated movie/movie controller pair.

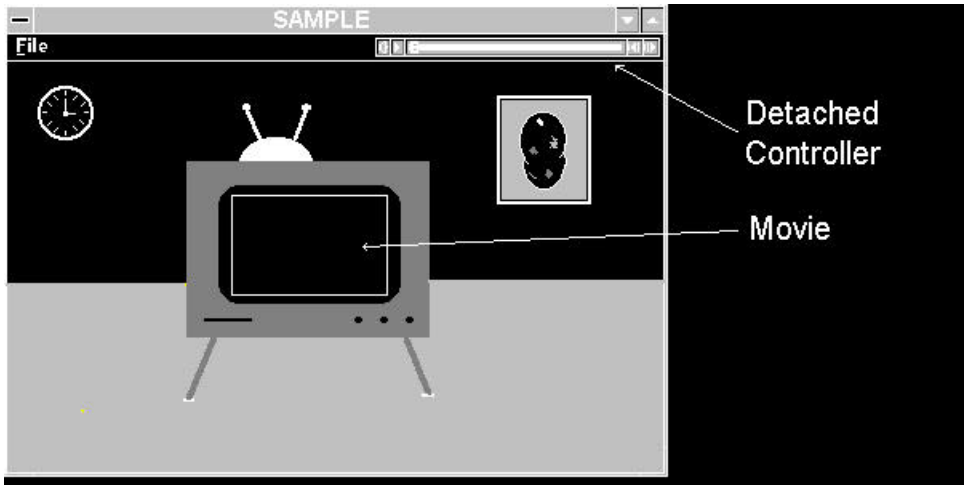


Figure 8. Movie imbedded in complex graphic, controller detached

10. Active and Inactive Movie Controllers

Instantiated movie controllers exist in one of two states as far as QuickTime for Windows is concerned: active or inactive. When a controller is created, it is set to the active state by

default. At any point in the program, it may be set to the inactive state by calling `MCActivate` with its last parameter set to `FALSE`. Calling the function with `TRUE` reactivates the movie controller.

```
MovieController mcController;
•
•
MCActivate (mcController, hWndParent, FALSE);
```

Generally, movie controllers behave very much like standard Windows controls. An inactive movie controller is analogous to a disabled Windows control in that it does not respond to mouse clicks. Additionally, all of its elements are grayed, the slider appears as an outline and the belt is hidden. Keyboard input is always ignored by an inactive movie controller.

QuickTime for Windows allows you to set the active or inactive state for as many movie controllers as you wish. If one of your applications requires that only a single controller have active status at any given time, you will have to devise your own scheme for managing these types of situations.

Both attached and detached movie controllers can be made inactive. Doing so has no effect on the movie with which either type is associated, except that the movie cannot be affected by the controller user interface until it is reactivated.

If a movie is running and its controller is inactive, you either have to call a function like `MCDoAction` with appropriate parameters or reactivate the controller to allow the user to stop the movie. There is no QuickTime for Windows function to specifically query the active state of a movie controller.

Figure 9. An inactive movie controller.

The ability to alter the state of a movie controller dynamically could be advantageous under a number of scenarios. For instance, you might have a movie that your application needs to play uninterrupted from beginning to end. In this instance, you would disable the controller when the movie was started and re-enable it when the movie was over.

Another example is the case mentioned earlier where you want only one of many movie controllers active at a time, so that keyboard input can be directed properly. As your QuickTime for Windows applications increase in complexity, this level of control will prove valuable.

11. Movie Size and Position

Bounds Rectangles

The key to sizing and positioning movies and movie controllers is the controller's *bounds rectangle*. If the movie controller is attached, this is the area encompassed by the controller plus the movie rectangle (see Figure 10, below).

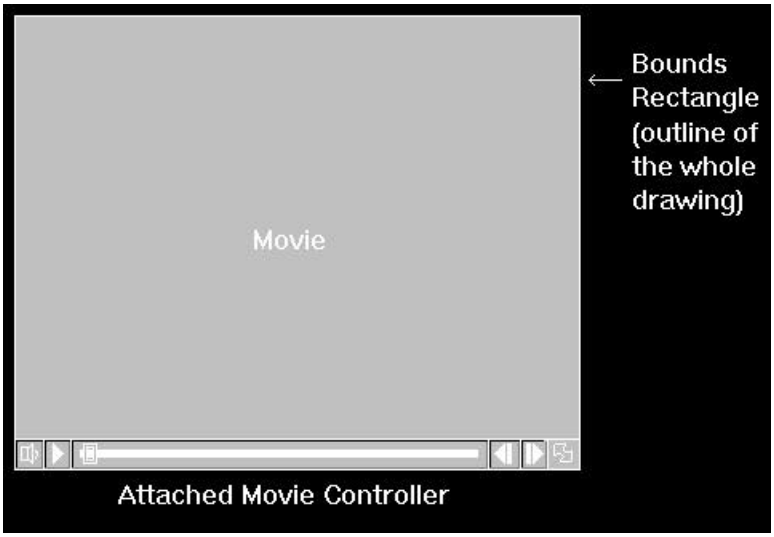


Figure 10. Attached Movie Controller Bounds Rectangle

When a movie controller is detached, its dimensions alone determine the bounds rectangle:

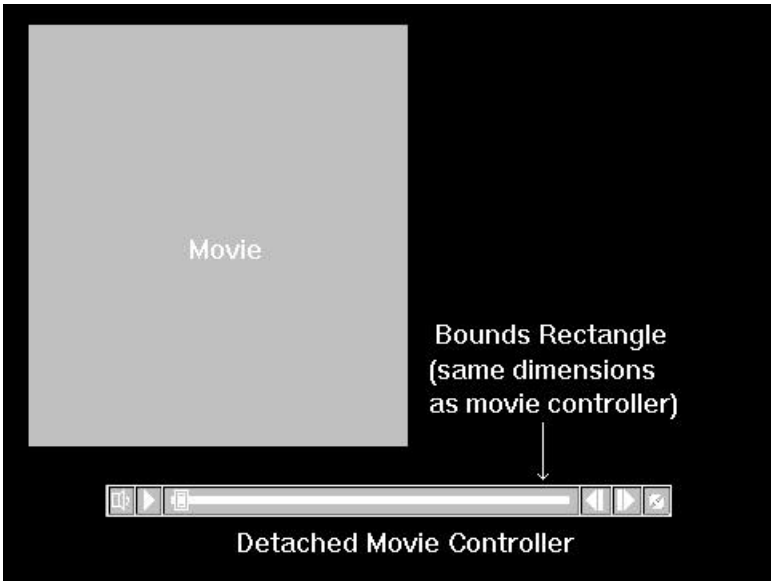


Figure 11. Detached Movie Controller Bounds Rectangle

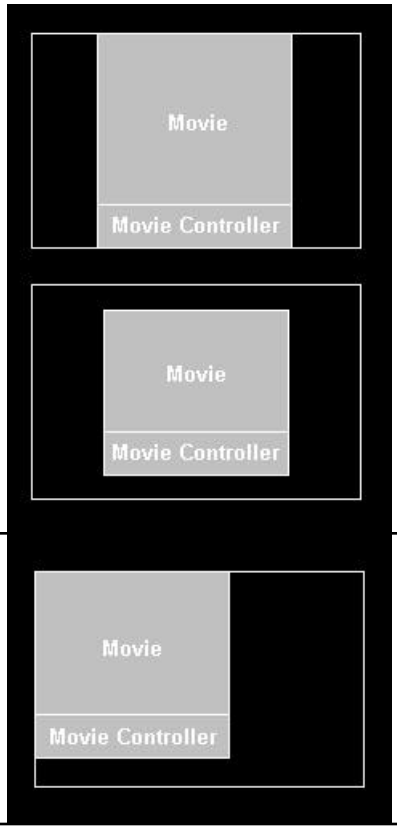
Rectangles specified by routines which move or create movie controllers become the bounds rectangles for those controllers. Depending on the particular function (and possibly its flags), the resulting bounds rectangle treats its contents in different ways.

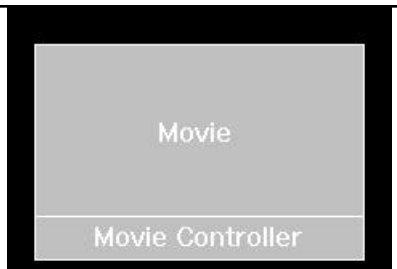
In some cases, the movie is scaled within the limits of the bounds rectangle. In others, the movie is resized to completely fill its assigned portion of the rectangle. It is worth studying each of the following examples carefully to get a solid understanding of these differences.

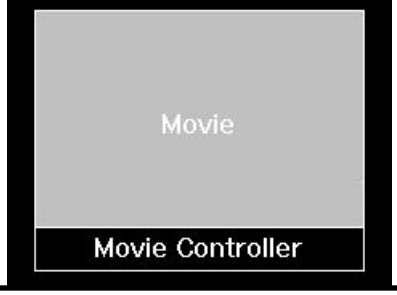
After any call that resizes or repositions the bounds rectangle is processed, QuickTime for Windows calls `MCDoAction` with `mcActionControllerSizeChanged`. If your program has a filter, you can make it handle this action (see subsection A, part 13 for information on filters).

NewMovieController

This call creates a new attached controller in the bounds rectangle you provide. The movie and controller are positioned in the rectangle according to the creation flags specified:

Flags: *Results:*	`0` Movie controller positioned at bottom of bounds rectangle. If movie extends beyond remaining area in either direction, it is *scaled* to fit in center of remaining area. If movie fits completely within remaining area, it is centered within remaining area.	
Flags: *Results:*	`mcTopLeftMovie` Same as above case, but resultant movie and controller shifted to top left corner of bounds rectangle.	

Flags: *Results:*	`mcScaleMovieToFit` Movie controller positioned at bottom of bounds rectangle. Movie *resized* to fit in remaining area.	

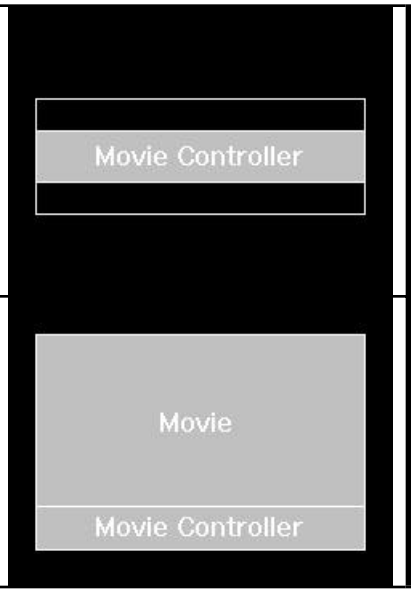
Flags:
 	
Results:
	`mcTopLeftMovie`
	`mcScaleMovieToFit`
	
	Bounds rectangle you supply expanded to accommodate movie controller. Movie *resized* to fit in bounds rectangle you supply.
		

The following example shows how a new movie controller is created with a bounds rectangle matching the current dimensions of a movie plus the controller, then how the dimensions of the bounds rectangle are retrieved so that the movie/movie controller pair can be exactly encompassed by the parent window:

```
MovieController mcController;
Movie mMovie;
RECT rcMovie;
•
•
// Get current dimensions of movie

   GetMovieBox (mMovie, &rcMovie);
   OffsetRect(&rcMovie, -rcMovie.left, -rcMovie.top);

// Instantiate the controller

   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit, hWnd);

// Get the new bounds rectangle

   MCGetControllerBoundsRect (mcController, &rcMovie);
   AdjustWindowRect (&rcMovie, WS_CAPTION | WS_OVERLAPPED, FALSE);
   OffsetRect(&rcMovie, -rcMovie.left, -rcMovie.top);
   SetWindowPos (hWnd, 0, 0, 0,
      rcMovie.right, rcMovie.bottom, SWP_NOMOVE | SWP_NOZORDER);
   ShowWindow (hWnd, nCmdShow);
   UpdateWindow (hWnd);
```

MCSetControllerBoundsRect

For detached movie controllers, this function repositions and resizes the controller. For attached controllers, it repositions and resizes both the controller and the movie.

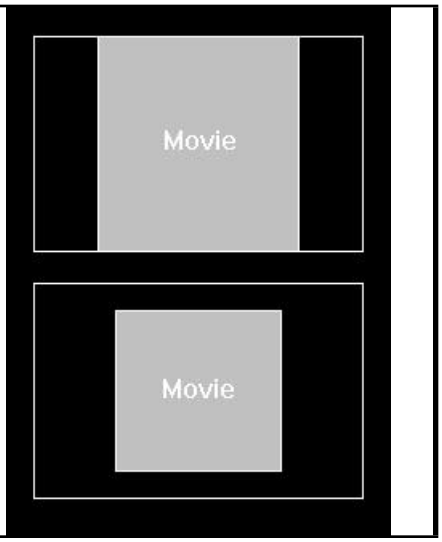
Attachment state: *Results:*	Detached Centers the movie controller vertically in the rectangle you provide. Returns a value of `controllerBoundsNotExact` if your rectangle is too big.	
Attachment state: *Results:*	Attached Movie controller positioned at bottom of bounds rectangle. Movie *resized* to fit in remaining area.	

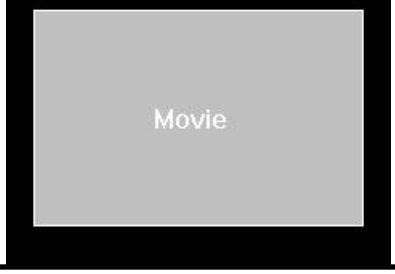
MCPositionController

This routine repositions the movie and movie controller for both attached and detached controllers:

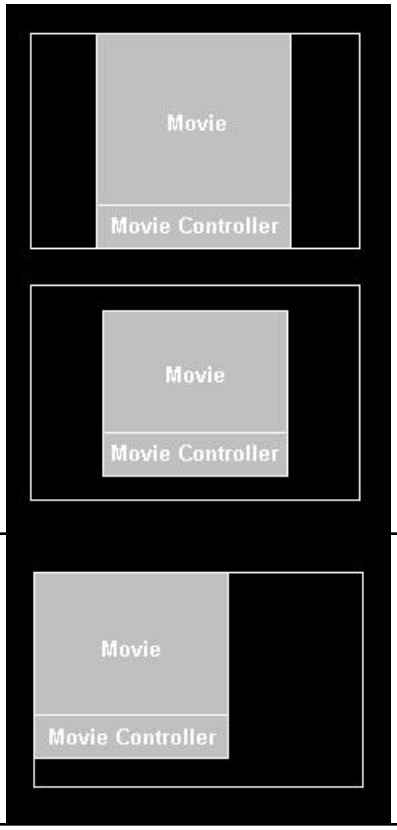
Detached Controllers: Calling `MCPositionController` for a detached controller requires specifying two rectangles, one for the movie and one for the controller. The controller is always centered vertically in its rectangle. The function returns `controllerBoundsNotExact` if this rectangle is too big.

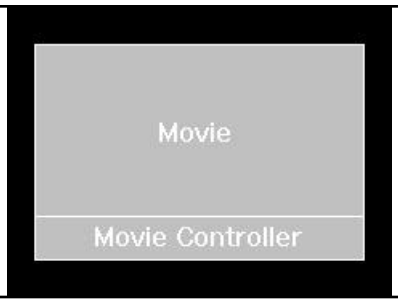
The movie is repositioned and resized depending on the flags you provide:

Flags: *Results:*	`0` If movie extends beyond rectangle in either direction, it is *scaled* to fit in center of the rectangle. If movie fits completely within rectangle, it is centered within rectangle.	

Flags: *Results:*	`mcTopLeftMovie` Same as above, but resultant movie shifted to top left corner of bounds rectangle.	
Flags: *Results:*	`mcScaleMovieToFit` Movie *resized* to fit in rectangle you supply.	

Attached Controllers: Calling `MCPositionController` on an attached controller requires specifying only one rectangle for both the movie and the controller (the second rectangle is ignored and should be coded as NULL). The way the rectangle is used depends on the flags you provide:

Flags: *Results:*	`0` Movie controller positioned at bottom of bounds rectangle. If movie extends beyond remaining area in either direction, it is *scaled* to fit in center of remaining area. If movie fits completely within remaining area, it is centered within remaining area.	
Flags: *Results:*	`mcTopLeftMovie` Same as above case, but resultant movie and controller shifted to top left corner of bounds rectangle.	

Flags:	`mcScaleMovieToFit`	
Results:	Movie controller positioned at bottom of bounds rectangle. Movie *resized* to fit in remaining area.	

MCSetControllerAttached

As discussed previously, `MCSetControllerAttached` attaches or detaches a movie controller. If the controller is made detached, only a logical operation takes place. It is not physically moved until a subsequent `MCPositionController` is issued.

If the movie controller is made attached, it is moved underneath the movie:

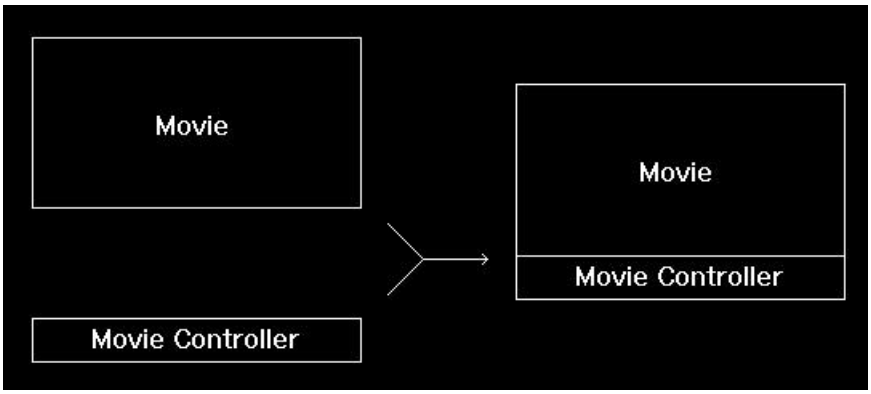


Figure 12. How SetControllerAttached works.

MCNewAttachedController

`MCNewAttachedController` takes an existing movie controller, associates a movie with it and attaches the controller to the movie. The controller is made visible if it was not already.

If the controller is detached when the call is issued, it is first attached. The controller bounds rectangle is then offset such that its top left corner is aligned with the point specified in the call.

MCSetMovie

`MCSetMovie` takes an existing controller and associates a new movie with it. The controller bounds rectangle is then offset such that its top left corner is aligned with the point specified in the call.

MCGetControllerBoundsRect

The function for retrieving the bounds rectangle is `MCGetControllerBoundsRect`, which fills a Windows `RECT` structure with the desired coordinates:

```
RECT rcBounds;
MovieController mcController;
•
•
MCGetControllerBoundsRect (mcController, &rcBounds);
```

GetMovieBox

You can always use `GetMovieBox` to obtain the coordinates of the movie only:

```
RECT rcMovie;
Movie mMovie;
•
•
GetMovieBox (mMovie, &rcMovie);
```

If no the movie currently has no bounds, either because it contains no enabled tracks with bounds, or its movie box was previously set to an empty rectangle, the rectangle specified to receive the coordinates is made empty.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

---

12. Movie Controller Attributes

Aside from features like attachment, activation state, size and position, movie controllers have other important attributes which can be manipulated by an application. Some of these attributes are stored in data structures which you can access as flags arranged in bit fields. Others are retrieved or set individually.

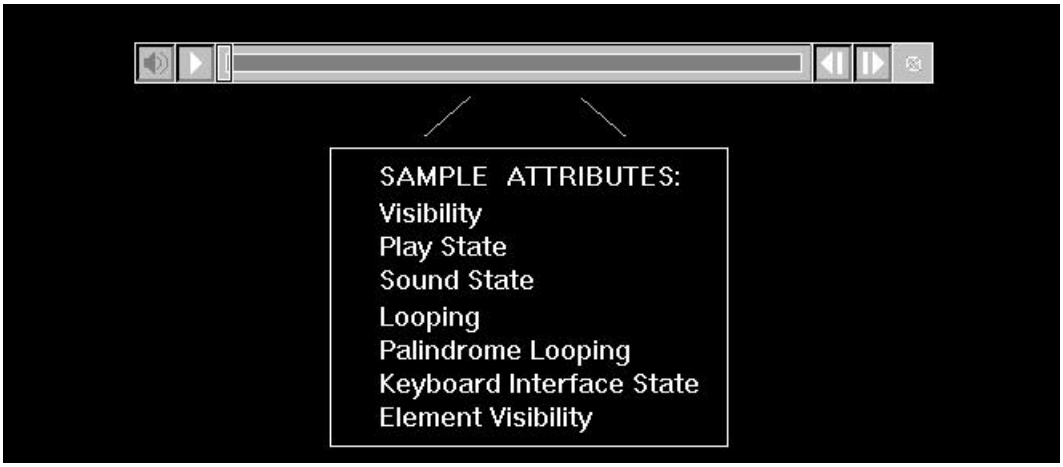


Figure 13. Movie Controller Attributes.

If a movie controller needs to be hidden, for example, the easiest way to do it is to call the routine `MCSetVisible` (using `FALSE` makes the controller invisible):

```
Boolean bVisible;
MovieController mcController;
•
•
MCSetVisible (mcController, bVisible);
```

Invisible movie controllers may be attached, detached, active or inactive. You just can't see them. It is possible, however, to control a movie if its controller is not visible. For instance, you can stop or start a movie by single- or double-clicking (respectively) directly on it.

Also, you can use a movie controller's keyboard interface (if enabled) to stop, start or otherwise manipulate a movie (see subsection 4 of this overview). Finally, you can control a movie programatically using appropriate routines from the QuickTime for Windows API.

To query the visibility state of a movie controller, you can use the corresponding routine `MCGetVisible`. Setting visibility might be useful in applications handling multiple movies, special case movies and overall application aesthetics, just as you would detachment or activation.

The states of the Movie Controller's individual control elements are also considered attributes. To hide the speaker button and the left and right step buttons, you can use `MCDoAction`:

```
MovieController mcController;
•
•
MCDoAction (mcController, mcActionSetFlags,
   mcFlagSuppressStepButtons | mcFlagSuppressSpeakerButton );
```

To hide the grow box, you have to fill a Windows `RECT` structure with zeros, then pass its address to `MCDoAction` to use in setting the grow box bounds:

```
MovieController mcController;
RECT rcGrowBoxRect;
•
•
SetRectEmpty (&rcGrowBoxRect);

MCDoAction (mcController, mcActionSetGrowBoxBounds,
   &rcGrowBoxRect);
```

Enabling the keyboard interface for a movie controller is also done with `MCDoAction`, as is querying the state of a controller's keyboard interface:


```
MovieController mcController;
Boolean bActive;
•
•
MCDoAction (mcController, mcActionSetKeysEnabled, TRUE);
•
•
MCDoAction (mcController, mcActionGetKeysEnabled, &bActive);
```

If a movie controller's keyboard interface is enabled, the controller will accept keyboard input only if it is active.

If you need to get more low-level information about a movie controller, the function `MCGetControllerInfo` is available. This call retrieves a long integer with bit flags denoting controller attributes such as whether the movie is playing, looping, looping back and forth, if the movie has sound, and so forth.

```
MovieController mcController;
LONG lMCInfoFlags;
•
•
MCGetControllerInfo (mcController, &lMCInfoFlags);
if (lMCInfoFlags & mcInfoHasSound)
   {
   •
   •
   }
```

The following table consolidates the full range of movie controller attributes, how to get their status, and how to set them. Full documentation on the various functions is found in Section III, *Programmer's Reference*.

Attribute	How to Query Attribute Status	How to Set Attribute Status
Controller Attachment State	call `MCIsControllerAttached`	call `MCSetControllerAttached`, `NewMovieController` or `MCNewAttachedController`
Controller's Movie	call `MCGetMovie`	call `MCSetMovie`, or `NewMovieController`
Controller Active State	---	call `MCActivate`
Controller Bounds Rectangle	call `MCGetControllerBoundsRect`	call `MCSetControllerBoundsRect`
Controller Position	call `MCGetControllerBoundsRect` (for detached controllers only)	call `MCPositionController`
Controller Size	call `MCGetControllerBoundsRect` (for detached controllers only)	call `MCPositionController`
Controller Visibility	call `MCGetVisible`	call `MCSetVisible`
Action Filter Used	---	call `MCSetActionFilter`
Play State	call `MCGetControllerInfo`, check `mcInfoIsPlaying` bit flag	---
Sound State	call `MCGetControllerInfo`, check `mcInfoHasSound` bit flag	---
Looping State	call `MCGetControllerInfo`, check `mcInfoIsLooping` bit flag	call `MCDoAction` with the action flag `mcActionSetLooping`
Looping Palindrome State	call `MCGetControllerInfo`, check `mcInfoIsInPalindrome` bit flag	call `MCDoAction` with the action flag `mcActionSetLoopIsPalindrome`
Keyboard Active State	call `MCDoAction` with the action flag `mcActionGetKeysEnabled`	call `MCDoAction` with the action flag `mcActionSetKeysEnabled`

Speaker Button Visibility	call `MCDoAction` with the action flag `mcActionGetFlags`, check for `mcFlagSuppressSpeakerButton`	call `MCDoAction` with the action flag `mcActionSetFlags` set to `mcFlagSuppressSpeakerButton`
Step Button Visibility	call `MCDoAction` with the action flag `mcActionGetFlags`, check for `mcFlagSuppressStepButtons`	call `MCDoAction` with the action flag `mcActionSetFlags` set to `mcFlagSuppressStepButtons`
Grow Box Visibility	---	call `MCDoAction` with the action flag `mcActionSetGrowBoxBounds`
Window Palette Use	call `MCDoAction` with the action flag `mcActionGetFlags`, check for `mcFlagsUseWindowPalette`	call `MCDoAction` with the action flag `mcActionSetFlags` set to `mcFlagsUseWindowPalette`
Volume Level	call `MCDoAction` with the action flag `mcActionGetVolume`	call `MCDoAction` with the action flag `mcActionSetVolume`
Selection State	call `MCDoAction` with the action flag `mcActionGetPlaySelection`	call `MCDoAction` with the action flag `mcActionSetPlaySelection`
Badge Use State	call `MCDoAction` with the action flag `mcActionGetUseBadge`	call `MCDoAction` with the action flag `mcActionSetUseBadge`
Play Every Frame State	call `MCDoAction` with the action flag `mcActionGetPlayEveryFrame`	call `MCDoAction` with the action flag `mcActionSetPlayEveryFrame`
Play Rate	call `MCDoAction` with the action flag `mcActionGetPlayRate`	call `MCDoAction` with the action flag `mcActionPlay`

13. Badges

A *badge* is a visual element displayed on the face of a movie to distinguish it from a static graphic when its movie controller is not visible. To be able to display a badge automatically, a movie controller must be created with the `mcWithBadge` creation flag.

Three conditions have to be met before a badge can be displayed automatically. First, the movie cannot be playing. Second, the badge flag must have been turned on when the movie controller was created (or with `mcActionSetUseBadge`). Third, your application must call `MCSetVisible` with `FALSE` as the second parameter, to make the movie controller invisible.

If the first two conditions are satisfied, calling `MCSetVisible` with `FALSE` (or creating the controller with `mcNotVisible`) hides the controller and causes the badge to be displayed.

```
Movie mMovie;
MovieController mcController;
RECT rcMovie;
•
•
mcController = NewMovieController (mMovie, &rcMovie, mcWithBadge, hWnd);
```

If a movie controller is displaying a badge, clicking the badge hides it and restores the movie controller (if the `mcWithBadge` flag is on).

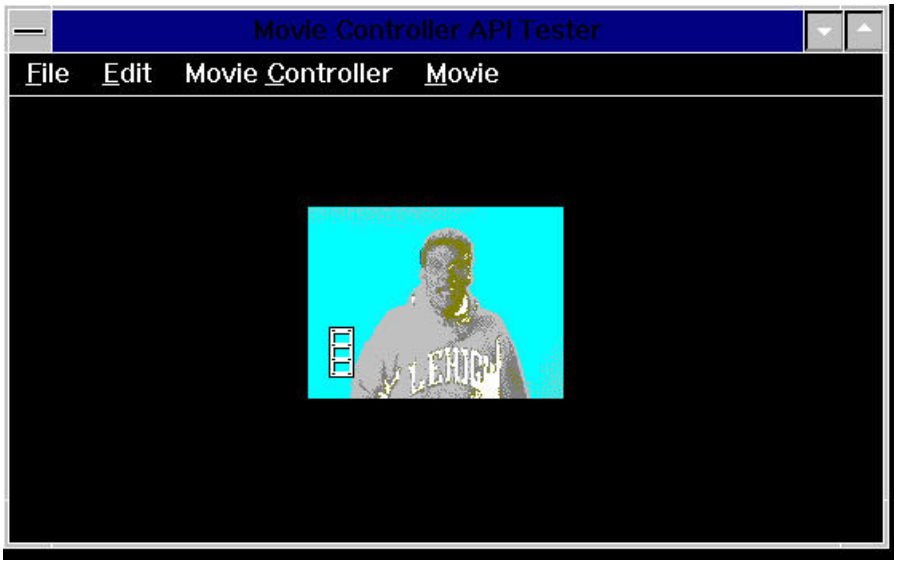


Figure 14. A Movie with a Badge

A good point to remember is that the visibility of the badge is not an attribute of a movie controller, while the ability to display *a badge is.*

If your application needs more control over displaying badges, you can use the function `MCDrawBadge`. This routine lets you display a badge at any time, regardless of whether `mcWithBadge` is on or the movie is playing. Calling the function does not affect the state of the `mcWithBadge` flag.

When you call `MCDrawBadge`, you must set the second parameter to NULL. The third parameter receives the address of a handle to a badge region, which your program can use later at its discretion.

```
MovieController mcController;
HRGN hrgnBadge;
•
•
MCDrawBadge (mcController, NULL, &hrgnBadge);
```

Obviously, under certain circumstances you can create a situation where both a badge and a movie controller are visible at once, which is not good QuickTime for Windows style.

14. Actions and Filters

The function `MCDoAction` is one of the most versatile in the QuickTime for Windows API. Although it is available to you for handling specific, low-level tasks, it is also used by various high-level functions in QuickTime for Windows. Along with a movie controller object, it takes parameters for the action desired and additional data specific to that action, often the address of a Boolean value denoting whether the action item should be toggled on or off:


```
MovieController mcController;
Boolean bFlag;
•
•
MCDoAction (mcController, mcActionActivate, &bFlag);
```

As we have seen, `MCDoAction` can be used to do things like starting a movie and setting the controller's active state. Many other actions can be effected by this routine, however, and it is worth exploring the complete list in Section III, *Programmer's Reference* to get a sense of the power and flexibility that `MCDoAction` provides.

Closely related to `MCDoAction` is the function `MCSetActionFilter`, which gives you a way to intercept the `MCDoAction` call. The usefulness of this routine is hard to underestimate, since QuickTime for Windows itself uses `MCDoAction` so extensively--especially in processing user interaction.

For example, almost anywhere you click on the movie controller generates a `MCDoAction` call internally. By creating carefully-designed filter functions, you can customize the behavior of your movie controllers to almost any level you wish.

`MCSetActionFilter` inserts the address of a user-defined filter function in the movie controller's data structure. This filter function is called automatically when your program calls `MCDoAction`. `MCSetActionFilter`'s last parameter is a `LONG` which can be used to pass additional information to the filter function or the movie controller itself (e.g. the address of a structure containing data necessary for complex processing).

```
Boolean CALLBACK __export MyFilter (MovieController, UINT, LONG);

MovieController mcController;
struct {...} *pData;
•
•
MCSetActionFilter (mcController, MyFilter, (LONG) pData);
```

If you compile your program using Borland *smart callbacks* or Microsoft's `-GEs` compiler option, or your filter function is in a dynamic link library, you do not need to use `MakeProcInstance` on your filter address before calling `MCSetActionFilter`.

If a filter function is used, it gets a chance to process the action item before the movie controller. Its return value must be a Boolean: `TRUE` indicates that the controller doesn't have to handle it. `FALSE` tells the controller to complete any appropriate processing of the action item.

To remove a filter, you must call `MCSetActionFilter` with the filter function address set to NULL. Since a filter is essentially a *callback* function, it must be declared as `CALLBACK` and listed in the `EXPORTS` section of your .DEF file.

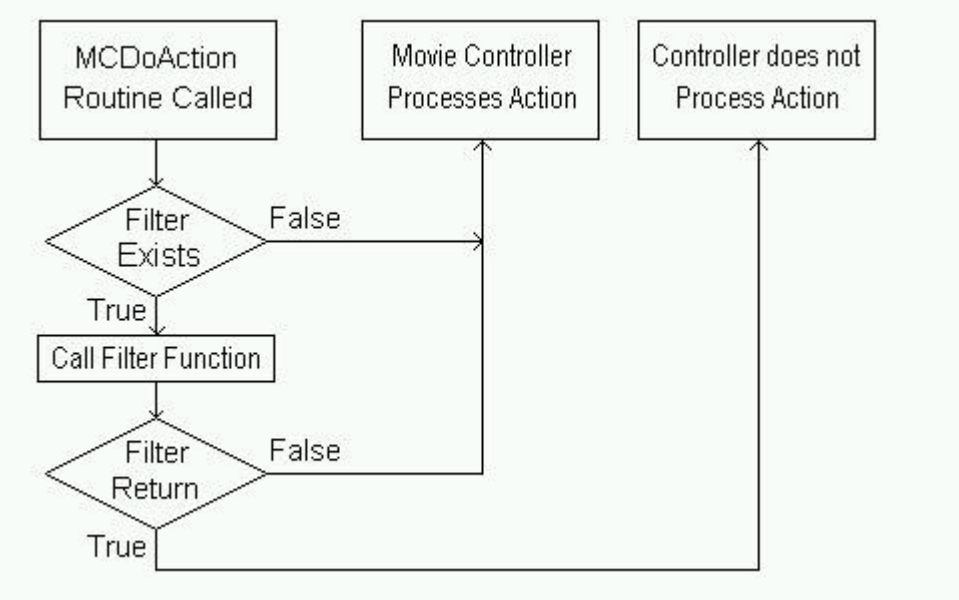


Figure 15. Using an Action Filter Function

You can view using an action filter as a kind of built-in subclassing. The following code fragment shows how you might set up your switch and case statements to handle a limited number of actions:

```
Boolean CALLBACK __export MyFilter (MovieController mcController,
   UINT uAction, LPVOID lpParam)
   {
   switch (uAction)
      {
      case mcActionDraw:
         •
         •
         return TRUE;

      case mcActionPlay:
         •
         •
         return TRUE;

      case mcActionKey:
         •
         •
         return TRUE;

      case mcActionBadgeClick:
         •
         •
         return TRUE;
```



```
      default:
         return FALSE;
      }
   }
```

15. Pictures

Like a movie, a QuickTime for Windows *picture* is a collection of data that can be rendered visually. Unlike a movie, a picture consists of a single complete image with no time coordinate system. This complete image is actually composed of one or more pieces, often arranged as bands within the area of the complete image.

Pictures are stored in picture files, from which they may be extracted using various QuickTime for Windows API routines and then displayed by your application. All of the pieces that comprise a complete image as described above are generally stored in the same picture file. Once extracted, a QuickTime for Windows picture is handled conceptually as a *picture object*, in a manner similar to a movie object.

QuickTime for Windows pictures are stored in the Macintosh PICT format (for a complete discussion of this format, refer to *Inside Mac Volumes V and VI*) or JFIF format (see the document *JPEG File Interchange Format, Version 1.1*, available from C-Cube Microsystems, San Jose, CA). Picture files and picture objects are manipulated by QuickTime for Windows API calls. For example, to extract a picture object:

```
PicHandle phPicture;
PicFile pfPicture;
•
•
if (OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ) != noErr)
   {
   phPicture = GetPictureFromFile (pfPicture);
   ClosePictureFile (pfPicture);
   }
•
•
DisposePicture (phPicture);
```

As noted earlier, your QuickTime for Windows applications do not have to call `EnterMovies` if they are only going to deal with picture objects. `QTInitialize` is required, however, along with `QTTerminate`. Since picture objects occupy memory, they must be disposed of properly with `DisposePicture` (or its equivalent, `KillPicture`) when they are no longer needed. As with movies, a picture file should be closed as soon as possible once its picture is extracted.

The Macintosh PICT file format defines numerous *opcodes*, in much the same way as, for example, the TIFF format. Under QuickTime for Windows, however, only a subset of these opcodes are processed:

- `0x0090` - BitsRect

- `0x0091` - BitsRgn
- `0x0098` - PackBitsRect
- `0x0099` - PackBitsRgn
- `0x009A` - DirectBitsRect (denotes a direct image)
- `0x009B` - DirectBitsRgn (denotes a direct image)
- `0x8200` - Compressed QuickTime image
- `0x8201` - Uncompressed QuickTime image
- `0x0011` - Version

To draw the image contained in a picture object, you can use `DrawPicture`:

```
PicHandle phPicture;
HDC hdc;
RECT rcPicture;
•
•
DrawPicture (hdc, phPicture, &rcPicture, NULL);
```

Certain pictures may be stored with additional data defining a custom palette. You can extract this palette with `GetPicturePalette` and then use it in your Windows application to obtain a more faithful rendering of a picture:

```
PicHandle phPicture;
HDC hdc;
HPALETTE hpalPicture
RECT rcPicture;
•
•
// Standard Windows call to see if driver can handle a palette

   if (GetDeviceCaps (hdc, RASTERCAPS) || RC_PALETTE)
      {
      hpalPicture = GetPicturePalette (phPicture);
      SelectPalette (hdc, hpalPicture,0);
      RealizePalette (hdc);
      }
   •
   •
   DrawPicture (hdc, phPicture, &rcPicture, NULL);
```

Picture files cannot be created or edited, but the images in them may be converted to formats for editing and saving under Windows. For example, the following code puts a

device independent bitmap, derived from a QuickTime for Windows picture, on the Windows clipboard:

```
PicFile pfPicture
PicHandle phPicture;
DIBHandle hdPicture;
•
•
// Extract a picture and convert it to Windows Device Independent
// Bitmap (DIB)

   if (OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ) != noErr)
      {
      phPicture = GetPictureFromFile (pfPicture);
      ClosePictureFile (pfPicture);
      }
   •
   •
   hdPicture = PictureToDIB (phPicture);
   DisposePicture (phPicture);

// Put the DIB in the clipboard

   OpenClipboard (hWnd);
   EmptyClipboard ();
   SetClipboardData (cf_DIB, hdPicture);
   CloseClipboard ();
```

Some QuickTime for Windows API calls allow you to operate directly on a picture file without first extracting a picture object. For instance, `DrawPictureFile` draws the image contained in a file:

```
PicFile pfPicture;
RECT rcPict;
HDC hdc;
•
•
OpenPictureFile ("HOUSE.PIC", &pfPicture, OF_READ);
DrawPictureFile (hdc, pfPicture, &rcPict, NULL);
ClosePictureFile (pfPicture);
```

You can use `GetPictureInfo` to extract information about a picture object. Similarly, you can use `GetPictureFileInfo` to extract data directly from a picture file.

16. Getting Pictures from Movies

Movie data can be viewed as a collection of compressed still images. A routine that allows you to retrieve such individual images from a movie is `GetMoviePict`, which takes a specified movie time as a parameter.

`MCGetCurrentTime` retrieves the movie's current time, i.e. position on the movie's time axis. This function can be used whether a movie is playing or not.


```
Movie mMovie;
MovieController mcController;
PicHandle phMyPicHandle;
TimeValue tvTime;
TimeScale tsTime;
•
•
tvTime = MCGetCurrentTime (mcController, &tsTime);
phMyPicHandle = GetMoviePict (mMovie, tvTime);
```

The picture object obtained from `GetMoviePict` points to an image in a format unusable by Windows directly. If you want to convert it to a Windows format suitable for use by other Windows applications, your can do so using `PictureToDIB` or `DrawPicture` with a memory device context. This routine returns a handle to a device-independent bitmap, which can then be used to put the picture in the Windows clipboard or send it to a printer.

Note: Picture handles on Windows are not public data structures, as they are on the Macintosh. You should not make any assumptions about the contents of a Picture handle. You should always use the KillPicture function to dispose of the picture.

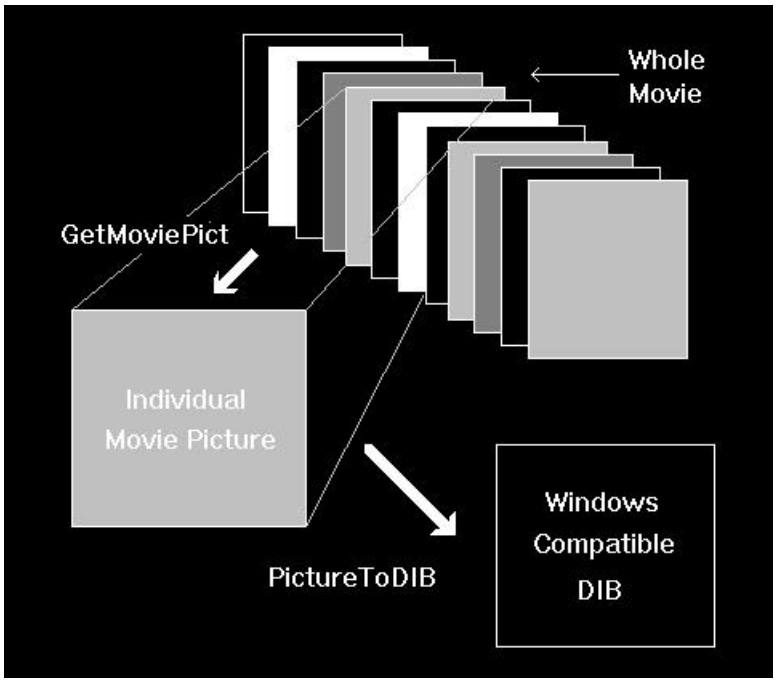


Figure 16. Retrieving a Picture from a Movie

The alternative to converting an image retrieved by `GetMoviePict` is to display it directly. Calling the function `DrawPicture` puts the picture on the screen (only for display device context) at coordinates you specify. You'll need to supply a device context,

the picture object reference and a display rectangle. Whatever you decide to do with a movie picture object you retrieve, you must free it when you are done with it.

```
Movie mMovie;
MovieController mcController;
PicHandle phMyPicHandle;
TimeValue tvTime;
•
•
tvTime = MCGetCurrentTime (mcController, /* Time scale address */);
phMyPicHandle = GetMoviePict (mMovie, tvTime);
DrawPicture (hdcMyDevCon, phMyPicHandle, &rcPicture, NULL);
•
•
DisposePicture (phMyPicHandle);
```

As with picture objects extracted from picture files, pictures extracted from movies may also contain custom palette information. You can use `GetPicturePalette` to retrieve this data and set the Windows palette to better render these individual movie images.

A *movie poster* is a frame in a movie selected when the movie was created to represent the movie when it is not loaded or not being played. You have access to this picture with `GetMoviePosterPict`, which returns an image object created from the frame designated as the movie's poster. One interesting way to use movie posters might be in an open movie dialog box. When the name of the movie is highlighted in the list box, its poster would be displayed next to it.

```
case LN_SELECT:
   •
   •
   OpenMovieFile (/* file name highlighted */, ...);
   NewMovieFromFile (...);
   phMyPicHandle = GetMoviePosterPict (/*NewMovieFromFile object */);
   hDIB = PictureToDIB (phMyPicHandle);
   /* Display DIB in dialog box using bitmap object. */
   break;
```

The GetMoviePict and GetMoviePosterPict routines return image of all currently enabled tracks in the movie. For example, if a movie has both a Video track and a Text track, the returned picture contains both track’s images. In some cases you may only want the image from one track. In these cases you can use GetTrackPict instead. The following example extracts the picture from the first enabled Video track in the movie, if one exists.


```
Movie mMovie;
MovieController mcController;
PicHandle phMyPicHandle;
TimeValue tvTime;
Track trkVideo;
•
•
tvTime = MCGetCurrentTime (mcController, /* Time scale address */);
trkVideo = GetMovieIndTrack(mMovie, 1, VideoMediaType,
   movieTrackMediaType | movieTrackEnabledOnly);
if (trkVideo) {
   phMyPicHandle = GetTrackPict (trkVideo, tvTime);
   DrawPicture (hdcMyDevCon, phMyPicHandle, &rcPicture, NULL);
   DisposePicture (phMyPicHandle);
}
•
•
```

17. Getting User Data from Movies

User data is typically inserted into a movie by its creator to identify special characteristics, production credits, and so forth. Any movie can contain a *user data list*, which is available for use by your application. A user data list comprises all the user data for a movie, and may contain one or more *user data items*. Each user data item has several attributes:

- The type identifier - denotes the specific type of the item, e.g. date, copyright, etc.
- The index value - a unique, one-based number denoting list position among like types
- The data itself - generally text, possibly other data

To get a handle to a movie's user data, you call `GetMovieUserData`:

```
Movie mMovie;
UserData udData;
•
•
udData = GetMovieUserData (mMovie);
```

With this handle, you can parse the data. Each of the other functions which handle user data has a specific purpose in this regard:

`GetNextUserDataType` takes the user data handle and desired user data type as parameters. If the type parameter is 0, the routine returns the first user type in the user data list. For subsequent calls (for example, in a loop to get all the user data), use the previous value returned by this function. The current format of the user data type identifier in a QuickTime movie is four-character constant, which is supported in the

Macintosh environment, but not directly under Windows. You can create the equivalent, however, with the macro QTFOURCC.

```
UserData udData;
OSType osType;
•
•
osType = QTFOURCC('©','d','a','y');
osType = GetNextUserDataType (udData, osType);
```

Below are some common user data types (note they are case senstive). By convention, text user data types start with a "©" symbol. Remember to use the QTFOURCC macro.

©cpy	Copyright statement
©day	Date the movie's content was created
©dir	Name of movie's director
©ed1 to ©ed9	Edit dates and descriptions
©fmt	Indication of movie format (computer-generated, digitized, etc.)
©inf	Information about the movie
©prd	Name of movie's producer
©prf	Names of performers
©req	Special hardware and software requirements
©src	Credits for providers of movie source content
©wrt	Name of movie's writer
LOOP	Denotes that the movie expects to be played in loop mode. If the value of this user data type is empty or 0, normal loop mode is indicated. A value of 1 denotes palindrome loop mode.
WLOC	Denotes that the last known position of the movie on the desktop is available, represented by two 16-bit integers contained in its associated value. Because movies are created on the Mac, this may not translate well to the Windows desktop.

CountUserDataType returns the number of items of a given type in a user data list. You pass it the handle to the user data list and the desired type:

```
UserData udData;
LONG lItemCount;
•
•
lItemCount = CountUserDataType (udData, QTFOURCC('©','d','a','y'));
```

GetUserData retrieves a specified user data item. You need to pass it the handle of a global memory block you have allocated, in which it will place the requested item. When you allocate the memory block, you should make it of an arbitrary size, since QuickTime

for Windows will reallocate memory internally based on your handle if the data item requested is too big. You must free this handle explicitly when you are done with it. In addition to the memory handle, you must also pass `GetUserData` the index value of the data item you want, and the address of a `LONG` which it fills with the size of the data item requested (in bytes).

```
UserData udData;
HGLOBAL ghMem;
LONG lIndex, lByteCount;
struct {...} *pData;
•
•
// Note arbitrary size of allocation request

if ((ghMem = GlobalAlloc (GMEM_MOVEABLE, 128)) == NULL);
   {
   /* Inform user of failure. */
   return;
   }

GetUserData (udData, &ghMem, QTFOURCC('t','e','s','t'), lIndex,
   &lByteCount);

pData = GlobalLock (ghMem);
•
•
/* Do something with user data item. */
•
•
GlobalUnlock (ghMem);
GlobalFree (ghMem);
```

When you specify a type of user data in this routine, you must know its format in advance. One way to handle this is to have `GlobalLock` return a pointer to a structure type you declare which maps onto the structure of the user data type you are retrieving.

`GetUserDataText` retrieves the text associated with a particular user data text item. Its parameters are the same as for `GetUserData`, with one exception: the region code. A region code is a value representing a particular language or country.


```
UserData udData;
LONG lIndex, lByteCount;
HGLOBAL ghMem;
LPSTR lpstrText;
•
•
ghMem = GlobalAlloc (GMEM_MOVEABLE, 128); // Note arbitrary size

GetUserDataText  (udData, &ghMem, QTFOURCC('@','d','a','y'),
   lIndex, 0, &lByteCount);

lpstrText = (LPSTR) GlobalLock (ghMem);
lpstrText [lByteCount] = '\0';
•
•
/* Do something with text string. */
•
•
GlobalUnlock (ghMem);
GlobalFree (ghMem);
```

In this example, 0 is the code for US (English). A table of these codes is presented in the documentation for this function in Section III, *Programmer's Reference*, along with a more complex example integrating all of these calls.

18. Getting System Data from Movies

In addition to individual picture frames and user data, movies contain a substantial amount of other data that your QuickTime for Windows programs can make use of, such as preferred play settings, time-based information and so forth.

Preferred settings are data elements held by a movie that denote optimum performance characteristics. When a movie is created, the author has the opportunity to encode what he or she feels is the most suitable volume, play rate, etc., which can later be used to play the movie as the author intended.

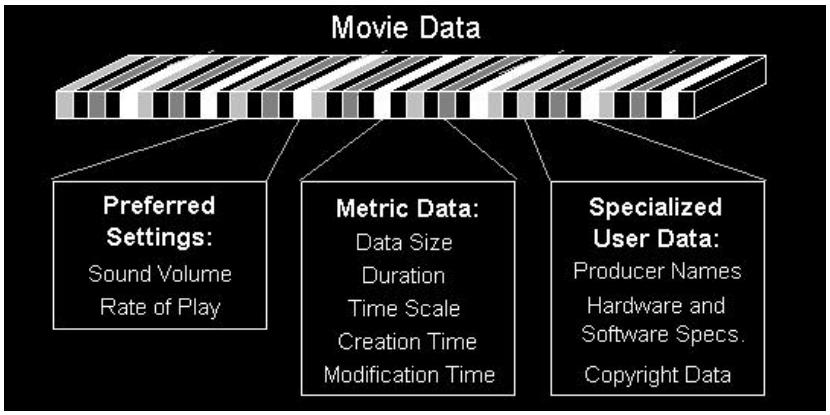


Figure 17. Available Movie System and User Data

For example, you can get the preferred volume with `GetMoviePreferredVolume`, then use the return value to set the movie volume with a call to `MCDoAction` with the `mcActionSetVolume` parameter.

To retrieve the preferred play rate, the call is `GetMoviePreferredRate`. You can set the movie's play rate as above using the `mcActionPlay` action with the returned rate as the additional parameter.

The second category, metric data, is more diverse. You will be the best judge of how to use these particular routines in your QuickTime for Windows programs. The routine `GetMovieDataSize`, for instance, returns the size in bytes of a specified movie segment.

`GetMovieTimeScale` returns the movie's time scale, which (as we noted earlier) is a specific fraction of a second. `GetMovieDuration` returns a movie's duration expressed in terms of its time scale.

You can manipulate a movie's time scale with `ConvertTimeScale`. The timestamp functions, `GetMovieCreationTime` and `GetMovieModificationTime`, return the values for when the movie was created and last modified, respectively.

19. Cover Procedures

QuickTime for Windows allows your application to perform custom processing whenever one of your movies covers a screen region or reveals a region that was previously covered. You perform this processing in cover procedures. Cover procedures are useful in handling movies with "empty segments," i.e. portions of movies intentionally lacking any visual element.

By default, QuickTime for Windows will display the normal background color during an empty segment. You can use a cover procedure to display other information meaningful to your application.

There are two types of cover procedures: those that are called when your movie covers a screen region, and those called when it uncovers a screen region, revealing a region that was previously covered. Cover procedures that are called when your movie covers a screen region are responsible for erasing the region--you may choose to save the hidden region in a bitmap. Cover procedures that are called when your movie reveals a hidden region must redisplay the hidden region.

Use `SetMovieCoverProcs` to set both types of cover procedures. The following example shows how to establish a cover procedure called when your movie uncovers a screen region.


```
OSErr CALLBACK __export CoverProc (Movie, HDC, LONG);
•
•
HWND hWnd;
Movie mMovie;
•
•
SetMovieCoverProcs (mMovie, CoverProc, 5879);
•
•
OSErr CALLBACK __export CoverProc (Movie m, HDC hdc, lID)
   {
   RECT rcClip;
   GetClipBox (hdc, &rcClip;
   FillRect (hdc, &rcClip, GetStockObject (WHITE_BRUSH));
   return 0;
   }
```

Note that the third parameter to `SetMovieCoverProcs` is an arbitrary constant passed directly to your routine. You can use this to distinguish invocations when your cover procedure is shared by two or more movies.

If you compile your program using Borland *smart callbacks* or Microsoft's `-GEs` compiler option, or your filter function is in a dynamic link library, you do not need to use `MakeProcInstance` on your cover procedure address before calling `MCSetMovieCoverProcs`. Since a cover procedure is essentially a *callback* function, it must be declared as `CALLBACK` and listed in the `EXPORTS` section of your .DEF file.

20. QuickTime for Windows Error Handling

The QuickTime for Windows API provides two routines for trapping non-Movie Controller function errors: `GetMoviesError` and `GetMoviesStickyError`. Detailed information on these routines can be found in Section III, *Programmer's Reference*. Movie Controller functions do not return error conditions.

21. Additional Media Types Supported by QuickTime for Windows

QuickTime for Windows can play movies containing up to five different media types. So far, we've looked at movies with two: video and sound. Additional media types that QuickTime for Windows supports are as follows. Media types can be combined in a movie in any combination, but only one of a single type is processed.

- **Text**: textual data, like subtitles, that is often played in combination with video. QuickTime for Windows supplies API's for your application to search for text in a movie.

- **MPEG**: a combination of video and/or sound encoded in standard MPEG format. Most often, movies with MPEG media do not also contain standard QuickTime video and sound media, although they can. QuickTime for Windows can also play MPEG media directly from MPEG files. MPEG playback requires special hardware, like Sigma Design's Reel Magic™ board, to be installed.

- **Music or MIDI**: sound data, such as that generated by an electronic musical instrument, encoded in QuickTime music format. Most PC sound boards process MIDI data.

An example of a movie with both text and video media is shown below.

Getting Information about the Tracks in a Movie

You can use `GetMovieIndTrack` to determine if a particular kind of track is present in a movie. Alternatively, you can use `GetMovieTrackCount`, and `GetMovieIndTrack` to interate through all the tracks in a movie. Then, use `GetTrackMedia` to get the media out of the track. (The extracted media can then be manipulated using various media routines). You can then use `GetMediaHandlerDescription` to determine the type of each track. Once you have a track, you can use `GetMediaSampleDescription` to obtain the sample description handle for the track. This will provide information about the particular data for that track, for example the compressor used to create a video track, or the sample rate of a sound track.

Enabling and Disabling Tracks

Data in a QuickTime movie is stored in *tracks*. Before you can enable or disable a particular track, you must obtain the track's reference. To do this, call `GetMovieIndTrackType`. For example:

```
Movie m;
Track trkText;
•
•
trkText = GetMovieIndTrackType (m, 1,
            TextMediaType, movieTrackMediaType);
```


The track obtained from this call can then be passed to `SetTrackEnabled`:

```
Track trkText;
•
•
SetTrackEnabled (trkText, FALSE);
```

The effect of disabling a track depends on whether the media it contains is visible (video and text) or audible (sound and music) or both (MPEG). If the media is visible, it is hidden when disabled. The movie rectangle (as obtained by `GetMovieBox)` shrinks to the smallest rectangle enclosing the enabled visible media. The opposite occurs when the media is enabled. If the media is audible, it is silenced when disabled.

After enabling or disabling one or more tracks, you must call `MCMovieChanged`. This call alerts the Movie Controller that you have changed certain characteristics of the movie and instructs it to re-generate its appearance appropriately.

```
Movie m;
MovieController mc;
•
•
MCMovieChanged (mc, m);
```

You can determine if a particular track is enabled by calling `GetTrackEnabled`.

```
Track trkMusic;
Boolean bEnabled
•
•
bEnabled = GetTrackEnabled (trkMusic);
```

A track's enabled state is also effected by the movie's active state. If the movie is inactive, all tracks are effectively disabled. However, if you call `GetTrackEnabled`, it will still return TRUE for those tracks which were enabled when the movie was made inactive. The actual enabled state of any track is actually the combination of the movie's active state and the track's enabled state.

Searching for Text in a Movie

If a movie contains text media, your program can use `MovieSearchText` to search for text. `MovieSearchText` can be instructed to skip to the movie time of the found text and, independently, to highlight it.

22. Getting Text from a Movie

The text stored in a movie can be used in many different ways. The most obvious is to display the data. However, after a search operation, the user may wish to copy the text from the movie to use it in a word processor. In other cases, an application may wish to apply its own search algorithm. Some applications may use the text stored in a movie to allow scripts or hot spots to be associated with a movie. In all these cases, the application must be able to get the text out of the movie.

The easiest way to extract text is to use the `PutMovieIntoTypedHandle` routine. This routine will provide the text, translated from Macintosh to Windows characters where appropriate. You can have the text automatically placed on the clipboard, and the text may be from a single sample or a range of time.

A lower level approach to extracting text, is to use the `GetMediaSample` routine. This provides access to the raw text sample, including any additional information or tables that may be stored with the text.

23. Memory Management

Because QuickTime for Windows is based on QuickTime originally developed for the Macintosh it requires certain memory management functionality which is not available directly from MS Windows. To alleviate this problem, QuickTime for Windows provides a set of routines to emulate the Macintosh Memory Manager. The following routines are supported:

```
NewHandle
DisposeHandle
HLock
HUnlock
HGetState
HSetState
GetHandleSize
SetHandleSize
MemError
```

The only major difference between the Macintosh and Windows version of the Memory Manager is the addition of the function `DereferenceHandle` on Windows. You cannot directly dereference handles under Windows. You must use the `DereferenceHandle` function to do this. `DereferenceHandle` only works if the `Handle` is locked.

For Windows programmers, the most notably difference from MS Windows memory management routines is that the lock and unlock routines do not maintain a count. If a handle is locked 3 times, a single unlock will unlock the block. To maintain the state of a handle, use the `HGetState` and `HSetState` routines.

Future version of QuickTime for Windows may provide more complete Macintosh Memory Manager support.

QuickTime for Windows routines which take a `Handle` as an argument, expect a `Handle` which was created by QuickTime for Windows' `NewHandle` routine. They will fail if passed a standard Windows `HANDLE`.

The QuickTime for Windows Environment

Hardware Considerations

The supported environment for QuickTime for Windows is Windows 3.1 or later, either standard or enhanced mode, running on an I386, I486, or Pentium machine. If a program incorporating QuickTime for Windows is run in a non-supported environment, `QTInitialize` will fail. If this happens, it is responsibility of your application not to execute any further QuickTime for Windows calls. QuickTime for Windows does provide some assistance in this area by making all of its calls no-ops when `QTInitialize` fails, but you should take the extra steps to not even call the functions if `QTInitialize` fails.

Developing QuickTime for Windows Programs

To start building QuickTime for Windows programs, you need to make four changes to your development environment and program source files:

- Include the library file QTW.LIB in the link line of your program's make file
- Add the line `#include "QTW.H"` to your program's source file.
- Change the stack size to at least 16K in your program's.DEF file
- Check that the SET LIB, SET INCLUDE and PATH environment variables in your AUTOEXEC.BAT or IDE project options file to access all of the QuickTime for Windows development tools.

QuickTime for Windows On-line Help

If you have installed QuickTime for Windows from diskettes, all of the help files are in the directory `\qtw\help`. They are in the standard .HLP format, accessible with the *WinHelp* program. If you have installed from CD-ROM, you will have the standard .HLP files plus their source code files (with the extension .RTF) and their corresponding help project files (with the extension .HPJ), also in `\qtw\help`. Of particular note are the files for the Movie Controller, which you can integrate with your application's help system.

You can rebuild the compiled help files using the Windows help compiler. For example, to build the Movie Controller help file, you would invoke:

```
HC31 MCENU.HPJ
```

The three-letter "ENU" string in the file name indicates the U.S. English version. To compile help files for other languages, use the appropriate source files in `\qtw\help`.

QuickTime for Windows Applications

QuickTime for Windows provides two sample applications for viewing QuickTime movies and pictures: *Movie Player* and *Picture Viewer*. These programs use the Microsoft standard Multiple Document Interface (MDI) to view multiple movies or pictures, respectively. Complete source code is provided for each application for use as a learning tool. When running either program, you will find extensive on-line help available through the Help menu item or the F1 function key.

The Movie Player

This application lets you play one or more movies in its main window. All movies run in standard MDI child windows. You can resize any of the movies by dragging on their borders, or by using the grow box in the lower right corner. Individual movie frames and an OLE movie object reference can be copied to the clipboard through the *Edit* menu item, and information about the movie is available under the *Movie* menu item. The Movie Player executable is in the `\windows` subdirectory. Its source code is in `\qtw\samples\mplayer`. You can build PLAYER.EXE with the make file PLAYER.MAK (in standard NMAKE format), also located in this directory.

Online help files for the Movie Player are provided in two formats: PLAYENU.RTF (*rich text* format, only if you installed from CD-ROM) and PLAYENU.HLP (standard compiled help files, usable by the Windows help subsystem). These help files are in the directory `\qtw\help` and are currently localized for the U.S. English language. You can localize them for other languages at your discretion (no other localization is normally required for QuickTime for Windows programs). Help files for the Movie Controller, MCENU.RTF and MCENU.HLP, are in the same format and location.

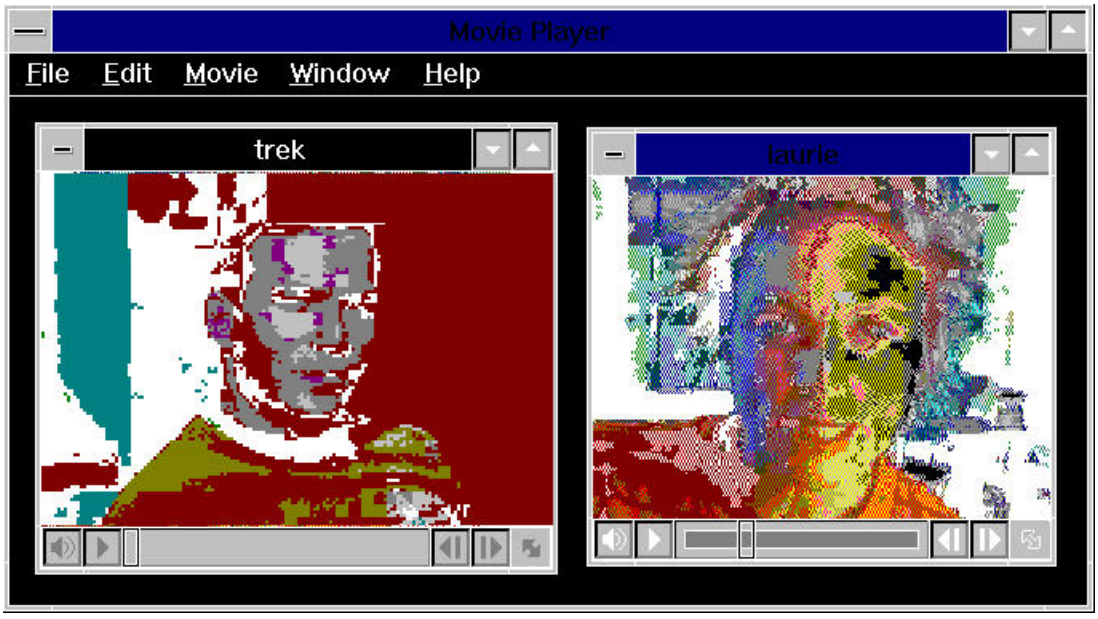


Figure 18. The Movie Player program.

The Picture Viewer

This application lets you view one or more pictures in its main window. All pictures are displayed in standard MDI child windows, which you can resize by dragging on their frame-sizing borders or by using the grow box in the lower right corner. Individual pictures can be copied to the clipboard through the *Edit* menu item, and information about the picture is available under the *Image* menu item. The Picture Viewer executable is in the `\windows` subdirectory. Its source code is in `\qtw\samples\pviewer`. You can build VIEWER.EXE by executing the make file VIEWER.MAK (in standard NMAKE format), also located in this directory.

Online help files for the Picture Viewer are provided in two formats: VIEWENU.RTF (*rich text* format, only if you installed from CD-ROM) and VIEWENU.HLP (standard compiled help files, usable by the Windows help subsystem). These help files are in the directory `\qtw\help` and are currently localized for the U.S. English language. You can localize them for other languages at your discretion (no other localization is normally required for QuickTime for Windows programs).

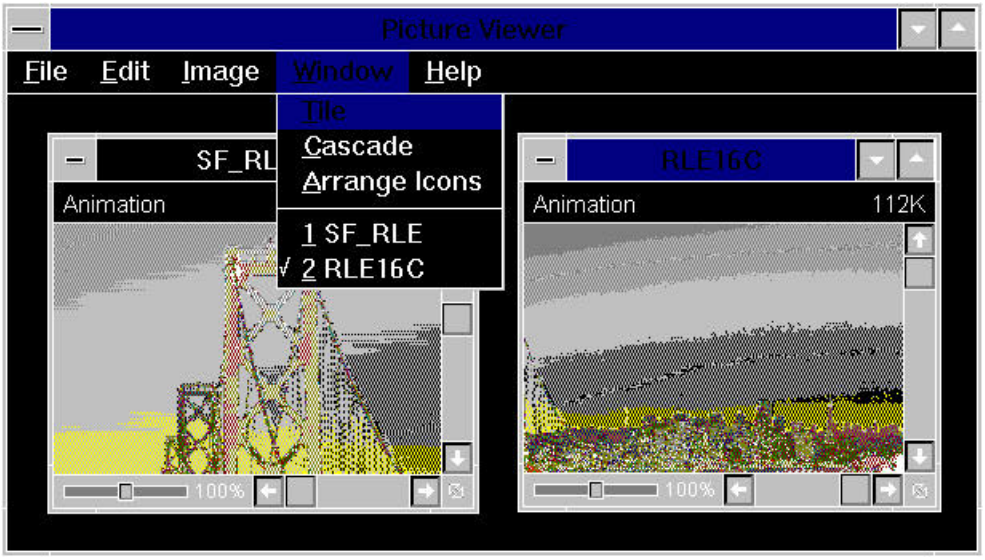


Figure 19. The Picture Viewer program.

QuickTime for Windows vs. QuickTime for the Macintosh

Summary

As an experienced QuickTime programmer ready to use the QuickTime for Windows API, you know about differences between the Windows and Macintosh platforms. You should also be aware of how QuickTime and QuickTime for Windows themselves differ in implementation.

We noted earlier that QuickTime movies can be created and edited on the Macintosh, while they can be handled in playback mode only in the current version of QuickTime for Windows. It is also worth re-emphasizing that the primary focus of the QuickTime for Windows API and related documentation is the Movie Controller.

Although QuickTime for Windows' API is based as closely as possible on QuickTime's, the platform differences noted above have necessitated the creation of QuickTime for Windows calls with no counterpart on the Macintosh side. These are discussed in context in the material that follows. Equally important is that many of the QuickTime Toolbox routines available to the Macintosh developer are not exposed in the QuickTime for Windows API, since the focus is on the Movie Controller.

The Movie Controller

The important ideas to keep in mind regarding the QuickTime for Windows Movie Controller are:

- Playing movies under QuickTime for Windows is possible only with the Movie Controller, as opposed to under QuickTime, which allows movies to be played using its Toolbox API.

- The QuickTime for Windows Movie Controller is functionally identical to the default movie controller under QuickTime.

- You can simulate the appearance of a QuickTime toolbox application using an invisible movie controller.

Initialization and Termination Differences

QuickTime is an operating system extension on the Macintosh and does not need to be explicitly initialized. Under QuickTime for Windows, any application that makes calls to the QuickTime for Windows libraries must first verify that the libraries are available on the system. This is accomplished with the QuickTime for Windows-only routine `QTInitialize`, which establishes links to those libraries if they are present. The `QTTerminate` function must be called before your QuickTime for Windows-enabled program is unloaded. Details on these calls are available in Section III, *Programmer's Reference*.

Picture Handling Differences

Since pictures on the Macintosh are also generally handled at the operating system level, there are a number of new routines to deal with individual QuickTime for Windows images. Again, complete information on these calls is available in Section III, *Programmer's Reference*.

```
ClosePictureFile
DisposePicture
DrawPicture
GetPictureFileInfo
GetPictureFromFile
GetPictureInfo
GetPicturePalette
KillPicture
OpenPictureFile
PictureToDIB
```

Other Differences

The following new routines are included in the QuickTime for Windows API to bridge other platform differences. See Section III, *Programmer's Reference*.

`MAKELFIXED` (macro)
`MAKESFIXED` (macro)
`MCIsPlayerMessage` (named `MCIsPlayerEvent on the Macintosh`)
`NormalizeRect`
`QTFOURCC` (macro)

Versions of QuickTime for Windows prior to 2.0 provided GetVideoInfo and GetSoundInfo calls which were never present on the Macintosh version of QuickTime. In QuickTime 2.0 for Windows the GetMediaSampleDescription takes the place of these two calls and removes the need for calls such as GetTextInfo or GetMusicInfo. GetVideoInfo and GetSoundInfo are considered obsolete, and should no longer be used. They are maintained only for compatibility reasons.

QuickTime API Calls Supported by QuickTime for Windows

Application Defined Movie Routines	`SetMovieCoverProcs`

Enabling and Disabling Movies and Tracks	`GetMovieActive`
	`GetTrackEnabled`
	`SetMovieActive`
	`SetTrackEnabled`

Locating Tracks and Media	`GetMediaTrack`
	`GetMovieIndTrack`
	`GetMovieIndTrackType`
	`GetMovieTrackCount`
	`GetTrackMedia`
	`GetTrackMovie`

Enhancing Movie Playback Performance	`PrerollMovie`

Error Routines	`ClearMoviesStickyError`
	`GetMoviesError`
	`GetMoviesStickyError`

Movies and the Event Loop	`GetMovieStatus`
	`PtInMovie`
	`UpdateMovie`

Generating Pictures from Movies	`GetMoviePict`
	`GetMoviePosterPict`
	`GetTrackPict`

Getting Information about Tracks and Media	`GetMediaHandlerDescription`
	`GetMediaSampleDescription`
	`GetMediaTimeScale`
	`GetTrackDimensions`
	`GetTrackMatrix`

Initializing the Movie Toolbox	`EnterMovies` `ExitMovies`

Movie Controller	`DisposeMovieController`
	`MCActivate`
	`MCDoAction`
	`MCDraw`
	`MCDrawBadge`
	`MCGetControllerBoundsRect`
	`MCGetControllerInfo`
	`MCGetCurrentTime`
	`MCGetMovie`
	`MCGetVisible`
	`MCIdle`
	`MCIsControllerAttached`
	`MCIsPlayerMessage`
	`MCKey`
	`MCMovieChanged`
	`MCNewAttachedController`
	`MCPositionController`
	`MCSetActionFilter`
	`MCSetControllerAttached`
	`MCSetControllerBoundsRect`
	`MCSetVisible`
	`NewMovieController`

Determining Movie Creation and Modification Time	`GetMovieCreationTime`
	`GetMovieDataSize`
	`GetMovieModificationTime`

Movie Routines	`CloseMovieFile`
	`DeleteMovieFile`
	`DisposeMovie`
	`GetMovieBox`
	`NewMovieFromDataFork`
	`NewMovieFromFile`
	`OpenMovieFile`
	`SetMovieBox`

Working with Pictures and Picture Files	`DisposePicture`
	`DrawPictureFile`
	`GetPictureFileHeader`
	`KillPicture`

Movie Posters and Movie Previews	`GetMoviePosterTime`
Preferred Movie Settings	`GetMoviePreferredRate` `GetMoviePreferredVolume`

Time Base Routines	`AddTime`
	`ConvertTimeScale`
	`SubtractTime`

Working with Movie User Data	`CountUserDataType`
	`GetMovieUserData`
	`GetNextUserDataType`
	`GetUserData`
	`GetUserDataText`

Working with Movie Time	`GetMovieActiveSegment`
	`GetMovieDuration`
	`GetMovieTime`
	`GetMovieTimeScale`
	`GetMovieSelection`
	`TrackTimeToMediaTime`

Matrix Support	`ConcatMatrix` `TransformRect`

Memory Management Support	`DereferenceHandle`
	`DisposeHandle`
	`GetHandleSize`
	`HGetState`
	`HLock`
	`HSetState`
	`HUnlock`
	`MemError`
	`NewHandle`
	`SetHandleSize`

Extracting Data from a Movie	`GetMediaSample` `PutMovieIntoTypedHandle`
Seaching Text Tracks	`MovieSearchText`

Preparing Macintosh movie and picture files for QuickTime for Windows

QuickTime movies prepared on the Macintosh to play under Windows need to have two related characteristics. They must be 1) self-contained, and 2) contained in a single fork file. These characteristics are set by the Macintosh application that saves the movie. Such an application is the Movie Player, which is part of QuickTime 2.0 for the Macintosh. In addition, QuickTime for Windows is designed to process only a single track of each of these media types (additional tracks are ignored):

Video
Text
MPEG
Sound
Music

If your movies contain more than one track of any of these media types, you must use a movie editing program to composite multiple tracks.

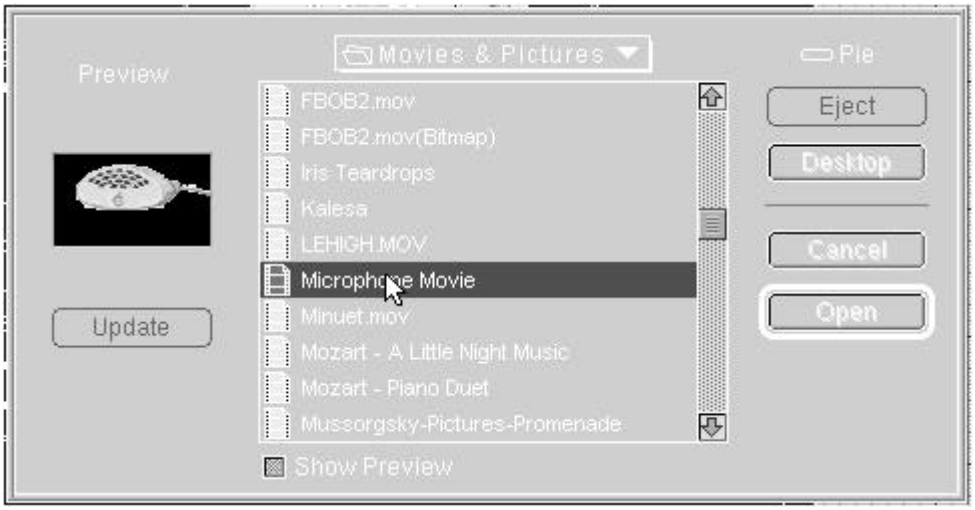
Macintosh QuickTime pictures may be transferred to a Windows machine directly (e.g., over a network or with a Mac to PC file transfer program) and viewed without any special preparation.

To use the Movie Player to create a movie file that can be ported to a Windows machine:

1. Make sure that the QuickTime 2.0 extension is installed in your System Folder.

    - Launch the Movie Player.

    - Open the QuickTime movie to be saved.

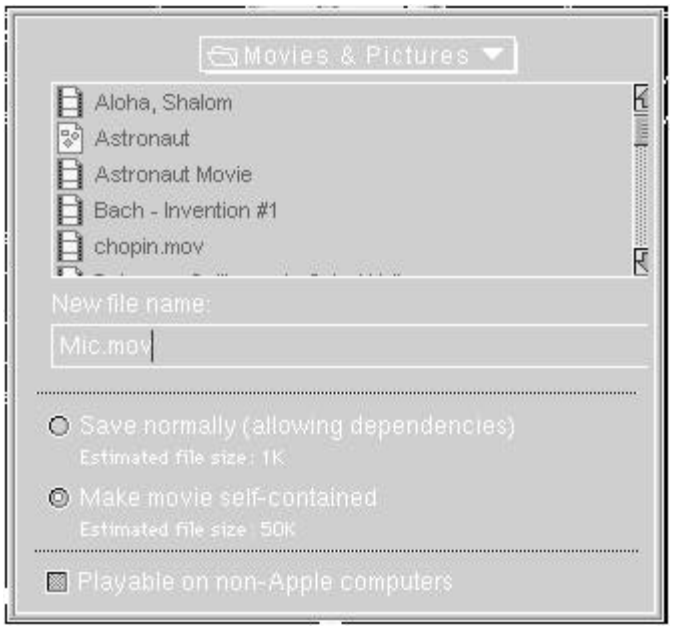


3. In the File Menu select "Save As".

4. Click the "Make movie self-contained" button. This creates a movie that contains no references to other files.

5. Check "Playable on non-Apple computers". This creates a movie file that does not depend on resources.

6. Save the file.



The file just created can now be ported to a Windows machine (e.g., over a network or with a Mac to PC file exchange program) and viewed with any application that supports QuickTime for Windows.

Section 2. A QuickTime for Windows Tutorial

Introduction

The series of sample programs presented in this section of the manual is intended as a learning tool. While they clearly demonstrate the power and flexibility of the QuickTime for Windows API, none of the programs should be taken out of context or used in production quality applications without careful consideration. Although the complete source code for each program is listed out in this section, the files are also in the `\qtw\samples` directory of your installed QuickTime for Windows environment.

WINPLAY1 - Your First QuickTime for Windows Program

Introduction

WINPLAY1 serves one purpose: it puts into context the essential steps for initializing, executing and disposing various QuickTime for Windows API components required to play a movie. Its user interface is a plain frame window completely filled by a single movie and attached movie controller.

The WINPLAY1 Source Code

- WINPLAY1.MAK is the standard make file.
- WINPLAY1.DEF is the module definition file.
- WINPLAY1.C is the C source file.

WINPLAY1.MAK

```
ALL : WINPLAY1.EXE

WINPLAY1.OBJ : WINPLAY1.C
 cl -c -AS -DSTRICT -G2 -Zpel -W3 -WX -Od winplay1.c

WINPLAY1.EXE : WINPLAY1.OBJ WINPLAY1.DEF
 link /nod /a:16 winplay1, winplay1.exe, nul, qtw libw slibcew, \
    winplay1.def;
 rc winplay1.exe
```


WINPLAY1.DEF

```
NAME        WINPLAY1
DESCRIPTION 'Sample Application'
EXETYPE     WINDOWS
STUB        'winstub.exe'
CODE        PRELOAD MOVEABLE DISCARDABLE
DATA        PRELOAD MOVEABLE MULTIPLE
HEAPSIZE    1024
STACKSIZE   16384
```

WINPLAY1.C

```
#include <windows.h>
#include <qtw.h>

long FAR PASCAL __export WndProc (HWND, UINT, WPARAM, LPARAM);

MovieFile mfMovie;
RECT rcMovie;
Movie mMovie;
MovieController mcController;

int PASCAL WinMain (HINSTANCE hInstance, HINSTANCE hPrevInstance,
   LPSTR lpszCmdParam, int nCmdShow)
   {
   static char szAppName[] = "WinPlay1";
   HWND        hWnd;
   MSG         msg;
   WNDCLASS    wndclass;

// Establish links to QuickTime for Windows

   if (QTInitialize (NULL))
      {
      MessageBox (NULL, "QTInitialize failure", szAppName, MB_OK);
      return 0;
      }

// Allocate memory required for playing movies

   if (EnterMovies ())
      {
      MessageBox (NULL, "EnterMovies failure", szAppName, MB_OK);
      return 0;
      }

// Register and create main window

   if (!hPrevInstance)
      {
      wndclass.style         = CS_DBLCLKS | CS_HREDRAW | CS_VREDRAW;
      wndclass.lpfnWndProc   = WndProc;
      wndclass.cbClsExtra    = 0;
      wndclass.cbWndExtra    = 0;
      wndclass.hInstance     = hInstance;
```



```
      wndclass.hIcon         = LoadIcon (NULL,IDI_APPLICATION);
      wndclass.hCursor       = LoadCursor (NULL, IDC_ARROW);
      wndclass.hbrBackground = (HBRUSH) (COLOR_WINDOW + 1);
      wndclass.lpszMenuName  = NULL;
      wndclass.lpszClassName = szAppName;

      if (!RegisterClass (&wndclass))
         {
         MessageBox (NULL, "RegisterClass failure", szAppName, MB_OK);
         return 0;
         }
      }

   hWnd = CreateWindow (szAppName, szAppName, WS_CAPTION | WS_SYSMENU |
      WS_CLIPCHILDREN | WS_OVERLAPPED, CW_USEDEFAULT, CW_USEDEFAULT,
      CW_USEDEFAULT, CW_USEDEFAULT, NULL, NULL, hInstance, NULL);

   if (hWnd == NULL)
      {
      MessageBox (NULL, "CreateWindow failure", szAppName, MB_OK);
      return 0;
      }

// Instantiate the movie

   if (OpenMovieFile ("SAMPLE.MOV", &mfMovie, OF_READ) != noErr)
      {
      MessageBox (NULL, "OpenMovieFile failure", szAppName, MB_OK);
      return 0;
      }

   NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
   CloseMovieFile (mfMovie);

// Instantiate the movie controller

   GetMovieBox (mMovie, &rcMovie);
   OffsetRect(&rcMovie, -rcMovie.left, -rcMovie.top);
   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit, hWnd);

// Make the movie paused initially

   MCDoAction (mcController, mcActionPlay, 0);

// Eliminate the grow box

   SetRectEmpty (&rcMovie);
   MCDoAction (mcController, mcActionSetGrowBoxBounds, &rcMovie);

// Make the frame just big enough for the movie

   MCGetControllerBoundsRect (mcController, &rcMovie);
   AdjustWindowRect (&rcMovie, WS_CAPTION | WS_OVERLAPPED, FALSE);
   OffsetRect(&rcMovie, -rcMovie.left, -rcMovie.top);
   SetWindowPos (hWnd, 0, 0, 0,
      rcMovie.right, rcMovie.bottom, SWP_NOMOVE | SWP_NOZORDER);
```



```
// Make the movie active

   SetMovieActive (mMovie, TRUE);

// Make the main movie visible

   ShowWindow (hWnd, nCmdShow);
   UpdateWindow (hWnd);

// Play the movie

   while (GetMessage (&msg, NULL, 0, 0))
      {
      TranslateMessage (&msg);
      DispatchMessage (&msg);
      }

// Destroy the movie controller

   DisposeMovieController (mcController);

// Destroy the movie

   DisposeMovie (mMovie);

// Cut the connections to QuickTime for Windows

   ExitMovies ();
   QTTerminate ();

// Return to Windows

   return msg.wParam;
   }

long FAR PASCAL __export WndProc (HWND hWnd, UINT message,
   WPARAM wParam, LPARAM lParam)
   {
   PAINTSTRUCT ps;

// Drive the movie controller

   if (MCIsPlayerMessage (mcController, hWnd, message, wParam, lParam))
      return 0;

// Process the windows message

   switch (message)
      {
      case WM_PAINT:

         if (!BeginPaint (hWnd, &ps))
            return 0;
         EndPaint (hWnd, &ps);
         return 0;

      case WM_DESTROY:
```



```
         PostQuitMessage (0);
         return 0;
      }

// Return to Windows

   return DefWindowProc (hWnd, message, wParam, lParam);
   }
```

Building QuickTime for Windows Programs

The most significant difference between WINPLAY1.MAK and an otherwise standard make file is in the link line: a file named QTW.LIB is specified in the library list. In general, the only change necessary for your existing Windows make files is to make sure QTW.LIB is added to your list of statically-linked libraries.

WINPLAY1.DEF is provided only to complete the source file set for this tutorial. Module definition files for your existing Windows programs generally will not have to be modified for QuickTime for Windows.

Initializing QuickTime for Windows Programs

The first QuickTime for Windows function in WINPLAY1.C is `QTInitialize`, which has a void parameter list and returns one of five possible values:

`QTI_OK`	Success
`QT_FAIL_CORRUPTDLL`	A QuickTime for Windows DLL failed to load
`QTI_FAIL_NOEXIST`	QuickTime for Windows is not installed
`QTI_FAIL_286`	QuickTime for Windows requires a 386 or better
`QTI_FAIL_WIN30`	Windows 3.1 or better required

This routine must be called before any other QuickTime for Windows function. Although it is performed automatically when any such function is executed, you should call it explicitly as a matter of programming style. Its primary purpose is to bind QuickTime for Windows-enabled applications to QuickTime for Windows at *run time.* Normally, a program utilizing DLLs is bound to them at link time; if calls to the DLLs are not resolved at load time, the program fails to load. The function `QTInitialize` provides *access* to QuickTime for Windows functions after the program has loaded. If QuickTime for Windows is not installed, the program will fail to play movies but otherwise run normally.

For instance, if you were the developer of an existing word processing program, you might want to add the ability to play movies in your documents but still be able to run the application on a non-QuickTime for Windows system.You can develop a QuickTime for Windows-enabled application without worrying about whether its DLLs will be present on future host systems.

`QTInitialize` also provides safety features to prevent a fatal failure if the application is running on a non-supported platform, or if the application accidentally makes a QuickTime for Windows call when QuickTime for Windows is not present. In these cases, all QuickTime for Windows calls are no-ops.

In WINPLAY1, a standard Windows message box is displayed if `QTInitialize` does not return QTI_OK, and the program exits when the message box is dismissed. If we fell through to the rest of the QuickTime for Windows functions, each of them would return unsuccessfully and no movie would be displayed. The program's main window would be created, however, and it would behave normally.

If `QTInitialize` returns successfully, the program calls `EnterMovies` to allocate memory required by QuickTime for Windows (not its movies) that will be used to track movies for this program. `EnterMovies` has an empty parameter list and returns an `OSErr`. An `OSErr` is returned by a number of QuickTime for Windows functions. 0 indicates no error. Various other integer values denote QuickTime for Windows error conditions which your program may react to as you deem appropriate. Please see Appendix A for a listing of these error codes.

WINPLAY1 checks the return and puts up a message box, followed by a program exit, if an error condition is indicated. An application may call `EnterMovies` multiple times, but memory will be allocated only for the first call.

As noted in the overview, `QTInitialize` and `EnterMovies` (if your program plays movies) only need to be called once during the life of your QuickTime for Windows application. Functions which deal with initializing individual movies, discussed next, need to be executed for each QuickTime for Windows movie your program incorporates.

Loading a Movie

Assuming WINPLAY1 has been successfully initialized for using the QuickTime for Windows libraries, it can now proceed to ready a specific movie for playing. `OpenMovieFile` is hard coded to open the movie file SAMPLE.MOV, its first parameter. Its second parameter is the address of `mfMovie`, which will be passed to `NewMovieFromFile`.

The third parameter is an integer expressed as a standard file open flag as defined for the Windows `OpenFile` function, normally OF_READ, since movies generally cannot be opened other than read-only in the current version of QuickTime for Windows. `OpenMovieFile` returns an `OSErr`, which is checked and handled in the same way as it was for `EnterMovies` and `QTInitialize`.

Note: For overall clarity, return codes are not checked for QuickTime for Windows functions beyond this point. Of course, in production-grade code all QuickTime for Windows return values would be checked and handled appropriately.

To initialize a movie object to pass to `NewMovieController`, we have to call `NewMovieFromFile`. Its first parameter is the address of our movie object `mMovie`. Second is the `mfMovie` assigned by QuickTime for Windows when we called `OpenMovieFile`. The fifth parameter is hard coded to `0` to mark it simply as inactive. The rest of the parameters are set to NULL in the current version of QuickTime for Windows. For each movie you want to play, you must call `OpenMovieFile` and `NewMovieFromFile` . WINPLAY1 only plays a single movie, and thus only makes the calls once.

`CloseMovieFile` is called next, since movie files should not be left open any longer than necessary. It takes `mfMovie` as its only parameter.

Creating a Movie Controller

While `NewMovieFromFile` allocates and initializes all storage required for the movie and performs various internal tasks (e.g. telling QuickTime for Windows' scheduler to add the movie to its tables), there is still some conceptual distance. What we have now is access to a collection of movie data with no mechanism to play it. As explained in the overview, this is the role of the Movie Controller.

W must first pass QuickTime our movie’s size and position within WINPLAY1's client area. The routine `GetMovieBox` provides these values, which are the original dimensions of the movie as contained in the movie file (if the movie is freshly extracted with `NewMovieFromFile`).

We are now prepared to call `NewMovieController`, which must be done for each movie controller you wish to create (again, our sample program only has one). The parameters are:

- `mMovie`, the movie object assigned by QuickTime for Windows when it processed `NewMovieFromFile`
- the address of `rcMovie`, the structure we have just filled with our movie's desired dimensions and coordinates
- `mcTopLeftMovie` and `mcScaleMovieToFit`, standard controller creation flags for displaying the movie in the movie rectangle (`rcMovie`)
- `hWnd`, the window handle for WINPLAY1, whose window will be the parent for the new movie controller and associated movie.

`NewMovieController` returns a `MovieController` object, an entity which you will use extensively in subsequent QuickTime for Windows calls.

Several key things now happen involving the QuickTime for Windows internal functions and data structures. The visible effect, once the movie is made visible, is the creation of the movie controller and its individual controls.

Before we call `ShowWindow`, however, we have to make WINPLAY1's frame window just big enough to enclose the movie and movie controller. This is accomplished with a combination of Windows calls and the routine `MCGetControllerBoundsRect` (previously discussed in part 10 of QuickTime for Windows Concept*s* in the overview).

As explained in the overview, once a movie is associated with a controller, it starts playing immediately (assuming it has a non-zero play rate, which is normally the case). To make a movie paused when first visible and associated with a new controller, you can use `MCDoAction` with an action of `mcActionPlay` and a play rate of 0. It is good style to do this as soon as possible after performing the association.

It is important to note again that movies and movie controllers are not married for life. Movie controllers can be dynamically reassigned to movies at any point in your program, providing they are properly initialized. Destroying one does not destroy the other, nor does disconnecting a movie/movie controller pair disable either component. You will learn various ways to exploit this feature as you explore this tutorial.

Modifying the Window Procedure

The single piece of QuickTime for Windows code in `WndProc` is the routine `MCIsPlayerMessage`, but it wields significant power. Its parameters are:

- `mcController`, the movie controller object initialized in `NewMovieController`
- `hWnd`, the main window handle of WINPLAY1
- `message`, `wParam` and `lParam`, the same parameters passed in to `WndProc`.

To elaborate on the overview, the job of `MCIsPlayerMessage` is to redirect all messages targeted for the movie controller. If a message received by `WndProc` is not meant for the movie controller, `MCIsPlayerMessage` returns 0 and the message gets processed normally. If the message is supposed to be handled by the movie controller, `MCIsPlayerMessage` returns non-zero and the message does not get handled by `WINDPLAY1`.

Remember that for each movie controller you create, you have to code a separate call to `MCIsPlayerMessage` *with the corresponding* `mcController` *variable as the first parameter. Since WINPLAY1 creates a single controller, we only make the call once.*

Cleaning Up

Before WINPLAY1 exits, it needs to make sure it has not left any garbage lying around or kept any resources tied up. We do this in three stages, conceptually the reverse order of how the initialization was handled. First, we destroy the movie controller by calling `DisposeMovieController`, which takes the `mcController` object as its only parameter, and needs to be called for every movie controller you have created.

Second, the movie is released by executing `DisposeMovie`. This, too, is required for each movie you have instantiated, with the appropriate `mMovie` object as its sole parameter. Finally, `ExitMovies` (if your application plays movies) and `QTTerminate` are invoked. Like their counterparts that handle QuickTime for Windows initialization, they must only be called once by your program. As noted in the overview, executing `QTInitialize` is not required, but is recommended for good overall style.

Remember that while destroying a window with a movie controller in it causes the function `DisposeMovieController` *to be called internally for that controller, this is a safety feature only. Good QuickTime for Windows style dictates specifically disposing the controller.*

Running WINPLAY1.EXE

Having successfully compiled and linked WINPLAY1.EXE, you will want to fire it up and watch it play a movie. Before you do, however, you need to check that the movie name hard coded in the `OpenMovieFile` routine matches the file name and location of the movie you expect to play. Since WINPLAY1.EXE only specifies the movie name (and not the path), make sure SAMPLE.MOV is in the same directory as WINPLAY1.EXE before you run it. If you want to play other movies without rebuilding WINPLAY1.EXE, you can copy any other sample movie files to the directory containing WINPLAY1.EXE, using the hard coded movie name as a target file name.

Figure 20. Running WINPLAY1.EXE.

Once you have made sure WINPLAY1.EXE can find its data, you should try to run it, preferably using the **Run** option under the Program Manager's **File** menu item (see Figure 20). Clicking on the face of the movie window or the start button in the movie controller will run the movie. Now is probably a good time to experiment with the other movie controller buttons to get a feel for its basic operation.

STEREO - Managing Multiple Movies

Introduction

Now that you can play a movie in a Windows program, you should next understand the issues of dealing with various movies in the same application. In this section, you will create a program called STEREO.EXE which plays two movies simultaneously and lets you dynamically detach their controllers. The concepts we'll explore include:

- Active and inactive states of movies and movie controllers
- Attached and detached movie controllers
- Resizing movies and movie controllers
- Multiple calls to `MCIsPlayerMessage` in a window procedure.

The STEREO Source Code

Before getting into the STEREO.C listing, you should note that the Common Dialog Box Library is used to create the Open Movie dialog box. COMMDLG.LIB is included on the link line of STEREO.MAK.

STEREO.MAK

```
ALL : STEREO.EXE

STEREO.OBJ : STEREO.C STEREO.H
 cl -c -AS -DSTRICT -G2 -Zpel -W3 -WX -Od stereo.c

STEREO.RES : STEREO.RC STEREO.H
 rc -r stereo.rc

STEREO.EXE : STEREO.OBJ STEREO.RES STEREO.DEF
 link /nod /a:16 stereo, stereo.exe, nul, qtw commdlg libw slibcew, \
    stereo.def;
 rc stereo.res
```

STEREO.DEF

```
NAME        STEREO
DESCRIPTION 'Sample Application'
EXETYPE     WINDOWS
STUB        'winstub.exe'
CODE        PRELOAD MOVEABLE DISCARDABLE
DATA        PRELOAD MOVEABLE MULTIPLE
HEAPSIZE    1024
STACKSIZE   16384
```


\STEREO.H

```
#define IDM_OPEN          1
#define IDM_ATTACH        2
#define IDM_DETACH        3
```

STEREO.RC

```
#include <windows.h>
#include "stereo.h"

stereo MENU
  {
  POPUP "&File"
    {
    MENUITEM "&Open...", IDM_OPEN
    }
  POPUP "&Action"
    {
    MENUITEM "&Attach Controller", IDM_ATTACH
    MENUITEM "&Detach Controller", IDM_DETACH
    }
  }
```

STEREO.C

```
#include <windows.h>
#include <commdlg.h>
#include <string.h>
#include <stdlib.h>
#include <direct.h>
#include <qtw.h>
#include "stereo.h"

#ifdef __BORLANDC__
   #define _getcwd getcwd
#endif

long FAR PASCAL __export WndProc (HWND, UINT, WPARAM, LPARAM);
VOID CalcSize (HWND);

RECT rcLeft, rcRight, rcMovieBox, rcClient;
MovieController mcLeft, mcRight, mcActive;

int PASCAL WinMain (HINSTANCE hInstance, HINSTANCE hPrevInstance,
   LPSTR lpszCmdParam, int nCmdShow)
   {
   static char szAppName [] = "Stereo";
   HWND        hWnd;
   MSG         msg;
   WNDCLASS    wndclass;

// Establish links to QuickTime for Windows

   if (QTInitialize (NULL))
      {
```



```
      MessageBox (NULL, "QTInitialize failure", szAppName, MB_OK);
      return 0;
      }

// Allocate memory required for playing movies

   if (EnterMovies ())
      {
      MessageBox (NULL, "EnterMovies failure", szAppName, MB_OK);
      return 0;
      }

// Register and create main window

   if (!hPrevInstance)
      {
      wndclass.style         = CS_DBLCLKS | CS_HREDRAW | CS_VREDRAW;
      wndclass.lpfnWndProc   = WndProc;
      wndclass.cbClsExtra    = 0;
      wndclass.cbWndExtra    = 0;
      wndclass.hInstance     = hInstance;
      wndclass.hIcon         = LoadIcon (NULL,IDI_APPLICATION);
      wndclass.hCursor       = LoadCursor (NULL, IDC_ARROW);
      wndclass.hbrBackground = (HBRUSH) (COLOR_WINDOW + 1);
      wndclass.lpszMenuName  = szAppName;
      wndclass.lpszClassName = szAppName;

      if (!RegisterClass (&wndclass))
         {
         MessageBox (NULL, "RegisterClass failure", szAppName, MB_OK);
         return 0;
         }
      }

   hWnd = CreateWindow (szAppName, szAppName, WS_OVERLAPPEDWINDOW |
      WS_CLIPCHILDREN, CW_USEDEFAULT, CW_USEDEFAULT, CW_USEDEFAULT,
      CW_USEDEFAULT, NULL, NULL, hInstance, NULL);

   if (hWnd == NULL)
      {
      MessageBox (NULL, "CreateWindow failure", szAppName, MB_OK);
      return 0;
      }

// Show the main window

   ShowWindow (hWnd, nCmdShow);
   UpdateWindow (hWnd);

// Play the movies

   while (GetMessage (&msg, NULL, 0, 0))
      {
      TranslateMessage (&msg);
      DispatchMessage (&msg);
      }

// Cut the connections to QuickTime for Windows
```



```
   ExitMovies ();
   QTTerminate ();

// Return to Windows

   return msg.wParam;
   }

long FAR PASCAL __export WndProc (HWND hWnd, UINT message,
   WPARAM wParam, LPARAM lParam)
   {
   OPENFILENAME ofn;
   PAINTSTRUCT ps;
   Boolean bLeft;
   POINT ptMovie;
   MovieFile mfMovie;

   static Movie mLeft, mRight;

   static char szDirName [256];
   static char szFile [256];
   static char szFileTitle [256];

// Drive the movie controllers

   if (MCIsPlayerMessage (mcLeft, hWnd, message, wParam, lParam)
    || MCIsPlayerMessage (mcRight, hWnd, message, wParam, lParam))
      return 0;

// Process window messages

   switch (message)
      {

   // Create empty movie controllers when main window is created

      case WM_CREATE:

         SetRectEmpty (&rcMovieBox);
         SetRectEmpty (&rcClient);

         mcLeft = NewMovieController (NULL, &rcClient,
            mcNotVisible, hWnd);
         mcRight = NewMovieController (NULL, &rcClient,
            mcNotVisible, hWnd);
         return 0;

   // Process menu commands

      case WM_COMMAND:

         switch (wParam)
            {

         // Use COMMDLG to open a movie file

            case IDM_OPEN:
```



```
            memset (&ofn, 0, sizeof (ofn));
            ofn.lStructSize = sizeof (ofn);
            ofn.hwndOwner = hWnd;
            ofn.lpstrFilter = "Movies (*.mov)\0*.mov\0\0";
            ofn.nFilterIndex = 1;
            ofn.lpstrFile = szFile;
            ofn.nMaxFile = sizeof (szFile);
            ofn.lpstrFileTitle = szFileTitle;
            ofn.nMaxFileTitle = sizeof (szFileTitle);
            ofn.lpstrInitialDir =
               _getcwd (szDirName, sizeof (szDirName));
            ofn.Flags = OFN_PATHMUSTEXIST | OFN_FILEMUSTEXIST;

            if (GetOpenFileName (&ofn) &&
               (OpenMovieFile (ofn.lpstrFile, &mfMovie,
               OF_READ) == noErr))
               {
               RECT rcGrowBox;

            // Dispose of any existing movies

               DisposeMovie (mLeft);
               DisposeMovie (mRight);

            // Extract two instances of the same movie

               NewMovieFromFile (&mLeft, mfMovie, NULL, NULL,
                  0, NULL);
               NewMovieFromFile (&mRight, mfMovie, NULL, NULL,
                  0, NULL);
               CloseMovieFile (mfMovie);

            // Get the normal dimensions of the movie

               GetMovieBox (mLeft, &rcMovieBox);
               OffsetRect (&rcMovieBox, -rcMovieBox.left,
                  -rcMovieBox.top);

            // Calculate initial positions of controllers

               GetClientRect (hWnd, &rcClient);
               rcLeft.top = rcRight.top = rcClient.top +
                 (rcClient.bottom / 2) - (rcMovieBox.bottom / 2);
               rcLeft.bottom = rcRight.bottom = rcClient.top +
                 (rcClient.bottom / 2) + (rcMovieBox.bottom / 2);
               rcLeft.left = (rcClient.right / 4)
                 - (rcMovieBox.right / 2);
               rcLeft.right = rcLeft.left + rcMovieBox.right;
               rcRight.left = (rcClient.right / 2)
                 + (rcClient.right / 4)
                 - (rcMovieBox.right / 2);
               rcRight.right = rcRight.left + rcMovieBox.right;

            // Associate the movies with the existing controllers

               ptMovie.x = rcLeft.left;
               ptMovie.y = rcLeft.top;
```



```
                MCSetMovie (mcLeft, mLeft, hWnd, ptMovie);

                ptMovie.x = rcRight.left;
                ptMovie.y = rcRight.top;
                MCSetMovie (mcRight, mRight, hWnd, ptMovie);

            // Pause the movies

                MCDoAction (mcLeft, mcActionPlay, 0);
                MCDoAction (mcRight, mcActionPlay, 0);

            // Center the movies

                MCPositionController (mcLeft, &rcLeft,
                   NULL, mcTopLeftMovie + mcScaleMovieToFit);
                MCPositionController (mcRight, &rcRight,
                   NULL, mcTopLeftMovie + mcScaleMovieToFit);

            // Make the controllers visible

                MCSetVisible (mcLeft, TRUE);
                MCSetVisible (mcRight, TRUE);

            // Make both movies active and the right mc inactive

                SetMovieActive (mLeft, TRUE);
                SetMovieActive (mRight, TRUE);
                MCActivate (mcRight, hWnd, FALSE);

            // Eliminate the grow boxes

                SetRectEmpty (&rcGrowBox);
                MCDoAction (mcLeft, mcActionSetGrowBoxBounds,
                   &rcGrowBox);
                MCDoAction (mcRight, mcActionSetGrowBoxBounds,
                   &rcGrowBox);
                }
            return 0;

     // Change active controller to attached

           case IDM_ATTACH:

              MCSetControllerAttached (mcActive, TRUE);
              return 0;

     // Change active controller to detached

           case IDM_DETACH:
              {
              RECT rcMCRect;
              SHORT sMCHeight;

           // Detach the controller

              MCSetControllerAttached (mcActive, FALSE);

           // Choose the appropriate movie/movie controller
```



```
            if (mcActive == mcLeft)
               {

            // Get the bounds rect for the controller only
            // since it is now detached

               MCGetControllerBoundsRect (mcLeft, &rcMCRect);
               OffsetRect (&rcMCRect, -rcMCRect.left, -rcMCRect.top);

            // Save the controller height

               sMCHeight = rcMCRect.bottom - rcMCRect.top;

            // Move the controller down

               memcpy (&rcMCRect, &rcLeft, sizeof (RECT));
               rcMCRect.top = rcLeft.bottom +
                  (rcMovieBox.bottom / 2);
               rcMCRect.bottom = rcMCRect.top + sMCHeight;
               MCPositionController (mcLeft, &rcLeft, &rcMCRect,
                  mcTopLeftMovie);
               }

            else
               {

            // Get the bounds rect for the controller only
            // since it is now detached

               MCGetControllerBoundsRect (mcRight, &rcMCRect);
               OffsetRect (&rcMCRect, -rcMCRect.left, -rcMCRect.top);

            // Save the controller height

               sMCHeight = rcMCRect.bottom - rcMCRect.top;

            // Move the controller down

               memcpy (&rcMCRect, &rcRight, sizeof (RECT));
               rcMCRect.top = rcRight.bottom +
                  (rcMovieBox.bottom / 2);
               rcMCRect.bottom = rcMCRect.top + sMCHeight;
               MCPositionController (mcRight, &rcRight, &rcMCRect,
                  mcTopLeftMovie);
               }
            }
            return 0;
         }
         return 0;

// Center the controllers in the left and right halves of the window

   case WM_SIZE:

   // Attach the controllers

      MCSetControllerAttached (mcLeft, TRUE);
```



```
        MCSetControllerAttached (mcRight, TRUE);

        CalcSize (hWnd);
        MCSetControllerBoundsRect (mcLeft, &rcLeft);
        MCSetControllerBoundsRect (mcRight, &rcRight);
        return 0;

     case WM_LBUTTONDOWN:
        {
        SFIXED sfxVolume;

     // Activate the controller selected by the mouse click

        GetClientRect (hWnd, &rcClient);
        bLeft = (SHORT) (LOWORD (lParam)) < ((rcClient.right -
           rcClient.left) / 2);
        mcActive = bLeft ? mcLeft : mcRight;
        MCActivate (mcLeft, hWnd, bLeft);
        MCActivate (mcRight, hWnd, !bLeft);

     // Disable sound and keyboard interface for appropriate controller

        if (mcActive == mcLeft)
           {
           MCDoAction (mcRight, mcActionGetVolume, (LPVOID)
              &sfxVolume);
           sfxVolume = - (abs (sfxVolume));
           MCDoAction (mcRight, mcActionSetVolume, (LPVOID) sfxVolume);

           MCDoAction (mcRight, mcActionSetKeysEnabled,
              (LPVOID) FALSE);
           }

        else
           {
           MCDoAction (mcLeft, mcActionGetVolume, (LPVOID) &sfxVolume);
           sfxVolume = - (abs (sfxVolume));
           MCDoAction (mcLeft, mcActionSetVolume, (LPVOID) sfxVolume);

           MCDoAction (mcLeft, mcActionSetKeysEnabled, (LPVOID) FALSE);
           }

     // Enable sound and keyboard for active controller

        MCDoAction (mcActive, mcActionGetVolume, (LPVOID) &sfxVolume);
        sfxVolume = abs (sfxVolume);
        MCDoAction (mcActive, mcActionSetVolume, (LPVOID) sfxVolume);

        MCDoAction (mcActive, mcActionSetKeysEnabled, (LPVOID) TRUE);
        }
        return 0;

  // Repaint the Window

     case WM_PAINT:

        if (!BeginPaint (hWnd, &ps))
           return 0;
```



```
         EndPaint (hWnd, &ps);
         return 0;

   // Destroy the movies and controllers when the window is destroyed

      case WM_DESTROY:

         DisposeMovieController (mcLeft);
         DisposeMovieController (mcRight);
         DisposeMovie (mLeft);
         DisposeMovie (mRight);
         PostQuitMessage (0);
         return 0;
      }

// Return to Windows

   return DefWindowProc (hWnd, message, wParam, lParam);
   }

VOID CalcSize (HWND hWndCaller)
   {
   RECT rcBounds;

   GetClientRect (hWndCaller, &rcClient);

   MCGetControllerBoundsRect (mcLeft, &rcBounds);
   OffsetRect (&rcBounds, -rcBounds.left, -rcBounds.top);

   rcLeft.top = rcRight.top = rcClient.top +
      (rcClient.bottom / 2) - (rcBounds.bottom / 2);

   rcLeft.bottom = rcRight.bottom = rcClient.top +
      (rcClient.bottom / 2) + (rcBounds.bottom / 2);

   rcLeft.left = (rcClient.right / 4) - (rcBounds.right / 2);
   rcLeft.right = (rcClient.right / 4) + (rcBounds.right / 2);

   MCGetControllerBoundsRect (mcRight, &rcBounds);
   OffsetRect (&rcBounds, -rcBounds.left, -rcBounds.top);

   rcRight.left = (rcClient.right / 2) + (rcClient.right / 4)
      - (rcBounds.right / 2);
   rcRight.right = (rcClient.right / 2) + (rcClient.right / 4)
      + (rcBounds.right / 2);
   }
```

Understanding Active and Inactive Movie States

As we learned in the overview, both movies and movie controllers have active and inactive states. While they are easy to set, it is still important to remember two things: these states do not affect QuickTime for Windows programs in parallel ways, and more than one movie or controller can be active simultaneously.

A movie's state can be set by `SetMovieActive`, whose parameters are the movie object and a value of either `TRUE` (for active) or `FALSE` (for inactive). An inactive movie simply is not played--it does not receive cycles from QuickTime for Windows' internal scheduler. Don't confuse a movie's active state with its playing/paused state. In other words, calling `SetMovieActive` should not be used to start or stop playing a movie.

A movie controller's state can be set by `MCActivate` with its last parameter set to `TRUE` or `FALSE`. Again, since movie controllers generally mirror the behavior of standard Windows controls, it is useful to view an inactive movie controller as a disabled Windows control. It cannot receive user input (i.e. mouse clicks, since keyboard input is enabled separately) and its appearance is grayed. Movie controllers are created with an active state by default.

A movie/movie controller pair can easily have opposing states. For instance, an active movie can have an inactive controller, and vice versa. In the former case, a playing movie's controller can be deactivated, graying it and prohibiting further user input, but the movie will keep playing. In the latter, clicking the start button on an inactive movie's active controller will not play the movie.

Since more than one movie or movie controller can have active or inactive status under QuickTime for Windows itself, it is the application's responsibility to identify and keep track of its own *application specific* active movies, movie controllers and controller attributes (e.g., sound and keyboard states). Any serious QuickTime for Windows program design must be aware of and incorporate this paradigm if it expects to effectively route events and call QuickTime for Windows functions with appropriate movie and movie controller objects.

STEREO addresses the issue in an elementary way using a variable called `mcActive`. Whenever a movie controller is activated by a user input event (i.e. a mouse click), the movie controller object linked to the window area which received the click is copied into this variable. (This is merely a convention used to simplify our sample program--see the code fragment below). As a result, routines using the program's active movie controller object pass `mcActive` instead of the variable that received the original controller object.

STEREO calls `MCActivate` on what it deems *its* non-active controller with the last parameter set to `FALSE`, setting it to a QuickTime for Windows inactive state. This in turn causes the controller's elements to be grayed (see Figure 21).


```
case WM_LBUTTONDOWN:
   •
   •
// Activate the controller selected by the mouse click

   GetClientRect (hWnd, &rcClient);
   bLeft = (SHORT) (LOWORD (lParam)) < ((rcClient.right -
      rcClient.left) / 2);
   mcActive = bLeft ? mcLeft : mcRight;
   MCActivate (mcLeft, hWnd, bLeft);
   MCActivate (mcRight, hWnd, !bLeft);
   •
   •
   return 0;
```

Visualizing Attached and Detached Movie Controllers

A movie controller is attached to or detached from a movie also by an explicit QuickTime for Windows function call, such as `MCSetControllerAttached`. Once attached, it is automatically associated and normally appears joined to the bottom edge of the movie (under uncommon circumstances they may be programatically attached but not physically joined). When the controller is used for resizing, both it and the movie grow or shrink together. If the application repositions either one of them, they both travel in unison.

Detached movie controllers are not joined physically to their movies (as above, this is the normal condition--sometimes they may be programatically detached but not separated). Although they play their movies just like attached controllers, repositioning or resizing one does not necessarily affect the other. As you will see in this tutorial, detached movie controllers can perform some very useful functions.

You cannot create a detached movie controller from scratch. If your program requires one, you have to detach an existing attached controller. STEREO plays with this idea a little by creating a pair of movie controllers using `NewMovieController` with its first parameter set to NULL, then associating them with movies when they are opened.

The other parameters are the address of the `RECT` containing the controller's screen coordinates--in this case all zeros, the controller creation flags and the parent window handle. Creation flags are discussed in subsection D, part 4, and in Section III, *Programmer's Reference*.

STEREO's two movie controllers are created early (and invisibly) to simplify the flow of this tutorial application. Not only that, they also play the same movie--eventually. Nevertheless, the program demonstrates several important differences between attached and detached controllers, as well as QuickTime for Windows' high degree of flexibility in handling them and its other components.

Attaching Movie Controllers to Movies

As explained in the overview, the function `MCNewAttachedController` is often used to both associate and attach movies and movie controllers. STEREO uses `MCSetMovie` instead to simply associate them. Its significant parameters are `PtLeft` and `PtRight`, the upper left corners of the movies relative to their parent window.

STEREO calls `MCSetMovie` on its existing controllers as soon as a movie is selected for opening, detaches them for proper sizing of their movie rectangles, then re-attaches them and makes them visible. We now have two otherwise normal movies with attached movie controllers ready for playing. But this is not the only way to attach a movie controller to a movie, as you can infer by using the **Action** menu to dynamically detach and re-attach them even while they are running.

Detaching and Re-attaching a Movie Controller

Pulling down the **Action** menu gives you **Attach Controller** and **Detach Controller** options for the application's active movie controller. If the controller is not attached, selecting **Attach Controller** causes it to jump to its appropriate attached position. The routine used for this purpose is `MCSetControllerAttached`, which takes as parameters the movie controller object and the Boolean value `TRUE`.

Selecting the **Detach Controller** menu item when the controller is currently attached to a movie triggers two significant events. First, `MCSetControllerAttached` is called with a value of `FALSE`. This alone, however, does not physically separate the movie controller from the movie. To split them apart you need `MCPositionController`.

The parameters of interest are the addresses of the `RECT` structures for the desired coordinates of the movie and the movie controller. If we had wanted to *query* the attachment state of the movie controller so we could, say, gray the appropriate menu item, we could have used the routine `MCIsControllerAttached`.

STEREO uses numbers which set the resulting detached controllers at arbitrary distances slightly below their movies, but your future programs could use values which have real meaning in developing a consistent user interface for your QuickTime for Windows applications. For example, your detached movie controllers could be handled like custom menus or tool bars in terms of their default positions and where the user of the application might expect to find them if not attached to their movies.

Resizing Movies and Movie Controllers

Just as it is the application's job to designate and track its own active movie controller(s), it must also handle changing movie and movie controller dimensions if the application's window is resized. STEREO does this under the WM_SIZE case in its window procedure, using the routine `MCSetControllerBoundsRect`.

When a WM_SIZE message is received, the program gets the coordinates of the client rectangle. It then bisects that area vertically to derive left and right sub-rectangles for each movie, which are supplied with slight offsets to `MCSetControllerBoundsRect` The function centers the resized movies and controllers in the new rectangles.

In your own QuickTime for Windows programs you may not want to resize your movies with your program windows. STEREO does it to show you the power of this particular call.

Calling MCIsPlayerMessage More than Once

Each movie controller that you want to receive messages must have a corresponding `MCIsPlayerMessage` call in the window procedure of its parent window. STEREO.C contains two instances of the routine, each one with a different controller object.

As your QuickTime for Windows programs get more complex, this is one of the points where you should carefully design the handling of their movie controller messages. For instance, you might keep an array of controller objects and call `MCIsPlayerMessage` in a `for` loop, passing specific objects conditionally, etc. Again, you will have to decide the best way to handle this.

Running STEREO.EXE

When STEREO.EXE is executed, the movie controllers will not be visible in the client area of the main window, since no movie is open yet. When a movie is opened from the file menu, each controller will become visible and attach itself to one of the two movies which will appear in STEREO's client area. The left one is initially set to an active state, and the right one made inactive. At that point the program's user interface should resemble Figure 21.

Figure 21. Running STEREO.EXE

As you experiment with the **Action** menu, your movie controllers will become detached and could ultimately look like Figure 22. You will notice that while the visual parts of both movies can play simultaneously, only the sound track of the active movie will be played. This is a Windows limitation--not a condition that can be controlled with the QuickTime for Windows API.

Figure 22. STEREO.EXE with Detached Movie Controllers.

BIGEIGHT - Movie Controller Attributes

Introduction

Beyond basic characteristics like association and attachment, movie controllers have many other useful attributes. The next sample program, BIGEIGHT.EXE, allows you to switch on and off eight of these attributes for a single detached movie controller. The attributes demonstrated are: controller visibility, speaker button visibility, step button visibility, grow box visibility, sound availability, keyboard interface availability, movie looping and palindrome looping modes.

The BIGEIGHT Source Code

BIGEIGHT.MAK

```
ALL : BIGEIGHT.EXE

BIGEIGHT.OBJ : BIGEIGHT.C
 cl -c -AS -DSTRICT -G2 -Zpel -W3 -WX -Od bigeight.c

BIGEIGHT.RES : BIGEIGHT.RC BIGEIGHT.H
 rc -r bigeight.rc

BIGEIGHT.EXE : BIGEIGHT.OBJ BIGEIGHT.RES BIGEIGHT.DEF
 link /nod /a:16 bigeight, bigeight.exe, nul, qtw libw slibcew, \
    bigeight.def
 rc bigeight.res
```

BIGEIGHT.DEF

```
NAME        BIGEIGHT
DESCRIPTION 'Sample Application'
EXETYPE     WINDOWS
STUB        'winstub.exe'
CODE        PRELOAD MOVEABLE DISCARDABLE
DATA        PRELOAD MOVEABLE MULTIPLE
HEAPSIZE    1024
STACKSIZE   16384
```

BIGEIGHT.H

```
#define IDM_CONTROLLER     1
#define IDM_GROW_BOX       2
#define IDM_KEYBOARD       3
#define IDM_LOOPING        4
#define IDM_PALINDROME     5
#define IDM_SOUND          6
#define IDM_SPEAKER_BUTTON 7
#define IDM_STEP_BUTTONS   8
```


BIGEIGHT.RC

```
#include <windows.h>
#include "bigeight.h"

bigeight MENU
  {
  POPUP "&Attributes"
    {
    MENUITEM "&Hide Controller", IDM_CONTROLLER
    MENUITEM "&Hide Step Buttons", IDM_STEP_BUTTONS
    MENUITEM "&Hide Speaker Button", IDM_SPEAKER_BUTTON
    MENUITEM "&Hide Grow Box", IDM_GROW_BOX
    MENUITEM SEPARATOR
    MENUITEM "&Disable Keyboard Interface", IDM_KEYBOARD
    MENUITEM "&Disable Sound", IDM_SOUND
    MENUITEM "&Enable Looping", IDM_LOOPING
    MENUITEM "&Enable Palindrome Looping", IDM_PALINDROME
    }
  }
```

BIGEIGHT.C

```
#include <windows.h>
#include <qtw.h>
#include "bigeight.h"

long FAR PASCAL __export WndProc (HWND, UINT, WPARAM, LPARAM);

MovieController mcController;

int PASCAL WinMain (HINSTANCE hInstance, HINSTANCE hPrevInstance,
   LPSTR lpszCmdParam, int nCmdShow)
   {
   static char szAppName[] = "BigEight";
   HWND        hWnd;
   MSG         msg;
   WNDCLASS    wndclass;
   Movie       mMovie;
   RECT        rcMovie, rcMovieBox;
   MovieFile   mfMovie;

// Establish links to QuickTime for Windows

   if (QTInitialize (NULL))
      {
      MessageBox (NULL, "QTInitialize failure", szAppName, MB_OK);
      return 0;
      }

// Allocate memory required for playing movies

   if (EnterMovies ())
      {
      MessageBox (NULL, "EnterMovies failure", szAppName, MB_OK);
      return 0;
```



```
      }

// Register and create main window

   if (!hPrevInstance)
      {
      wndclass.style         = CS_DBLCLKS | CS_HREDRAW | CS_VREDRAW;
      wndclass.lpfnWndProc   = WndProc;
      wndclass.cbClsExtra    = 0;
      wndclass.cbWndExtra    = 0;
      wndclass.hInstance     = hInstance;
      wndclass.hIcon         = LoadIcon (NULL,IDI_APPLICATION);
      wndclass.hCursor       = LoadCursor (NULL, IDC_ARROW);
      wndclass.hbrBackground = (HBRUSH) (COLOR_WINDOW + 1);
      wndclass.lpszMenuName  = szAppName;
      wndclass.lpszClassName = szAppName;

      if (!RegisterClass (&wndclass))
         {
         MessageBox (NULL, "RegisterClass failure", szAppName, MB_OK);
         return 0;
         }
      }

   hWnd = CreateWindow(szAppName, szAppName, WS_OVERLAPPEDWINDOW |
      WS_CLIPCHILDREN, CW_USEDEFAULT, CW_USEDEFAULT, CW_USEDEFAULT,
      CW_USEDEFAULT, NULL, NULL, hInstance, NULL);

   if (hWnd == NULL)
      {
      MessageBox (NULL, "CreateWindow failure", szAppName, MB_OK);
      return 0;
      }

// Instantiate the movie

   if (OpenMovieFile ("SAMPLE.MOV", &mfMovie, OF_READ) != noErr)
      {
      MessageBox (NULL, "OpenMovieFile failure", szAppName, MB_OK);
      return 0;
      }

   NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
   CloseMovieFile (mfMovie);

// Instantiate the movie controller

   GetMovieBox (mMovie, &rcMovieBox);
   OffsetRect(&rcMovieBox, -rcMovieBox.left, -rcMovieBox.top);

   GetClientRect (hWnd, &rcMovie);
   rcMovie.top = (rcMovie.bottom / 2) - (rcMovieBox.bottom / 2);
   rcMovie.bottom = rcMovie.top + rcMovieBox.bottom;
   rcMovie.left = (rcMovie.right / 2) - (rcMovieBox.right / 2);
   rcMovie.right = rcMovie.left + rcMovieBox.right;

   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit, hWnd);
```



```
// Make the movie paused initially

   MCDoAction (mcController, mcActionPlay, 0);

// Enable the keyboard interface

   MCDoAction (mcController, mcActionSetKeysEnabled, (LPVOID) TRUE);

// Make the movie active

   SetMovieActive (mMovie, TRUE);

// Make the main window visible

   ShowWindow (hWnd, nCmdShow);
   UpdateWindow (hWnd);

// Play the movie

   while (GetMessage (&msg, NULL, 0, 0))
      {
      TranslateMessage (&msg);
      DispatchMessage (&msg);
      }

// Destroy the movie controller

   DisposeMovieController (mcController);

// Destroy the movie

   DisposeMovie (mMovie);

// Cut the connections to QuickTime for Windows

   ExitMovies ();
   QTTerminate ();

// Return to Windows

   return msg.wParam;
   }

long FAR PASCAL __export WndProc (HWND hWnd, UINT message,
   WPARAM wParam, LPARAM lParam)
   {
   PAINTSTRUCT ps;
   RECT        rcGrowBox;

   static Boolean bControllerVisible = TRUE;
   static Boolean bGrowBoxVisible = TRUE;
   static Boolean bKeysEnabled = TRUE;
   static Boolean bLoopingEnabled = FALSE;
   static Boolean bPalindromeEnabled = FALSE;
   static Boolean bSoundEnabled = TRUE;
   static Boolean bSpeakerVisible = TRUE;
   static Boolean bSteppersVisible = TRUE;
```



```
// Drive the movie controller

   if (MCIsPlayerMessage (mcController, hWnd, message, wParam, lParam))
      return 0;

// Process the windows message

   switch (message)
      {
      case WM_COMMAND:
         {
         HANDLE hMenu;

         hMenu= GetMenu (hWnd);

         switch (wParam)
            {
            case IDM_CONTROLLER:
               {
               if (bControllerVisible == FALSE)
                  {

               // Change the controller menu item

                  ModifyMenu (hMenu, IDM_CONTROLLER, MF_BYCOMMAND |
                     MF_STRING, IDM_CONTROLLER,
                     (LPSTR) "Hide Controller");
                  bControllerVisible = TRUE;

               // Show the controller

                  MCSetVisible (mcController, TRUE);

               // Ungray the other menu itmes

                  EnableMenuItem (hMenu, IDM_STEP_BUTTONS, MF_ENABLED);
                  EnableMenuItem (hMenu, IDM_SPEAKER_BUTTON,
                     MF_ENABLED);
                  EnableMenuItem (hMenu, IDM_GROW_BOX, MF_ENABLED);
                  EnableMenuItem (hMenu, IDM_KEYBOARD, MF_ENABLED);
                  EnableMenuItem (hMenu, IDM_SOUND, MF_ENABLED);
                  EnableMenuItem (hMenu, IDM_LOOPING, MF_ENABLED);
                  EnableMenuItem (hMenu, IDM_PALINDROME, MF_ENABLED);
                  }

               else
                  {

               // Change the controller menu item

                  ModifyMenu (hMenu, IDM_CONTROLLER, MF_BYCOMMAND |
                     MF_STRING, IDM_CONTROLLER,
                     (LPSTR) "Show Controller");
                  bControllerVisible = FALSE;

               // Hide the controller
```



```
                MCSetVisible (mcController, FALSE);

            // Grey the rest of the menu items

                EnableMenuItem (hMenu, IDM_STEP_BUTTONS, MF_GRAYED);
                EnableMenuItem (hMenu, IDM_SPEAKER_BUTTON, MF_GRAYED);
                EnableMenuItem (hMenu, IDM_GROW_BOX, MF_GRAYED);
                EnableMenuItem (hMenu, IDM_KEYBOARD, MF_GRAYED);
                EnableMenuItem (hMenu, IDM_SOUND, MF_GRAYED);
                EnableMenuItem (hMenu, IDM_LOOPING, MF_GRAYED);
                EnableMenuItem (hMenu, IDM_PALINDROME, MF_GRAYED);
                }
            }
            break;

        case IDM_STEP_BUTTONS:
            {
            LONG lFlags;

            if (bSteppersVisible == FALSE)
                {

            // Change the step button menu item

                ModifyMenu (hMenu, IDM_STEP_BUTTONS, MF_BYCOMMAND |
                    MF_STRING, IDM_STEP_BUTTONS,
                    (LPSTR) "Hide Step Buttons");
                bSteppersVisible = TRUE;

            // Restore the step buttons

                MCDoAction (mcController, mcActionGetFlags, &lFlags);
                lFlags &= ~mcFlagSuppressStepButtons;
                MCDoAction (mcController, mcActionSetFlags,
                    (LPVOID) lFlags);
                }

            else
                {

            // Change the step button menu item

                ModifyMenu (hMenu, IDM_STEP_BUTTONS, MF_BYCOMMAND |
                    MF_STRING, IDM_STEP_BUTTONS,
                    (LPSTR) "Show Step Buttons");
                bSteppersVisible = FALSE;

            // Hide the step buttons

                MCDoAction (mcController, mcActionGetFlags, &lFlags);
                lFlags |= mcFlagSuppressStepButtons;
                MCDoAction (mcController, mcActionSetFlags,
                    (LPVOID) lFlags);
                }
            }
            break;

        case IDM_SPEAKER_BUTTON:
```



```
            {
            LONG lFlags;

            if (bSpeakerVisible == FALSE)
               {

            // Change the speaker button menu item

               ModifyMenu (hMenu, IDM_SPEAKER_BUTTON, MF_BYCOMMAND |
                  MF_STRING, IDM_SPEAKER_BUTTON,
                  (LPSTR) "Hide Speaker Button");
               bSpeakerVisible = TRUE;

            // Restore the speaker button

               MCDoAction (mcController, mcActionGetFlags, &lFlags);
               lFlags &= ~mcFlagSuppressSpeakerButton;
               MCDoAction (mcController, mcActionSetFlags,
                  (LPVOID) lFlags);
               }

            else
               {

            // Change the speaker button menu item

               ModifyMenu (hMenu, IDM_SPEAKER_BUTTON, MF_BYCOMMAND |
                  MF_STRING, IDM_SPEAKER_BUTTON,
                  (LPSTR) "Show Speaker Button");
               bSpeakerVisible = FALSE;

            // Hide the speaker button

               MCDoAction (mcController, mcActionGetFlags, &lFlags);
               lFlags |= mcFlagSuppressSpeakerButton;
               MCDoAction (mcController, mcActionSetFlags,
                  (LPVOID) lFlags);
               }
            }
            break;

         case IDM_GROW_BOX:
            {
            if (bGrowBoxVisible == FALSE)
               {

            // Change the grow box menu item

               ModifyMenu (hMenu, IDM_GROW_BOX, MF_BYCOMMAND |
                  MF_STRING, IDM_GROW_BOX, (LPSTR) "Hide Grow Box");
               bGrowBoxVisible = TRUE;

            // Set the grow box bounds to make it visible

               GetClientRect (hWnd, &rcGrowBox);
               MCDoAction (mcController, mcActionSetGrowBoxBounds,
                  &rcGrowBox);
               }
```



```
            else
               {

            // Change the grow box menu item

               ModifyMenu (hMenu, IDM_GROW_BOX, MF_BYCOMMAND |
                  MF_STRING, IDM_GROW_BOX,(LPSTR) "Show Grow Box");
               bGrowBoxVisible = FALSE;

            // Set the grow box bounds to all zeros to hide it

               SetRectEmpty (&rcGrowBox);
               MCDoAction (mcController, mcActionSetGrowBoxBounds,
                  &rcGrowBox);
               }
            }
            break;

         case IDM_KEYBOARD:
            {
            if (bKeysEnabled == FALSE)
               {

            // Change the keyboard interface menu item

               ModifyMenu (hMenu, IDM_KEYBOARD, MF_BYCOMMAND |
                  MF_STRING, IDM_KEYBOARD,
                  (LPSTR) "Disable Keyboard Interface");
               bKeysEnabled = TRUE;

            // Enable the keyboard interface

               MCDoAction (mcController, mcActionSetKeysEnabled,
                  (LPVOID) TRUE);
               }

            else
               {

            // Change the keyboard interface menu item

               ModifyMenu (hMenu, IDM_KEYBOARD, MF_BYCOMMAND |
                  MF_STRING, IDM_KEYBOARD,
                  (LPSTR) "Enable Keyboard Interface");
               bKeysEnabled = FALSE;

            // Disable the keyboard interface

               MCDoAction (mcController, mcActionSetKeysEnabled,
                  (LPVOID) FALSE);
               }
            }
            break;

         case IDM_SOUND:
            {
            SFIXED sfxVolume;
```



```
            if (bSoundEnabled == FALSE)
               {

            // Change the sound menu item

               ModifyMenu (hMenu, IDM_SOUND, MF_BYCOMMAND |
                  MF_STRING, IDM_SOUND, (LPSTR) "Disable Sound");

            // Restore the sound

               MCDoAction (mcController, mcActionGetVolume,
                  (LPVOID) &sfxVolume);
               sfxVolume = abs (sfxVolume);
               MCDoAction (mcController, mcActionSetVolume,
                  (LPVOID) sfxVolume);

               bSoundEnabled = TRUE;
               }

            else
               {

            // Mute the sound

               MCDoAction (mcController, mcActionGetVolume,
                  (LPVOID) &sfxVolume);
               sfxVolume = -(abs (sfxVolume));
               MCDoAction (mcController, mcActionSetVolume,
                  (LPVOID) sfxVolume);

               bSoundEnabled = FALSE;
               }
            }
            break;

         case IDM_LOOPING:
            {
            if (bLoopingEnabled == FALSE)
               {

            // Change the looping menu item

               ModifyMenu (hMenu, IDM_LOOPING, MF_BYCOMMAND |
                  MF_STRING, IDM_LOOPING, (LPSTR) "Disable Looping");
               bLoopingEnabled = TRUE;

            // Enable looping

               MCDoAction (mcController, mcActionSetLooping,
                  (LPVOID) TRUE);
               }

            else
               {

            // Change the looping menu item
```



```
                ModifyMenu (hMenu, IDM_LOOPING, MF_BYCOMMAND |
                   MF_STRING, IDM_LOOPING, (LPSTR) "Enable Looping");
                bLoopingEnabled = FALSE;

             // Disable looping

                MCDoAction (mcController, mcActionSetLooping,
                   (LPVOID) FALSE);
                }
             }
             break;

          case IDM_PALINDROME:
             {
             if (bPalindromeEnabled == FALSE)
                {

             // Change the palindrome menu item

                ModifyMenu (hMenu, IDM_PALINDROME, MF_BYCOMMAND |
                   MF_STRING, IDM_PALINDROME,
                   (LPSTR) "Disable Palindrome Looping");
                bPalindromeEnabled = TRUE;

             // Enable palindrome looping

                MCDoAction (mcController, mcActionSetLooping,
                   (LPVOID) TRUE);
                MCDoAction (mcController, mcActionSetLoopIsPalindrome,
                   (LPVOID) TRUE);
                }

             else
                {

             // Change the palindrome menu item

                ModifyMenu (hMenu, IDM_PALINDROME, MF_BYCOMMAND |
                   MF_STRING, IDM_PALINDROME,
                   (LPSTR) "Enable Palindrome Looping");
                bPalindromeEnabled = FALSE;

             // Disable palindrome looping

                MCDoAction (mcController, mcActionSetLooping,
                   (LPVOID) FALSE);
                MCDoAction (mcController, mcActionSetLoopIsPalindrome,
                   (LPVOID) FALSE);
                }
             }
             break;
          }
       }
       return 0;

    case WM_PAINT:

       if (!BeginPaint (hWnd, &ps))
```



```
            return 0;
         EndPaint (hWnd, &ps);
         return 0;

      case WM_DESTROY:

         PostQuitMessage (0);
         return 0;
      }

// Return to Windows

   return DefWindowProc (hWnd, message, wParam, lParam);
   }
```

The Power of MCDoAction

One of the most powerful routines in the QuickTime for Windows API is `MCDoAction`. As you can see in the BIGEIGHT.C listing, this function is used to change and query Movie Controller attributes. In QuickTime for Windows', `MCDoAction` is a key routine which can be used to dictate most of the Movie Controller's behavior. It is so versatile, in fact, that several other QuickTime for Windows routines use it internally to accomplish their particular tasks.

`MCDoAction` works by taking as its second parameter a particular defined action. There are over thirty-five such *mcActions* in the QuickTime for Windows API, ranging from starting the movie to toggling low-level attributes. In most cases, a third parameter is required to modify the task of the *mcAction* parameter. Often this is a Boolean value which turns a certain attribute on or off, or a pointer to a value holding state information:

```
MovieController mcController;
•
•
MCDoAction (mcController, mcActionSetKeysEnabled, (LPVOID) FALSE);
```

Actions and Flags

There are four components to the methods you use to determine attributes for a movie controller. The first is the collection of *mcActions* used by `MCDoAction`. A full listing of these actions is provided in Section III, *Programmer's Reference*.

Second is a group of flags used specifically by `MCDoAction` when it specifies the *mcActions* `mcActionSetFlags` or `mcActionGetFlags`:

Flag	Function
mcFlagSuppressStepButtons	Inhibit display of step buttons
mcFlagSuppressSpeakerButton	Inhibit display of speaker button
mcFlagsUseWindowPalette	Use a Windows palette to display movies

BIGEIGHT uses the first and second flags in the above list when it hides its movie controller's step and speaker buttons:

```
case IDM_SPEAKER_BUTTON:
   •
   •
   MCDoAction (mcController, mcActionGetFlags, &lFlags);
   lFlags |= mcFlagSuppressSpeakerButton;
   MCDoAction (mcController, mcActionSetFlags, (LPVOID) lFlags);
```

Use of the flag `mcFlagsUseWindowPalette` is slightly more complex, as it involves the Windows palette manager. Telling a movie controller to use this flag instructs it to construct a color palette based on the color table information found in the movie.

For instance, a particular movie might be of a sunset with fifty shades of orange. If the normal palette is used, these would all be mapped to a much smaller number of orange-ish hues. If a custom palette is used, additional shades of orange will be available for a much more faithful display. You should note that using `mcFlagsUseWindowPalette` only works with display drivers that support palettes--typically drivers that handle colors at pixel depth eight. Further information on this flag may be found in Section III, *Programmer's Reference*.

Also be aware that any program you are running that calls `RealizePalette` will distort other visible movies or pictures. This is because the palette on which the other images were based has changed. To restore them as well as possible, it is recommended that each of your QuickTime for Windows applications trap the `WM_PALETTECHANGED` message in its main window procedure. When this message is received, they should repaint their main windows and all child windows (using `InvalidateRect` is recommended) to remap their colors as closely as possible to the newly realized system palette.

The third set of flags constitutes a long integer and can be referred to as the *mcInfoFlags*. These flags hold state information set by `MCDoAction` with one of its *mcActions*, and can be retrieved by the function `MCGetControllerInfo`, as we saw in the overview. A table with these flags is presented in part 11, subsection A, of the overview.

The last group of flags are used to set movie controller attributes at creation time, not in conjunction with a `MCDoAction` call:

Flag	**Function**
mcTopLeftMovie	positions movie in top left corner of Movie rectangle
mcScaleMovieToFit	makes movie fit exactly into movie rectangle
mcWithBadge	makes movie controller capable of badge display
mcNotVisible	makes movie controller invisible when created

These flags are used by the routine `NewMovieController` when a movie controller is created. The first two are used by `MCPositionController` when a controller is repositioned. BIGEIGHT uses two of them to instantiate its controller:

```
MovieController mcController;
Movie mMovie;
RECT rcMovie;
•
•
mcController = NewMovieController (mMovie, &rcMovie,
   mcTopLeftMovie + mcScaleMovieToFit + mcWithBadge, hWnd);
```

As the states of these flags are not maintained by a movie controller, the QuickTime for Windows API does not provide a way to query them.

Regulating Movie Controller Attributes with MCDoAction

One of the first uses BIGEIGHT makes of `MCDoAction` is to enable the movie controller's keyboard interface:

```
MovieController mc;
•
•
MCDoAction (mcController, mcActionSetKeysEnabled, (LPVOID) TRUE);
```

An inactive keyboard interface is the default attribute for a new movie controller, but you can enable it at any time by calling `MCDoAction` as above with the last parameter set to `TRUE`. A list of the keyboard actions supported by the interface appears in part 4 of the overview. BIGEIGHT lets you toggle this attribute on and off using its attributes menu.

The default visible attributes of a movie controller are the speaker button, the start/pause button, the slider, the step buttons and the grow box (for attached controllers only). Of these, the speaker, the steppers and the grow box can be made invisible, though not all in the same way.

A controller's speaker and step buttons may be hidden or restored using `MCDoAction` with `mcActionSetFlags` and either `mcFlagSuppressSpeakerButton` or `mcFlagSuppressStepButton`, respectively:

```
case IDM_STEP_BUTTONS:
   •
   •
   MCDoAction (mcController, mcActionGetFlags, &lFlags);
   lFlags |= mcFlagSuppressStepButtons;
   MCDoAction (mcController, mcActionSetFlags, (LPVOID) lFlags);
```


In BIGEIGHT, the current flags are retrieved, modified and reset in as short a time as possible. This is good QuickTime for Windows programming style for a couple of reasons. First, you should not attempt to maintain a set of these flags yourself. The are managed by QuickTime for Windows and subject to its own internal functionality. Also, like Windows itself, QuickTime for Windows is a complex message-based entity that expects you to deal efficiently with any state information it makes available to you.

Hiding the grow box also uses `MCDoAction`, but with a different action parameter, namely `mcActionSetGrowBoxBounds`:

```
case IDM_GROW_BOX:
   •
   •
   SetRectEmpty (&rcGrowBox);
   MCDoAction (mcController, mcActionSetGrowBoxBounds, &rcGrowBox);
```

What actually hides the grow box are the dimensions of the third parameter, `rcMovie`, which have all been set to 0 by the Windows function `SetRectEmpty`. This is the only way to hide a movie controller's grow box.

BIGEIGHT calls `MCDoAction` the same way to restore the grow box, but with a non-zeroed rectangle. In this case, the client area of the parent window is used nominally.

The looping and looping palindrome attributes affect how a movie plays once it has been started by its controller. Simple looping specifies that the movie play continuously from start to finish until it is stopped by the user. Palindrome looping causes it to play continuously back and forth. `MCDoAction` has defined actions for both the looping and palindrome attributes. The third parameter in either case is a Boolean, which is used to toggle the attributes on or off. For palindrome looping to work, both normal looping and palindrome looping have to be enabled.

```
case IDM_PALINDROME:

   MCDoAction (mcController, mcActionSetLooping, (LPVOID) TRUE);
   MCDoAction (mcController, mcActionSetLoopIsPalindrome,
      (LPVOID) TRUE);
```

To query the state of the looping attributes, you can call `MCGetControllerInfo` and then examine the variable it fills with the attribute flags discussed above.

Turning the sound off involves using `MCDoAction` to retrieve the volume value, negating it, then using `MCDoAction` again reset it to the negative value. To turn it back on, we retrieve the value and reset the absolute value of it.


```
case IDM_SOUND:
   {
   SFIXED sfxVolume;

   if (bSoundEnabled == FALSE)
      {
   // Restore the sound

      MCDoAction (mcController, mcActionGetVolume, (LPVOID) &sfxVolume);
      sfxVolume = abs (sfxVolume);
      MCDoAction (mcController, mcActionSetVolume, (LPVOID) sfxVolume);
      bSoundEnabled = TRUE;
      }
   else
      {
   // Mute the sound

      MCDoAction (mcController, mcActionGetVolume, (LPVOID) &sfxVolume);
      sfxVolume = -(abs (sfxVolume));
      MCDoAction (mcController, mcActionSetVolume, (LPVOID) sfxVolume);
      bSoundEnabled = FALSE;
      }
   }
   break;
```

Using MCSetVisible

Setting the visibility attribute of a movie controller does not require `MCDoAction`. Rather it uses the function `MCSetVisible`, which takes the controller object and a `TRUE` or `FALSE` second parameter to either show or hide it:

```
MovieController mcController;
Boolean bState;
•
•
MCSetVisible (mcController, bState);
```

As noted in the overview, you can hide or restore an existing movie controller to view at any time. You can also specify that it be hidden when created (using the controller creation flags discussed earlier), and then later change its visibility attribute by calling `MCSetVisible` with a value of `TRUE`.

Badges

When a movie controller is made invisible, a badge can appear on the face of its associated movie to distinguish it from other types of graphic objects. The ability to display a badge is an attribute set at creation time with the controller creation flag `mcWithBadge` or later with `MCDoAction`. If this attribute is not set, no badge will appear.

BIGEIGHT sets the badge attribute when it creates its controller:


```
Movie mMovie;
MovieController mcController;
RECT rcMovie;
•
•
mcController = NewMovieController (mMovie, &rcMovie,
   mcTopLeftMovie + mcScaleMovieToFit + mcWithBadge, hWnd);
```

Clicking on a badge will hide it and display the movie controller, providing that the `mcWithBadge` flag is set.

If you want to manipulate a badge manually, `MCDrawBadge` is available. Assuming you do not set the `mcWithBadge` flag, you must be prepared to call this function whenever you want the badge to appear. Since playing the movie will automatically write over an existing badge, there is no specific QuickTime for Windows routine to hide a badge. `MCDrawBadge` does not set the `mcWithBadge` flag.

The second parameter of `MCDrawBadge` should always be NULL in this version of QuickTime for Windows. The third is the address of a handle to the badge region (a standard Windows `HRGN`) subsequently available to your program. QuickTime for Windows creates a region describing the area in which it drew the badge, and returns that region to you. It is your responsibility to later delete this region.

```
MovieController mcController;
HRGN hrgnBadge;
•
•
MCDrawBadge (mcController, NULL, &hrgnBadge);
```

A badge is a movie controller attribute even though it is a separate visual object. This assertion is supported by the fact that its availability can be set and queried with `MCDoAction`, and also at controller creation time along with other attributes.

Running BIGEIGHT.EXE

The first thing you see when you run BIGEIGHT is a movie positioned near the center of its client area. The program's single menu item allows access to options which toggle various attributes of the movie controller. For example, selecting Hide Controller makes the entire movie controller invisible. Clicking Hide Step Buttons, Hide Speaker Button or Hide Grow Box removes these elements from the controller. The other options are equally self-explanatory, and it is a good idea to play around with them to see how they work.

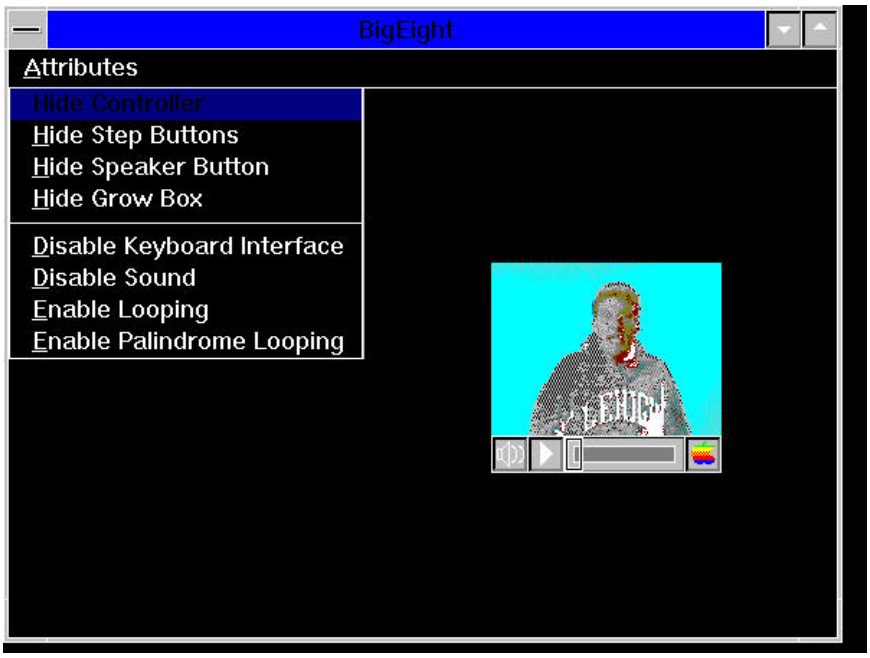


Figure 23. Running BIGEIGHT.EXE (with **Attributes** menu dropped).

FILTERS - Using Action Filters

Introduction

Action filters are the means by which you can customize movie controller behavior. When you set a filter, all subsequent `MCDoAction` calls will immediately call your filter function, giving you first crack at handling the action specified by `MCDoAction`. In Windows terms, you are essentially subclassing a movie controller. Additionally, your filter can tell `MCDoAction` to return immediately or pass the action through to the controller for normal processing.

FILTERS.EXE intercepts incoming movie controller bounds rectangle change messages (resulting, for example, from dragging the grow box) and then resizes the movie rectangle proportionately, i.e. preserving the original aspect ratio. The resulting bounds rectangle is scaled proportionately, adjusting the height to match the width to which it has been dragged.

The FILTERS Source Code

FILTERS.MAK

```
ALL : FILTERS.EXE

FILTERS.OBJ : FILTERS.C
 cl -c -AS -DSTRICT -G2 -GA -GEs -Zpel -W3 -WX -Od filters.c

FILTERS.EXE : FILTERS.OBJ FILTERS.DEF
 link /nod /a:16 filters, filters.exe, nul, qtw libw slibcew, \
    filters.def;
 rc filters.exe
```

FILTERS.DEF

```
NAME        FILTERS
DESCRIPTION 'Sample Application'
EXETYPE     WINDOWS
STUB        'winstub.exe'
CODE        PRELOAD MOVEABLE DISCARDABLE
DATA        PRELOAD MOVEABLE MULTIPLE
HEAPSIZE    1024
STACKSIZE   16384
```

FILTERS.C

```
#include <windows.h>
#include <qtw.h>

long FAR PASCAL __export WndProc  (HWND, UINT, WPARAM, LPARAM);
Boolean CALLBACK __export TestFilter (MovieController, UINT,
   LPVOID, LONG);

MovieController mcController;
```



```
RECT rcNorm;
SHORT sMCHeight;

int PASCAL WinMain (HINSTANCE hInstance, HINSTANCE hPrevInstance,
   LPSTR lpszCmdParam, int nCmdShow)
   {
   static char szAppName[] = "Filters";
   HWND        hWnd;
   MSG         msg;
   WNDCLASS    wndclass;
   MovieFile   mfMovie;
   RECT        rcMovie;
   Movie       mMovie;

// Establish links to QuickTime for Windows

   if (QTInitialize (NULL))
      {
      MessageBox (NULL, "QTInitialize failure", szAppName, MB_OK);
      return 0;
      }

// Allocate memory required for playing movies

   if (EnterMovies ())
      {
      MessageBox (NULL, "EnterMovies failure", szAppName, MB_OK);
      return 0;
      }

// Register and create main window

   if (!hPrevInstance)
      {
      wndclass.style         = CS_DBLCLKS | CS_HREDRAW | CS_VREDRAW;
      wndclass.lpfnWndProc   = WndProc;
      wndclass.cbClsExtra    = 0;
      wndclass.cbWndExtra    = 0;
      wndclass.hInstance     = hInstance;
      wndclass.hIcon         = LoadIcon (NULL,IDI_APPLICATION);
      wndclass.hCursor       = LoadCursor (NULL, IDC_ARROW);
      wndclass.hbrBackground = (HBRUSH) (COLOR_WINDOW + 1);
      wndclass.lpszMenuName  = NULL;
      wndclass.lpszClassName = szAppName;

      if (!RegisterClass (&wndclass))
         {
         MessageBox (NULL, "RegisterClass failure", szAppName, MB_OK);
         return 0;
         }
      }

   hWnd = CreateWindow(szAppName, szAppName, WS_OVERLAPPEDWINDOW |
      WS_CLIPCHILDREN, CW_USEDEFAULT, CW_USEDEFAULT, CW_USEDEFAULT,
      CW_USEDEFAULT, NULL, NULL, hInstance, NULL);

   if (hWnd == NULL)
      {
```



```
      MessageBox (NULL, "CreateWindow failure", szAppName, MB_OK);
      return 0;
      }

// Instantiate the movie

   if (OpenMovieFile ("SAMPLE.MOV", &mfMovie, OF_READ) != noErr)
      {
      MessageBox (NULL, "OpenMovieFile failure", szAppName, MB_OK);
      return 0;
      }

   NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
   CloseMovieFile (mfMovie);

// Get the normal movie dimensions. We'll use these as the
// movie aspect ratio in the filter

   GetMovieBox (mMovie, &rcNorm);
   OffsetRect (&rcNorm, -rcNorm.left, -rcNorm.top);

// Build the movie rectangle

   GetClientRect (hWnd, &rcMovie);
   rcMovie.top = (rcMovie.bottom / 3) - (rcNorm.bottom / 2);
   rcMovie.bottom = rcMovie.top + rcNorm.bottom;
   rcMovie.left = (rcMovie.right / 3) - (rcNorm.right / 2);
   rcMovie.right = rcMovie.left + rcNorm.right;

// Instantiate the movie controller

   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit + mcWithBadge, hWnd);

// Make the movie paused initially

   MCDoAction (mcController, mcActionPlay, 0);

// Calculate the controller height for use in filter

   MCGetControllerBoundsRect (mcController, &rcMovie);
   OffsetRect (&rcMovie, -rcMovie.left, -rcMovie.top);
   sMCHeight = rcMovie.bottom - rcNorm.bottom;

// Set an action filter, passing in the parent window handle

   MCSetActionFilter (mcController, TestFilter, (LONG) ((LPVOID) hWnd));

// Enable the keyboard interface

   MCDoAction (mcController, mcActionSetKeysEnabled, (LPVOID) TRUE);

// Make the movie active

   SetMovieActive (mMovie, TRUE);

// Make the main window visible
```



```
   ShowWindow (hWnd, nCmdShow);
   UpdateWindow (hWnd);

// Play the movie

   while (GetMessage (&msg, NULL, 0, 0))
      {
      TranslateMessage (&msg);
      DispatchMessage (&msg);
      }

// Destroy the movie controller

   DisposeMovieController (mcController);

// Destroy the movie

   DisposeMovie (mMovie);

// Cut the connections to QuickTime for Windows

   ExitMovies ();
   QTTerminate ();

// Return to Windows

   return msg.wParam;
   }

long FAR PASCAL WndProc (HWND hWnd, UINT message, WPARAM wParam,
   LPARAM lParam)
   {
   PAINTSTRUCT ps;

// Drive the movie controller

   if (MCIsPlayerMessage (mcController, hWnd, message, wParam, lParam))
      return 0;

// Process the windows message

   switch (message)
      {
      case WM_PAINT:

         if (!BeginPaint (hWnd, &ps))
            return 0;
         EndPaint (hWnd, &ps);
         return 0;

      case WM_DESTROY:

         PostQuitMessage (0);
         return 0;
      }

// Return to Windows
```



```
   return DefWindowProc (hWnd, message, wParam, lParam);
   }

Boolean CALLBACK __export TestFilter (MovieController mcCaller,
   UINT uAction, LPVOID lpParam, LONG refcon)
   {
   RECT rcBounds;
   static Boolean bBlock;

// Don't want to recursively call ourselves

   if (bBlock)
      return FALSE;

// Respond to mcAction

   switch (uAction)
      {
      case mcActionControllerSizeChanged:

      // Force a paint of the old client rectangle

         InvalidateRect ((HWND) refcon, NULL, TRUE);

         MCGetControllerBoundsRect (mcCaller, &rcBounds);

      // Calculate new bounds rect bottom

         rcBounds.bottom =
            rcBounds.top + MulDiv (rcBounds.right - rcBounds.left,
               rcNorm.bottom, rcNorm.right);

      // Add the controller height back in

         rcBounds.bottom += sMCHeight;

         bBlock = TRUE;
         MCSetControllerBoundsRect (mcCaller, &rcBounds);
         bBlock = FALSE;

         return TRUE;

      default:

         return FALSE;
      }
   }
```


Declaring an Action Filter

Each movie controller in your program can have a unique action filter, but only one at a time. To be used successfully, an action filter must meet certain criteria:

- It must be a callback function
- It must be explicitly exported
- It must use a defined parameter list.

FILTERS uses an action filter named `TestFilter`:

```
Boolean CALLBACK __export TestFilter (MovieController, UINT FAR *,
   LPVOID, LONG);
```

Like normal window or dialog procedures, it is declared as `CALLBACK`. It returns a Boolean value denoting whether the action passed to it by `MCDoAction` should be processed normally when the filter returns (`FALSE`), or if `MCDoAction` should itself return at that point (`TRUE`).

The filter's first argument is the related movie controller object. Its second is the address of the *mcAction* item currently being handled by `MCDoAction`. The third is an additional value dependent on the second. Fourth is a variable for passing additional data to the filter. The first three arguments are essentially a pass-through of the parameters passed to `MCDoAction` when it was called.

Setting an Action Filter

The routine used to set an action filter is `MCSetActionFilter`:

```
HANDLE hInst;
MovieController mcController;
•
•
MCSetActionFilter (mcController, TestFilter, 0L);
```

You can set a new action filter at any time in your program. If you want to remove a filter, you must call `MCSetActionFilter` with a `NULL` filter parameter:

```
HANDLE hInst;
MovieController mcController;
•
•
MCSetActionFilter (mcController, (MCActionFilter) NULL, 0L);
```


Although not demonstrated above, the last parameter can be used to pass data such as a window handle or the address of a structure with useful information for the action filter. Filter functions may be defined in any of your application's modules, either the executable itself or a library.

Defining an Action Filter

The action filter used by FILTERS traps dragging the grow box. If you wished, you could code cases for all of the possible *mcActions* and create unusual behavior for each. The filter would still function normally, although your movie might not perform as well as expected. In other words, if your program needs a filter, be sure to plan carefully for all of the extra processing that will be involved.

The basic layout of a filter is similar to a window procedure.

```
Boolean CALLBACK __export TestFilter (MovieController mcCaller,
   UINT uAction, LPVOID lpParam, LONG lRefCon)
   {
   switch (uAction)
      {
      /* cases */
      }

   return FALSE;
   }
```

Each of your cases should return `TRUE` or `FALSE` when its processing is finished. Good QuickTime for Windows style specifies that the default return value be `FALSE`, causing the action to be handled normally by the movie controller if the filter didn't process anything.

The case `TestFilter` deals with is resizing the bounds rectangle if the grow box is dragged. This causes QuickTime for Windows to generate a `MCDoAction` call with an *mcAction* of `mcActionControllerSizeChanged`. The third parameter, `lParam`, has no bearing on this particular action and is not used. `TestFilter`'s last argument, `lRefCon`, receives the application's parent window handle so the filter can call `InvalidateRect`.

```
case mcActionControllerSizeChanged:

// Force a paint of the old client rectangle

   InvalidateRect ((HWND) refcon, NULL, TRUE);

   MCGetControllerBoundsRect (mcCaller, &rcBounds);

// Calculate new bounds rect bottom

   rcBounds.bottom =
      rcBounds.top + MulDiv (rcBounds.right - rcBounds.left,
         rcNorm.bottom, rcNorm.right);
```



```
// Add the controller height back in

   rcBounds.bottom += sMCHeight;

   bBlock = TRUE;
   MCSetControllerBoundsRect (mcCaller, &rcBounds);
   bBlock = FALSE;

   return TRUE;
```

When our grow box is dragged and released, QuickTime for Windows recalculates the controller's bounds rectangle. In this simplified example, we first ensure that no garbage is left on the screen by calling `InvalidateRect`. We then retrieve the new rectangle with `MCGetControllerBoundsRect`. After subtracting the height of the movie controller derived in `WinMain`, we calculate a new height for our movie based on its new width.
The effect is to vary the height to preserve the original aspect ratio of the movie. Calling `MCSetControllerBoundsRect` displays the adjusted rectangle.

In general, if your application contains a movie controller with a grow box, you should use a filter to let the program know when the controller's size or position changes, since the program has no other way of knowing when this happens (you may have observed the consequences in BIGEIGHT). By providing such a filter, you can allow, say, a word processor to flow its text around a redimensioned movie, or simply let a program such as FILTERS clean up after itself.

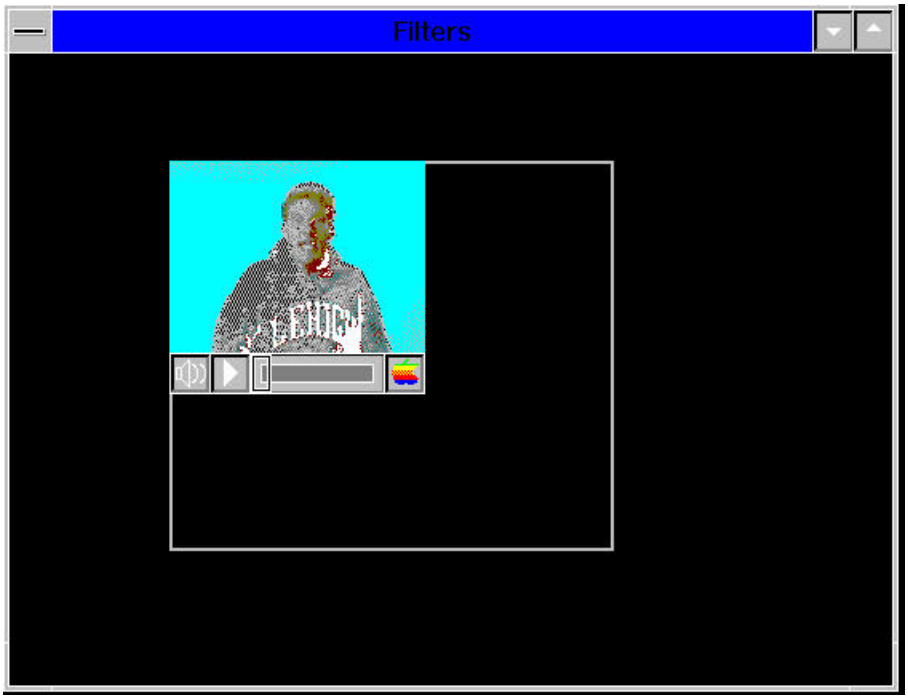


Figure 24. Running Filters (with grow rectangle showing).

Section III. Programmer's Reference

QuickTime for Windows API - Functions

AddTime

Syntax

```
VOID AddTime (TimeRecord FAR *lptrDst,
   const TimeRecord FAR *lptrSrc)
```

`AddTime` adds two time records together, replacing the first with the result. A time record is a structure that references a particular point in a movie, or a duration within a movie.

Parameters

`TimeRecord FAR` `*lptrDst`

The address of a time record containing the first operand for the addition. The time record referenced is overwritten by the result of the addition.

`const TimeRecord FAR` `*lptrSrc`

The address of a time record containing the second operand for the addition. The time record referenced remains unmodified by the operation.

Return

None. The result is placed in the time record referenced by the first parameter. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

If the time records contain different time scales, `AddTime` converts them as appropriate.

Example

```
MovieController mcController;
TimeRecord trOne, trTwo;
•
•
AddTime (&trOne, &trTwo);
MCDoAction (mcController, mcActionGoToTime, (LPVOID) &trOne);
```

See Also

Functions

`ConvertTimeScale, GetMovieTimeScale, SubtractTime, GetMoviesError, GetMoviesStickyError`

MCDoAction

`mcActionGoToTime`

Data Types `TimeRecord, TimeValue`

ClearMoviesStickyError

Syntax `VOID ClearMoviesStickyError (VOID)`

`ClearMoviesStickyError` clears the sticky error value. The sticky error value is the first non-zero error code returned by an eligible QuickTime for Windows routine since `ClearMoviesStickyError` was last called. Eligible QuickTime for Windows routines operate on movies (as opposed to movie controllers) and require a movie object.

Parameters This routine takes no parameters.

Return None.

Comments A result code is not placed into the sticky error value until the field has been cleared. Your application should clear the sticky error value when necessary to ensure that it does not contain a stale result code.

Example

```
Movie mMovie;
LFIXED lfxRate;
   •
   •
   ClearMoviesStickyError ();

// Assume call produces an error code

   lfxRate = GetMoviePreferredRate (mMovie);

// Assume other calls follow with no errors
   •
   •
   if (GetMoviesStickyError())
      {
      MessageBox (NULL, "GetMoviePreferredRate Failure",
         "Program", MB_OK);
      }
```

See Also

Functions `GetMoviesError, GetMoviesStickyError`

CloseMovieFile

Syntax `OSErr CloseMovieFile (MovieFile mfMovie)`

`CloseMovieFile` closes an open movie file.

Parameters *`MovieFile`* `mfMovie`
The reference value assigned by `OpenMovieFile`.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments It is good QuickTime for Windows programming style to close an opened movie file at the first opportunity, e.g. once the movie object has been extracted.

Example
```
MovieFile mfMovie;
Movie mMovie;
•
•
OpenMovieFile ("SAMPLE.MOV", &mfMovie, OF_READ);
NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
CloseMovieFile (mfMovie);
```

See Also

Functions `OpenMovieFile, GetMoviesError, GetMoviesStickyError`

ClosePictureFile

Syntax `OSErr ClosePictureFile (PicFile pfPicture)`

`ClosePictureFile` closes an open picture file.

Parameters *`PicFile`* `pfPicture`
The reference value assigned by `OpenPictureFile`.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments It is good QuickTime for Windows programming style to close an opened picture file at the first opportunity, e.g. once the necessary data has been extracted.

Example

```
PicFile pfPicture;
•
•
if (OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ))
   {
   /* Inform user of failure. */
   }
•
•
ClosePictureFile (pfPicture);
```

See Also

Functions `OpenPictureFile, GetMoviesError, GetMoviesStickyError`

ConcatMatrix

Syntax `void ConcatMatrix(const MatrixRecord FAR *mtrxSrc, MatrixRecord FAR *mtrxDest)`

Parameters *`MatrixRecord`* `*mtrxSrc`

Pointer to the source matrix

`MatrixRecord` `*mtrxDest`

Pointer to the destination matrix. The `ConcatMatrix` function performs a matrix multiplcation operation, combining the two matrices, and leaves the result in the matrix specified by this parameter.

Return none

Comments The form of the operation that the `ConcatMatrix` function performs is shown by the following formula:

[dest] = [dest] x [src]

This is a matrix multiplication operation. Note that matrix multiplication is not commutative.

Example

```
MatrixRecord mtrxMovie, mtrxTrack;

GetMovieMatrix(GetTrackMovie(trkTrack), & mtrxMovie);
GetTrackMatrix(trkTrack, &mtrxTrack);
ConcatMatrix(&mtrxTrack, &mtrxMovie);
// movie matrix now contains the tracks full display matrix
```

See Also

Functions GetMovieMatrix, GetTrackMatrix, GetTrackDimensions

Data Types `MatrixRecord`

ConvertTimeScale

Syntax

```
VOID ConvertTimeScale (TimeRecord FAR *lptrInout,
   TimeScale tsNewScale)
```

`ConvertTimeScale` converts a time from one time scale into a time relative to another time scale.

Parameters

`TimeRecord FAR` `*lptrInout`
A pointer to a `TimeRecord` which you must populate with the `TimeValue` and the `TimeScale` you wish to convert.

`TimeScale` `tsNewScale`
The `TimeScale` to which you wish to convert.

Return None. The `TimeRecord` referenced by the first parameter is overwritten with the converted `TimeValue` and `TimeScale` values that were the basis of the conversion. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The time coordinate system contains a time scale scored in time units. The number of units that pass per second quantifies the scale: a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

When the duration of all or part of a movie is needed, it is expressed as a number of time units. Particular points in a movie can be identified by a time value, which is the number of time units to that point from the beginning of the movie.

Different movies may have different time scales. Use `ConvertTimeScale` to compare `TimeValues` between different movies.

Example

```
Movie mMovieA, MovieB;
TimeRecord trRecord;
•
•
// Convert a TimeValue in Movie A to its TimeValue in Movie B

   trRecord.value.dwLo = GetMoviePosterTime (mMovieA);
   trRecord.value.dwHi = 0;
   trRecord.scale = GetMovieTimeScale (mMovieA);
   ConvertTimeScale (&trRecord, GetMovieTimeScale (mMovieB));
```

See Also

Functions `GetMovieDuration, GetMovieTimeScale, MCGetCurrentTime, GetMoviesError, GetMoviesStickyError`

Data Types `TimeRecord, TimeValue`

CountUserDataType

Syntax

```
LONG CountUserDataType (UserData udData,
   OSType ostType)
```

`CountUserDataType` determines the number of items of a given type in a user data list.

Parameters

`UserData` `udData`
The handle to the user data list.

`OSType` `ostType`
The user data type.

Return The number of items of the specified type in the user data list. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments A movie's user data list is placed in a movie by its creator and may contain items of various types. A common type is text containing copyright data, names of people involved in the movie's production, special hardware and software requirements, and other types of information about the movie. By convention, text user data types start with a "©" symbol. A list of commonly used text user data types may be found in Part 15 of QuickTime for Windows Concepts in the overview.

Example See the example in the description of `GetUserDataText`.

See Also

Functions `GetMovieUserData, GetNextUserDataType, GetUserData, GetUserDataText, GetMoviesError, GetMoviesStickyError`

Data Types `UserData, OSType`

CoverProc

Syntax
```
OSErr CALLBACK CoverProc (Movie mMovie, HDC hdc,
   LONG lID)
```

`CoverProc` is the prototype for the cover (or uncover) procedure set by the routine `SetMovieCoverProcs`. It shows the parameters you must pass to your cover procedure, and the value the procedure must return.

Parameters

`Movie` `mMovie`
The movie object.

`HDC` `hdc`
The handle to a device context, whose clipping region is preset to the area being covered or uncovered.

`LONG` `lID`
The reference constant supplied in the `SetMovieCoverProcs` call. You can use this value to allow a single cover procedure to handle multiple cases.

Return

Your cover procedure should return `noErr` if it does not detect an error. Otherwise, return one of the values defined in Appendix A.

Comments

`CoverProc` is not a defined QuickTime for Windows function. It is a prototype only, used as a template for your cover procedures.

Example

```
OSErr CALLBACK __export MyCoverProc (Movie, HDC, LONG);
•
•
HWND hWnd;
Movie mMovie;
•
•
SetMovieCoverProcs (mMovie, MyCoverProc, NULL, 5879);
•
•
OSErr CALLBACK __export MyCoverProc (Movie m, HDC hdc, lID)
   {
   RECT rcClip;
   GetClipBox (hdc, &rcClip);
   FillRect (hdc, &rcClip, GetStockObject (WHITE_BRUSH));
   return 0;
   }
```

See Also

Functions `SetMovieCoverProcs`

DeleteMovieFile

Syntax `OSErr DeleteMovieFile (LPCSTR lpstrFileSpec)`

`DeleteMovieFile` deletes a movie file.

Parameters *`LPCSTR`* `lpstrFileSpec`

The name of the movie file, including the extension (.MOV).

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments Physically deletes a movie file from the disk media.

Example

```
DeleteMovieFile ("NEWSREEL.MOV");
```

See Also

Functions `OpenMovieFile, CloseMovieFile, GetMoviesError, GetMoviesStickyError`

DereferenceHandle

Syntax `LPVOID DereferenceHandle(Handle theHandle)`

Parameters *`Handle`* `theHandle`
The handle to be dereferenced.

Return A pointer to the first byte of the memory block referenced by `theHandle`. This pointer remains vaild until the handle is either unlocked or disposed.

Comments This is the only memory related function not taken directly from the Macintosh Memory Manager. It is the only way to access the contents of the data referenced by `theHandle`.

Example
```
LPVOID dataPtr;

theHandle = NewHandle(12);
if (MemError() == noErr) {
   HLock(theHandle);
   dataPtr = DereferenceHandle(theHandle);
   // do some work
   DisposeHandle(theHandle);
}
```

See Also

Functions `HLock`

Data Types `Handle`

DisposeHandle

Syntax `void DisposeHandle(Handle theHandle)`

Parameters *`Handle`* `theHandle`
The handle to be disposed.

Return None. MemError will be set on return.

Comments Use DisposeHandle to throw away the block referenced by theHandle when you no longer need the memory. It is safe to pass NULL to DisposeHandle. A handle does not have to be unlocked to be disposed.

Example

```
Handle theHandle;

theHandle = NewHandle(12);
.
.
.
DisposeHandle(theHandle);
```

See Also

Functions NewHandle, MemError

Data Types `Handle`

DisposeMovie

Syntax `VOID DisposeMovie (Movie mMovie)`

`DisposeMovie` frees any memory being used by a movie. Your program should call this routine when it is done working with a movie.

Parameters *`Movie`* `mMovie`

The movie object whose memory is being released.

Return None. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments `DisposeMovie` must be called, ultimately, for each movie instantiated by your program. It does not affect the DOS file containing the movie or the movie controller to which it may be attached.

Example

```
Movie mMovie;
MovieFile mfMovie;
•
•
OpenMovieFile ("SAMPLE.MOV", &mfMovie, OF_READ);
NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
CloseMovieFile (mfMovie);
•
•
DisposeMovie (mMovie);
```


See Also

Functions `NewMovieFromFile, DisposeMovieController, GetMoviesError, GetMoviesStickyError`

DisposeMovieController

Syntax

```
VOID DisposeMovieController
   (MovieController mcController)
```

`DisposeMovieController` destroys a movie controller.

Parameters

`MovieController` `mcController`
The movie controller object being destroyed.

Return None.

Comments `DisposeMovieController` must be called, ultimately, for every movie controller created by your program. This function does not affect any movie associated with the controller being destroyed.

Example

```
MovieController mcController;
Movie mMovie;
RECT rcMovie;
HWND hWnd;
•
•
mcController = NewMovieController (mMovie, &rcMovie,
   mcTopLeftMovie, hWnd);
•
•
DisposeMovieController (mcController);
```

See Also

Functions `NewMovieController, DisposeMovie`

DisposePicture

Syntax

```
VOID DisposePicture (PicHandle phPicture)
```

`DisposePicture` frees any memory being used by a QuickTime for Windows picture. Your program should call this routine when it is done working with a QuickTime for Windows picture.

Parameters

`PicHandle` `phPicture`
The picture object whose memory is being released.

Return

None. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

Either `KillPicture` or `DisposePicture` must be called, ultimately, for each picture instantiated by your program. It does not affect the DOS file containing the picture.

Example

```
PicHandle phPicture;
PicFile pfPicture;
•
•
if (!OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ))
   {
   phPicture = GetPictureFromFile (pfPicture);
   ClosePictureFile (pfPicture);
   }
•
•
DisposePicture (phPicture);
```

See Also

Functions

`GetPictureFromFile, OpenPictureFile, ClosePictureFile, KillPicture, GetMoviesError, GetMoviesStickyError`

DrawPicture

Syntax

```
OSErr DrawPicture (HDC hdc, PicHandle phThePict,
   const LPRECT lprcFrame,
   ProgressProcRecordPtr pprpProgressProc))
```

`DrawPicture` draws a picture in the QuickTime for Windows format.

Parameters

HDC hdc

The handle to the device context.

PicHandle phThePict

The picture object.

const LPRECT lprcFrame

The address of a rectangle in which the picture is to be drawn (in client area coordinates).

ProgressProcRecordPtr pprpProgressProc

Reserved. Should be coded as NULL.

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can also use GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments

A picture is a still image held in memory (e.g. a frame from a movie), in a format usable by QuickTime for Windows. A PicHandle is an object reference to this type of image, obtained by a call such as GetMoviePict (see the description of this routine). The picture object must be freed when you are done with it. *Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.*

Example

```
Movie mMovie;
MovieController mcController;
PicHandle phPicture;
RECT rcPicture;
HDC hdc;
TimeValue tvTime;
•
•
// Retrieve last movie frame, display it at different location

   tvTime = GetMovieDuration (mMovie);
   if ((phPicture = GetMoviePict (mMovie, tvTime)) != NULL)
      DrawPicture (hdc, phPicture, &rcPicture, NULL);
•
•
// Don't forget to free the picture object

   DisposePicture (phPicture);
```

See Also

Functions

GetMoviePict, PictureToDIB, GetMoviesError, GetMoviesStickyError

DataTypes `PicHandle`

DrawPictureFile

Syntax
```
OSErr DrawPictureFile (HDC hdc, PicFile pfPicture,
   const LPRECT lprcFrame,
   ProgressProcRecordPtr pprpProgressProc)
```

`DrawPictureFile` draws an image from the specified picture file.

Parameters

`HDC` `hdc`
A handle to the device context.

`PicFile` `pfPicture`
The picture file reference value returned by `OpenPictureFile`.

`const LPRECT` `lprcFrame`
A pointer to a rectangle where the picture is to be drawn (in client area coordinates).

`ProgressProcRecordPtr` `pprpProgressProc`
Reserved. Should be coded as NULL.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments This function is essentially the same as the `DrawPicture` function, except that it reads the picture from disk. Picture files are characterized by the DOS file suffix ".PIC", and are DOS versions of Macintosh PICT and JFIF files.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example
```
PicFile pfPicture;
RECT rcPict;
HDC hdc;
•
•
OpenPictureFile ("HOUSE.PIC", &pfPicture, OF_READ);
DrawPictureFile (hdc, pfPicture, &rcPict, NULL);
ClosePictureFile (pfPicture);
```


See Also

Functions `ClosePictureFile, DrawPicture, GetPictureFileInfo, GetPictureInfo, GetMoviesError, GetMoviesStickyError, OpenPictureFile`

EnterMovies

Syntax `OSErr EnterMovies (VOID)`

`EnterMovies` allocates memory for QuickTime for Windows to run itself.

Parameters This function takes no parameters.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments `EnterMovies` only needs to be called once during the life of your programs that play movies. The memory allocated is not memory used for movies, but rather for global QuickTime for Windows activities. An application may call `EnterMovies` multiple times, but storage will only be allocated the first time. Each call to `EnterMovies` should be balanced with a call to `ExitMovies`. The memory allocated by `EnterMovies` is only released when an equivalent number `ExitMovies` have occured, or the application terminates.

Example

```
if (EnterMovies() != noErr)
   {
   MessageBox (NULL, "EnterMovies failure", "WinPlay1",
      MB_OK);
   return 0;
   }
```

See Also

Functions `ExitMovies, QTInitialize, QTTerminate`

ExitMovies

Syntax `VOID ExitMovies (VOID)`

`ExitMovies` frees memory used by QuickTime for Windows to run itself.

Parameters This routine takes no parameters.

Return None.

Comments The memory released is the global memory used by QuickTime for Windows. It is not the memory used to store movies. QuickTime for Windows programs that do not call `EnterMovies` (e.g. those that display only individual QuickTime for Windows pictures) do not have to call `ExitMovies`.

Example

```
// Cut the connections to QuickTime for Windows

   ExitMovies ();
   QTTerminate ();
```

See Also

Functions `EnterMovies, QTInitialize, QTTerminate`

GetHandleSize

Syntax `Size GetHandleSize(Handle theHandle)`

Parameters *`Handle`* `theHandle`

The handle that you want to know the size of.

Return The logical size of the handle. This is the number of bytes of memory referenced by the handle. It is either the number of bytes assigned to the handle when it was allocated with `NewHandle`, or the last successful call to `SetHandleSize`.

Comments If a bad handle is passed, `MemError` will be set on return to indicate the problem.

Example

```
Handle theHandle;
Size handleSize;

theHandle = NewHandle(32);

SetHandleSize(theHandle, 61);
if (MemError() != noErr)
  return;  // couldn't allocate memory

handleSize = GetHandleSize(theHandle);
if (handleSize != 61)
  return;  // QuickTime for Windows is broken. Please return
           //  to place of purchase.
```


See Also

Functions `NewHandle`, `SetHandleSize`

Data Types `Handle, Size`

GetMediaHandlerDescription

Syntax
```
void GetMediaHandlerDescription(Media mdMedia,
OSType FAR *mediaType, LPSTR handlerName, OSType FAR
*manufacturer)
```

Parameters

Media mdMedia
: The media that you want to know the type of.

OSType *mediaType
: A four byte code indicating the type of media referenced by the media. For example, a video media would return VideoMediaType. You can pass NULL for this parameter.

LPSTR handlerName
: A pointer to a pascal string to return the name of the media handler used to manage the given media. In the current implementation this is always returned as a null string. You may pass NULL for this parameter.

OSType *manufacturer
: A pointer to a pascal string to return the name of manufacturer of the media handler used to manage the given media. In the current implementation this is always returned as a null string. You may pass NULL for this parameter.

Return Movies Error is set to a non-zero value if an error occured.

Comments Use GetMediaHandler description to determine the type of any given track or media.

Example

```
Track trkAnyTrack;
Media mdMedia;
OSType mediaType;

trkAnyTrack = GetMovieIndTrack(theMovie, 1);
mdMedia = GetTrackMedia(trkAnyTrack);
GetMediaHandlerDescription(md, &mediaType, NULL, NULL);
switch (mediaType) {
  case VideoMediaType:
  case SoundMediaType:
  case MusicMediaType:
.
.
.
}
```

See Also

Functions GetTrackMedia, GetMovieIndTrack, GetMovieIndTrackType

Data Types `Media, OSType`

GetMediaSample

Syntax

```
OSErr GetMediaSample(Media mdMedia, Handle theData,
long maxSizeToGrow, long FAR *actualSize, TimeValue
mediaTime, TimeValue FAR *sampleTime, TimeValue FAR
*durationPerSample, SampleDescriptionHandle theDesc,
long FAR *sampleDescriptionIndex, long
maxNumberOfSamples, long FAR *numberOfSamples, short
FAR *sampleFlags)
```

Parameters

Media mdMedia
: The media that you want retrieve the sample from

Handle theData
: Handle to receive the media sample. You create this Handle with NewHandle.

long maxSizeToGrow
: Indicates the maximum possible number of bytes that you wish to receive. If there is no limit, pass 0.

long *actualSize
: Returns the number of bytes returned in the actual sample. Pass NULL if you don’t want this information.

TimeValue mediaTime
: The media time of the sample that you wish to retrieve. You will typically obtain this time by calling TrackTimeToMediaTime.

TimeValue *sampleTime
: The starting media time of the actual first sample returned. This may not exactly match the media time requested, as the media time requested may fall in the middle of a sample. Pass NULL if you don't want this information.

TimeValue *durationPerSample
: Returns the duration, in the media's TimeScale, of the sample or samples returned. Pass NULL if you don't want this information.

SampleDescriptionHandle theDesc
: Returns the sample description for the sample being requested. You must allocate the handle to pass to this routine by calling NewHandle. Pass NULL if you don't want this information.

long *sampleDescriptionIndex
: Returns the index of the sample description. This is a convenient way to know if the sample description changed between samples. Pass NULL if you don't want this information.

long maxNumberOfSamples
: Indicates the maximum number of samples that you want to retrieve. Pass 0 if you don't care how many samples are returned. For video and text, most applications will want to pass 1 for this field.

long *numberOfSamples
: Returns the actual number of samples. Pass NULL if you don't want this information.

short *sampleFlags
: Returns the sample flags for the sample(s) returned. Sample flags are used to indicate information such as wether or not a sample is a key frame. Pass NULL if you don't want this information.

Return
: noErr if successfully complete.

Comments
: Use GetMediaSample to retrieve raw sample data from a QuickTime movie.

See Also

Functions
: TrackTimeToMediaTime, NewHandle, GetMediaSampleDescription

Data Types
: Handle, Media, SampleDescriptionHandle

GetMediaSampleDescription

Syntax

```
void GetMediaSampleDescription(Media mdMedia, long
sampleDescIndex, SampleDescriptionHandle theDesc)
```

Parameters

Media mdMedia

The media that you want retrieve the sample description from.

long sampleDescIndex

The index of the sample description you wish to retrieve from this media. Sample descriptions are numbered consecutively starting from 1.

SampleDescriptionHandle theDesc

A Handle, created with NewHandle, that will be resized on return and filled in with the requested sample description. The actual type of sample description returned depends on the type of the media being queried. For example, a video media returns an ImageDescriptionHandle whereas a sound media returns a SoundDescriptionHandle.

Return

Movies Error is set to a value other than noErr on return to indicate any problems.

Comments

GetMediaSampleDescription provides a way to determine the details of the format of the data stored in a particular media. Because a given media may contain data of several different formats (for example one video media might use several different compression formats), the index allows you conveniently iterate over all available information. This routine effectively replaces the now obsolete GetSoundInfo and GetVideoInfo routines of earlier version of QuickTime for Windows.

Example

```
Track videoTrack;
SampleDescriptionHandle desc;

videoTrack = GetMovieIndTrackType(theMovie, 1, VideoMediaType,
movieTrackMediaType | movieTrackEnabledOnly);
desc = NewHandle(0);
GetMediaSampleDescription(GetTrackMedia(videoTrack), 1, desc);
```

See Also

Functions

GetTrackMedia, GetMovieIndTrack, GetMovieIndTrackType

Data Types

Media, SampleDescriptionHandle, ImageDescriptionHandle, SoundDescriptionHandle

GetMediaTimeScale

Syntax `TimeScale GetMediaTimeScale(Media mdMedia)`

Parameters *`Media`* `mdMedia`
The media that you want retrieve the TimeScale of.

Return The media's TimeScale.

Comments When using calls such as GetMediaSample, it is necessary to be able to map back and forth between the duration of samples in the media's TimeScale and the movie's TimeScale. Often the TimeScale of the media is different than the TimeScale of the movie. Use GetMovieTimeScale to determine the TimeScale of the movie. Use ConvertTimeScale to convert from one TimeScale to another.

See Also

Functions GetMovieTimeScale, ConvertTimeScale

Data Types `Media, TimeScale`

GetMediaTrack

Syntax `Track GetMediaTrack(Media mdMedia)`

Parameters *`Media`* `mdMedia`
The media whose Track you want to retrieve.

Return The Track referenced by the given media. If the media is invalid, 0 is returned.

Comments Use GetMediaTrack to obtain the track that owns the given media. You will usually obtain the media by calling GetTrackMedia.

Example

```
Track trkFirst;
Media mdFirst;

trkFirst = GetMovieIndTrack(theMovie, 1);
mdFirst = GetTrackMedia(trkFirst);
if (GetMediaTrack(mdFirst) != trkFirst)
  ; // QuickTime for Windows is broken....
```


See Also

Functions GetTrackMedia

Data Types `Media, Track`

GetMovieActive

Syntax `Boolean GetMovieActive (Movie mMovie)`

`GetMovieActive` queries the active state of a movie (whether or not it can be played).

Parameters *`Movie`* `mMovie`

The movie object.

Return `TRUE` if the movie is active. `FALSE` if the movie is inactive. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments A movie with an inactive state will remain visible but will not play, since it does not receive cycles from QuickTime for Windows' scheduler while inactive.

Do not confuse a movie's active state with its playing/paused state, i.e. do not use `SetMovieActive` to start or stop playing a movie. You can set a movie's active state using `SetMovieActive`.

Example

```
Movie mMovie;
•
•
// If the movie is active, make it inactive

   if (GetMovieActive (mMovie))
      {
      SetMovieActive (mMovie, FALSE);
      }
```

See Also

Functions `SetMovieActive, GetMoviesError, GetMoviesStickyError`

GetMovieActiveSegment

Syntax

```
VOID GetMovieActiveSegment (Movie mMovie,
   TimeValue FAR *, TimeValue FAR *)
```

`GetMovieActiveSegment` determines which segment of a movie is currently selected for playing.

Parameters

`Movie` `mMovie`
The movie object.

`TimeValue FAR` `*tvStart`
A pointer to the start time value.

`TimeValue FAR` `*tvDuration`
A pointer to the duration time value.

Return

`tvStart` and `tvDuration` are populated with the starting time and the duration of the active movie segment, respectively. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

If the active segment is the entire movie, `tvStart` is set to -1 and `tvDuration` is undefined.

Example

```
Movie mMovie;
TimeValue tvStart, tvDuration;
•
•
GetMovieActiveSegment (mMovie, &tvStart, &tvDuration);
if (tvStart == -1)
    /* Code for when entire movie is active. */
else
    /* Code for when subset of entire movie is active. */
```

See Also

Functions `GetMovieActive`

MCDoAction `mcActionSetSelectionBegin, mcActionSetPlaySelection, mcActionSetSelectionDuration, GetMoviesError, GetMoviesStickyError`

GetMovieBox

Syntax `VOID GetMovieBox (Movie mMovie, LPRECT lprcMovieRect)`

`GetMovieBox` obtains the current dimensions of a movie rectangle.

Parameters *`Movie`* `mMovie`
The movie object.

`LPRECT` `lprcMovieRect`
The address of the movie rectangle.

Return The rectangle referenced by `lprcMovieRect` is populated with the movie's current dimensions. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The movie need not be visible on the screen for this function to provide its dimensions. Consequently, this call is quite useful for determining the optimum rectangle for displaying a movie when calling `NewMovieController`.
If the rectangle referenced by `lprcMovieRect` is NULL, a sound-only movie is indicated. It is up to you to handle this condition however you wish.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
RECT rcMovie;
Movie mMovie;
MovieFile mfMovie;
MovieController mcController;
•
•
// Open the movie file

   if (OpenMovieFile ("NEWSREEL.MOV", &mfMovie, OF_READ))
      {
      MessageBox (NULL, "Open failure", ...);
      }
   NewMovieFromFile (&mMovie, mfMovie, NULL, NULL,
      newMovieActive, NULL);
   CloseMovieFile  (mfMovie);

// Instantiate the movie controller

   GetMovieBox (mMovie, &rcMovie);
   OffsetRect (&rcMovie, -rcMovie.left, -rcMovie.top);
   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit, hWnd);
```


See Also

Functions `SetMovieBox, MCGetControllerBoundsRect, GetMoviesError, GetMoviesStickyError`

GetMovieCreationTime

Syntax `LONG GetMovieCreationTime (Movie mMovie)`

`GetMovieCreationTime` retrieves a movie's creation date and time.

Parameters *`Movie`* `mMovie`

The movie object.

Return A `LONG` containing the movie's creation date and time information. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The returned `LONG` may be decoded using the C language `ctime` function.

Example

```
LONG lDateTime;
Movie mMovie;
char buffer [80];
•
•
lDateTime = GetMovieCreationTime (mMovie);
wsprintf (buffer, "Movie created on %s", ctime (&lDateTime));
```

See Also

Functions `GetMovieModificationTime, GetMoviesError, GetMoviesStickyError`

GetMovieDataSize

Syntax `LONG GetMovieDataSize (Movie mMovie, TimeValue tvStart, TimeValue tvDuration)`

`GetMovieDataSize` retrieves the size, in bytes, of the data in a segment of a movie. This size includes the data in all tracks, regardless of their enabled state.

Parameters

Movie mMovie
The movie object.

TimeValue tvStart
A time value specifying the starting point of the segment whose size is being queried.

TimeValue tvDuration
A time value specifying the duration of the segment whose size is being queried.

Return

A LONG that contains the size, in bytes, of the movie's data that lies in the specified segment. Use GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments

This function may be called whether a movie is playing or not.
Use MCGetCurrentTime to retrieve the movie's current time.

Example

```
LONG lSize;
Movie mMovie;
TimeValue tvStart, tvDuration;
MovieController mcController;
•
•
// Get the number of bytes from the current position to two
// seconds later

   tvStart = MCGetCurrentTime (mcController, NULL);
   tvDuration = 2 * GetMovieTimeScale (mMovie);
   lSize = GetMovieDataSize (mMovie, tvStart, tvDuration);
```

See Also

Functions

ConvertTimeScale, MCGetCurrentTime, GetMoviesError, GetMoviesStickyError, GetMovieTimeScale

Data Types

TimeValue

GetMovieDuration

Syntax

```
TimeValue GetMovieDuration (Movie mMovie)
```

GetMovieDuration retrieves the duration of a movie, expressed in units of the movie's time scale.

Parameters *Movie* mMovie

The movie object.

Return A TimeValue containing the movie's duration, in units of the movie's time scale. Use GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments QuickTime for Windows' time coordinate system uses a time scale scored in time units. The number of units that pass per second quantifies the scale: a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

When the duration of all or part of a movie is needed, it is expressed in the number of time units it contains. Particular points in a movie can be identified by time values, which are the number of time units to those points from the beginning of the movie.

Different movies may have different time scales. Use ConvertTimeScale to compare TimeValues between differently scaled movies.

Example

```
LONG lSize;
Movie mMovie;
TimeValue tvDuration;
•
•
// Get the number of bytes in this movie

   tvDuration = GetMovieDuration (mMovie);
   lSize = GetMovieDataSize (mMovie, 0, tvDuration);
```

See Also

Functions ConvertTimeScale, GetMovieTimeScale, MCGetCurrentTime, GetMoviesError, GetMoviesStickyError

Data Types TimeValue

GetMovieIndTrack

Syntax Track GetMovieIndTrack(Movie mMovie, LONG trackIndex)

Parameters

Movie mMovie
: The movie object.

LONG trackIndex
: The index of the track within the movie you wish to retrieve. Tracks are numbered sequentially beginning with 1.

Return

The track with the given index is returned. If an invalid index is passed, 0 is returned for the track.

Comments

Use GetMovieIndTrack to iterate through all the tracks in a movie. You can use GetMovieTrackCount to determine how many tracks are in the movie. If you want to locate or interate through all tracks of a give type, use GetMovieIndTrackType

Example

```
LONG trackCount, I;

trackCount = GetMovieTrackCount(theMovie);
for (i=1; i<=trackCount; i++) {
  Track trkThisTrack = GetMovieIndTrack(theMovie, I);

  // do something interesting here
}
```

See Also

Functions

GetMovieTrackCount, GetMovieIndTrackType, GetTrackMedia

Data Types

Movie, Track

GetMovieIndTrackType

Syntax

```
Track GetMovieIndTrackType (Movie m,
   LONG index, OSType trackType, LONG flags);
```


Parameters

Movie m

The movie object.

LONG index

The index of the requested track, relative to 1. This index gives the position of the track in the move relative to other tracks that match the flags passed in the `flags` parameter.

Note: QuickTime for Windows currently only supports a single track of each media type and this parameter should always be coded as a constant of 1.

OSType trackType

The media type or media characteristic of the requested desired track.

Use the following constants to identify the available media types:

`VideoMediaType`
`SoundMediaType`
`TextMediaType`
`MusicMediaType`
`MPEGMediaType`

LONG flags

Indicates the media type or media characteristic of the desired track.

Code any of these values singly or in combination:

`movieTrackMediaType`
if a media type is specified

`movieTrackCharacteristic`
if a media characteristic is specified

`mediaTrackEnabledOnly`
if only enabled tracks are to be searched

Note: *The Macintosh version of QuickTime allows for tracks to be indentified by media characteristics, in addition to track types. Media characteristics are not currently supported by QuickTime for Windows.*

Return

A `Track` for the requested media type. If no track is available to meet the requested critera, NULL is returned for the track. Use `GetMoviesError` or `GetMoviesStickyError` to test for failure of this call.

Comments The `Track` returned by `GetMovieIndTrackType` can be passed to `SetTrackEnabled`, and other calls which require a `Track` parameter.

Example

```
Movie m;
Track trkText;
      •
      •
trkText = GetMovieIndTrackType (m, 1,
             TextMediaHandler, movieTrackMediaType);
SetTrackEnabled (trkText, FALSE);
      •
      •
MCMovieChanged (mc, m);
```

See Also

Functions `SetTrackEnabled`

GetMovieMatrix

Syntax `void GetMovieMatrix(Movie mMovie, MatrixRecord FAR *mtrxMovie)`

Parameters *`Movie`* `mMovie`

The movie object.

`MatrixRecord` `*mtrxMovie`

Pointer to a matrix record.

Return You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The movie's matrix is returned in mtrxMovie. The movie matrix is used to map a movie from its coordinate system to the display coordinate system.

SetMovieBox changes the movie matrix to scale and translate the movie.

Example

```
MatrixRecord mtrxMovie, mtrxTrack;
FIXED fWidth, fHeight;
RECT r;

GetMovieMatrix(GetTrackMovie(trkTrack), &mtrxMovie);
GetTrackMatrix(trkTrack, &mtrxTrack);
ConcatMatrix(&mtrxTrack, &mtrxMovie);
// movie matrix now contains the track's display matrix

GetTrackDimensions(trkTrack, &fWidth, &fHeight);
r.top = 0;
r.left = 0;
r.bottom = fHeight >> 16;
r.right = fWidth >> 16;
TransformRect(&mtrxMovie, &r, NULL);
// r now contains the display coordinates of the track
```

See Also

Functions ConcatMatrix, GetTrackMatrix

Data Types `MatrixRecord, Movie`

GetMovieModificationTime

Syntax `LONG GetMovieModificationTime (Movie mMovie)`

`GetMovieModificationTime` retrieves a movie's last modification date and time.

Parameters *`Movie`* `mMovie`

The movie object.

Return A `LONG` containing the movie's last modification date and time. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The resulting `LONG` may be decoded using the C language `ctime` function.

Example

```
LONG lDateTime;
Movie mMovie;
char buffer [80];
•
•
lDateTime = GetMovieModificationTime (mMovie);
sprintf (buffer, "Movie modified on %s", ctime (&lDateTime));
```


See Also

Functions `GetMovieCreationTime, GetMoviesError, GetMoviesStickyError`

GetMoviePict

Syntax
```
PicHandle GetMoviePict (Movie mMovie,
   TimeValue tvTime)
```

`GetMoviePict` retrieves an individual image from a movie in the QuickTime for Windows picture format at a specified movie time.

Parameters

`Movie` `mMovie`
The movie object.

`TimeValue` `tvTime`
The time value in the movie of the image to be retrieved.

Return

A picture object. A NULL return indicates failure. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

This function may be called whether a movie is playing or not.

The picture object returned is unusable by Windows directly. Use the function `PictureToDIB` to convert the image to a Windows Device Independent Bitmap (DIB). An alternative to converting the image is using `DrawPicture` to display it at specified coordinates.

Example

```
Movie mMovie;
MovieController mcController;
PicHandle phPicture;
RECT rcPicture;
HDC hdc;
TimeValue tvTime;
•
•
// Retrieve last movie frame then display it on the
// screen at another location

   tvTime = GetMovieDuration (mMovie);
   if ((phPicture = GetMoviePict (mMovie, tvTime)) != NULL)
      DrawPicture (hdc, phPicture, &rcPicture, NULL);
```


See Also

Functions `DrawPicture, GetMoviePosterPict, MCGetCurrentTime, PictureToDIB, GetMoviesError, GetMoviesStickyError`

GetMoviePosterPict

Syntax `PicHandle GetMoviePosterPict(Movie mMovie)`

`GetMoviePosterPict` retrieves a movie's poster frame in the QuickTime for Windows picture format.

Parameters *`Movie`* `mMovie`

The movie object.

Return A picture object. A NULL return indicates failure. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments This function may be called whether a movie is playing or not.

The picture object returned is unusable by Windows directly. Use the function `PictureToDIB` to convert it to a Windows Device Independent Bitmap (DIB). An alternative to converting the image is using `DrawPicture` to display it at specified coordinates.

Example

```
Movie mMovie;
PicHandle phPicture;
RECT rcPicture;
HDC hdc;
•
•
// Retrieve Poster Frame, then display it on the screen

   if ((phPicture = GetMoviePosterPict (mMovie)) != NULL)
      DrawPicture (hdc, phPicture, &rcPicture, NULL);
```

See Also

Functions `DrawPicture, GetMoviePict, GetMoviePosterTime, PictureToDIB, GetMoviesError, GetMoviesStickyError`

GetMoviePosterTime

Syntax `TimeValue GetMoviePosterTime (Movie mMovie)`

`GetMoviePosterTime` finds the poster's time in the movie.

Parameters `*Movie* mMovie`

The movie object.

Return The `TimeValue` of the poster frame. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The poster is an image from the movie which may be used to characterize it when the movie is not running. For example, the poster might serve as a visual representation of a movie's contents in an open dialog.

To get the poster picture object itself use `GetMoviePosterPict.`

Example

```
TimeValue tvPoster;
Movie mMovie;
•
•
tvPoster = GetMoviePosterTime (mMovie);
```

See Also

Functions `ConvertTimeScale, GetMovieDuration, GetMoviesError, GetMoviePosterPict, GetMoviesStickyError, MCGetCurrentTime`

Data Types `TimeValue`

GetMoviePreferredRate

Syntax `LFIXED GetMoviePreferredRate (Movie mMovie)`

`GetMoviePreferredRate` determines the preferred rate at which a movie is played.

Parameters `*Movie* mMovie`

The movie object.

Return

An `LFIXED` value which is the preferred rate of the movie expressed as a multiplier of the recorded rate. For example, a return value of 1.0 means play the movie at the recorded rate. A return value of 1.5 would mean play the movie 1.5 times faster than its recorded rate.

Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

The return value can be passed on to `MCDoAction mcActionPlay` to play the movie at the preferred rate.

Example

```
Movie mMovie;
MovieController mcController;
LFIXED lfxRate;
•
•
// Play the movie at the preferred rate

   lfxRate = GetMoviePreferredRate (mMovie);
   MCDoAction (mcController, mcActionPlay, (LPVOID) lfxRate);
```

See Also

Functions `GetMoviePreferredVolume, GetMoviesError, GetMoviesStickyError`

MCDoAction `mcActionPlay`

GetMoviePreferredVolume

Syntax

```
SFIXED GetMoviePreferredVolume (Movie mMovie)
```

`GetMoviePreferredVolume` returns a movie's preferred volume setting.

Parameters

`Movie` `mMovie`

The movie object.

Return

An `SFIXED` value ranging from 256 to -256. Negative values represent volume levels that play no sound but preserve the absolute value of the volume setting. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

The return value can be passed on to `MCDoAction` using the action `mcActionSetVolume` to play the movie at the preferred volume.

Example

```
Movie mMovie;
MovieController mcController;
SFIXED sfxVolume;
•
•
// Set the volume to the preferred level

   sfxVolume = GetMoviePreferredVolume (mMovie);
   MCDoAction (mcController, mcActionSetVolume,
      (LPVOID) sfxVolume);
```

See Also

Functions `GetMoviePreferredRate, GetMoviesError, GetMoviesStickyError`

MCDoAction `mcActionSetVolume`

GetMovieSelection

Syntax `void GetMovieSelection(Movie mMovie, TimeValue FAR *start, TimeValue FAR *duration)`

Parameters

`Movie` `mMovie`
The movie object.

`TimeValue` `*start`
Returns the start time of the selection. The TimeValue is in the movie's TimeScale. If you do not need the start time of the movie selection, pass NULL.

`TimeValue` `*duration`
Returns the duration of the selection. The TimeValue is in the movie's TimeScale. If you do not need the duration of the movie selection, pass NULL.

Return Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments Use GetMovieSelection to retrieve the currently selected segment of the movie. The user can change the selection with the movie controller if your application enables editing.

Example

```
TimeValue tvStart, tvDuration;
Handle hHandle;

GetMovieSelection(mMovie, &tvStart, &tvDuration);
hHandle = NewHandle(0);
PutMovieIntoTypedHandle(mMovie, NULL, QTFOURCC('T', 'E', 'X',
'T'), hHandle, tvStart, tvDuration, 0, NULL);
```


See Also

Functions GetMovieTime

Data Types `Movie, TimeValue`

GetMoviesError

Syntax `OSErr GetMoviesError (VOID)`

`GetMoviesError` retrieves the current QuickTime for Windows movie error value and resets it to 0.

Parameters This routine takes no parameters.

Return The result code from the previous eligible QuickTime for Windows call. Eligible QuickTime for Windows calls are calls that operate on movies (as opposed to movie controllers) and require a movie object.

Comments Use this call to obtain the result code for QuickTime for Windows movie calls that do not return an error as a function result. Even if a movie routine explicitly returns an error as a function result, the result is also available using the `GetMoviesError` function. See Appendix A for error condition values.

Example

```
Movie mMovie;
LFIXED lfxRate;
•
•
lfxRate = GetMoviePreferredRate (mMovie);
if (GetMoviesError())
    {
    MessageBox (NULL, "GetMoviePreferredRate Failure",
      "Program", MB_OK);
    }
```

See Also

Functions `GetMoviesStickyError, ClearMoviesStickyError`

Data Types `OSErr`

GetMoviesStickyError

Syntax

```
OSErr GetMoviesStickyError (VOID)
```

`GetMoviesStickyError` retrieves the sticky error value. The sticky error value is the first non-zero result code returned by an eligible QuickTime for Windows routine since `ClearMoviesStickyError` was last called.

Parameters

This routine takes no parameters.

Return

The first non-zero result code from the previous eligible QuickTime for Windows calls since the sticky error value was last cleared. Eligible QuickTime for Windows calls operate on movies (as opposed to movie controllers) and require a movie object.

Comments

Even if a movie routine explicitly returns an `OSErr`, the result is also available using the `GetMoviesStickyError` function.

The `GetMoviesStickyError` function does not clear the sticky error value. Use the `ClearMoviesStickyError` function for this purpose.

A result code will not be placed into the sticky error value until the field has been cleared. Your application should clear the sticky error value to ensure that it does not contain a stale result code.

Example

```
Movie mMovie;
LFIXED lfxRate;
•
•
// Assume call produces an error code

   lfxRate = GetMoviePreferredRate (mMovie);

// Assume other calls follow with no errors
•
•
   if (GetMoviesStickyError())
      {
      MessageBox (NULL, "GetMoviePreferredRate Failure",
         "Program", MB_OK);
      ClearMoviesStickyError();
      }
```

See Also

Functions

`GetMoviesError, ClearMoviesStickyError`

GetMovieStatus

Syntax
```
OSErr GetMovieStatus (Movie mMovie, LPVOID
lpvReserved)
```

`GetMovieStatus` returns an error code if there are any problems in the playing of the movie. For example, a particular track cannot play because there is insufficient memory.

Parameters

`Movie` `mMovie`
The movie object.

`LPVOID` `lpvReserved`
Reserved.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

You can use this call to detect any problems during playback.

Example

```
MovieFile mfMovie;
Movie mMovie;
LPVOID lpvReserved;
•
•
OpenMovieFile ("SAMPLE.MOV", &mfMovie, OF_READ);
NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);
CloseMovieFile (mfMovie);
if (GetMovieStatus (mMovie, lpvReserved))
   {
   /* Display error message. */
   }
```

See Also

Functions `GetMoviesError, GetMoviesStickyError`

GetMovieTime

Syntax
```
TimeValue GetMovieTime (Movie mMovie,
   TimeRecord FAR *trRecord)
```

`GetMovieTime` retrieves the current time of a movie at the point that the routine is called.

Parameters

Movie mMovie

The movie object.

TimeRecord *trRecord

The address of a TimeRecord which will be filled with the movie's time scale, time base and current time. The high 32 bits of the time value field are always 0, while the low 32 bits represent the same value as the returned TimeValue.

Return

A TimeValue containing the movie's current time at the point the routine is called. Use GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments

A movie's time coordinate system is based on a time scale scored in time units. The number of units that pass per second quantifies the scale: a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

When the duration of all or part of a movie is needed, it is expressed as the length of the portion of the movie in the number of time units it contains. Particular points in a movie can be identified by a time value, which is the number of time units to that point from the beginning of the movie.

Different movies may have different time scales. Use ConvertTimeScale to compare TimeValues between different movies.

Example

```
Movie mMovie;
TimeValue tvCurrentTime;
TimeRecord trTimeData;
•
•
// Get the movie's current time

   tvCurrentTime = GetMovieTime (mMovie, &trTimeData);
```

See Also

Functions

ConvertTimeScale, GetMovieDuration, MCGetCurrentTime, GetMovieTimeScale, GetMoviesError, GetMoviesStickyError

Data Types

TimeScale, TimeValue

GetMovieTimeScale

Syntax

```
TimeScale GetMovieTimeScale (Movie mMovie)
```

`GetMovieTimeScale` retrieves the time scale of a movie.

Parameters

`Movie` `mMovie`
The movie object.

Return

The time scale of the movie, i.e. the number of time units that pass per second. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

A movie's time coordinate system is based on a time scale scored in time units. The number of units that pass per second quantifies the scale: a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

When the duration of all or part of a movie is needed, it is expressed as the length of the portion of the movie in the number of time units it contains. Particular points in a movie can be identified by a time value, which is the number of time units to that point from the beginning of the movie.

Different movies may have different time scales. Use `ConvertTimeScale` to compare `TimeValues` between different movies.

Example

```
LONG lSize;
Movie mMovie;
TimeValue tvStart, tvDuration;
MovieController mcController;
•
•
// Get the number of bytes from the current position to two
// seconds later

   tvStart = MCGetCurrentTime(mcController, NULL);
   tvDuration = 2 * GetMovieTimeScale (mMovie);
   lSize = GetMovieDataSize (mMovie, tvStart, tvDuration);
```

See Also

Functions `ConvertTimeScale, GetMovieDuration, MCGetCurrentTime, GetMoviesError, GetMoviesStickyError`

Data Types `TimeScale, TimeValue`

GetMovieTrackCount

Syntax `LONG GetMovieTrackCount(Movie mMovie)`

Parameters *`Movie`* `mMovie`

The movie object.

Return The number of tracks contained in the movie. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The number of tracks returned includes both enabled and disabled tracks. Use GetMovieIndTrack to iterate through the tracks in the movie.

Example

```
LONG lCount;

lCount = GetMovieTrackCount(mMovie);
```

See Also

Functions GetMovieIndTrack

Data Types `Movie`

GetMovieUserData

Syntax `UserData GetMovieUserData (Movie mMovie)`

`GetMovieUserData` retrieves a handle to a list of user data belonging to a movie. This handle is maintained internally by QuickTime for Windows. You do not need to free it when you are finished using it.

Parameters *`Movie`* `mMovie`

The movie object.

Return The handle to a list of user data. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments A movie's user data list is placed in a movie by its creator and may contain items of various types. A common type is text containing copyright data, names of people involved in the movie's production, special hardware and software requirements, and other types of information about the movie. By convention, text user data types start with a "©" symbol. A list of commonly used text user data types may be found in Part 15 of QuickTime for Windows Concepts in the overview.

Example See the example in the description of `GetUserDataText.`

See Also

Functions `CountUserDataType, GetNextUserDataType, GetUserData, GetUserDataText, GetMoviesError, GetMoviesStickyError`

Data Types `UserData`

GetNextUserDataType

Syntax
```
OSType GetNextUserDataType (UserData udData,
   OSType ostType)
```

This function is used to retrieve the next user data type in a user data list.

Parameters

`UserData` `udData`
The handle to the user data list.

`OSType` `ostType`
The user data type. If zero is used, the first user data type in the list is returned. If a user data type is used, the next user data type is returned.

Return The next user data type, or zero if no more types are present. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments A movie's user data list is placed in a movie by its creator and may contain items of various types. A common type is text containing copyright data, names of people involved in the movie's production, special hardware and software requirements, and other types of information about the movie. By convention, text user data types start with a "©" symbol. A list of commonly used text user data types may be found in Part 15 of QuickTime for Windows Concepts in the overview.

Example See the example in the description of `GetUserDataText`.

See Also

Functions `CountUserDataType, GetNextUserDataType, GetUserData, GetUserDataText, GetMoviesError, GetMoviesStickyError`

Data Types `UserData`

GetPictureFileHeader

Syntax
```
OSErr GetPictureFileHeader (PicFile pfPicture,
   LPRECT lprcFrame, OpenCPicParams FAR *lpocppHeader)
```

`GetPictureFileHeader` retrieves the header to the picture file and the picture frame rectangle.

Parameters

`PicFile` `pfPicture`
The picture file reference value returned by `OpenPictureFile`.

`LPRECT` `lprcFrame`
The address of the picture frame rectangle.

`OpenCPicParams FAR` `*lpocppHeader`
The address of the picture file header data.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The picture frame rectangle and picture file header referenced by the second and third parameters are populated with the retrieved data. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments Picture files are characterized by the DOS file suffix ".PIC". They are DOS versions of Macintosh PICT and JFIF files.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
PicFile pfPicture;
OpenCPicParams ocppHeader;
RECT rcFrame;
•
•
OpenPictureFile ("HOUSE.PIC", &pfPicture, OF_READ);
GetPictureFileHeader (pfPicture, &rcFrame, &ocppHeader);
ClosePictureFile (pfPicture);
```

See Also

Functions `ClosePictureFile, DrawPictureFile, GetPictureFileInfo, GetPictureInfo, GetMoviesError, GetMoviesStickyError, OpenPictureFile`

Data Types `OpenCPicParams`

GetPictureFileInfo

Syntax

```
OSErr GetPictureFileInfo (PicFile pfPicture,
   ImageDescription FAR *idImageInfo)
```

`GetPictureFileInfo` retrieves detailed information about a picture file.

Parameters

`PicFile pfPicture`
The picture file reference value referred to by `OpenPictureFile`.

`ImageDescription FAR *idImageInfo`
The address of the image descriptor.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The image descriptor record is populated with information on the picture file. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The information retrieved by `GetPictureFileInfo` is more detailed than that retrieved by `GetPictureFileHeader`. Picture files are characterized by the DOS file suffix ".PIC". They are DOS versions of Macintosh PICT and JFIF files.

Example

```
PicFile pfPicture;
ImageDescription idImageInfo;
•
•
OpenPictureFile ("HOUSE.PIC", &pfPicture, OF_READ);
idImageInfo.idSize = sizeof (ImageDescription);
GetPictureFileInfo (pfPicture, &idImageInfo);
ClosePictureFile (pfPicture);
```

See Also

Functions `ClosePictureFile, GetPictureFileHeader, GetPictureInfo, GetMoviesError, GetMoviesStickyError, OpenPictureFile`

Data Types `ImageDescription`

GetPictureFromFile

Syntax `PicHandle GetPictureFromFile (PicFile pfPicture)`

`GetPictureFromFile` extracts a picture from a picture file.

Parameters *`PicFile`* `pfPicture`

The reference value assigned by `OpenPictureFile` .

Return A `PicHandle` for subsequently referencing the picture, `NULL` if failure. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments You can use the picture object returned by `GetPictureFromFile` to create a Windows Device Independent Bitmap (DIB).

Example

```
PicFile pfPicture;
PicHandle phThePict;
•
•
if (!OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ))
   {
   phThePict = GetPictureFromFile (pfPicture);
   ClosePictureFile (pfPicture);
   }
```

See Also

Functions `OpenPictureFile, ClosePictureFile, GetMoviesError, GetMoviesStickyError`

GetPictureInfo

Syntax

```
OSErr GetPictureInfo (PicHandle,
   ImageDescription FAR *)
```

`GetPictureInfo` retrieves detailed information about an image.

Parameters

`PicHandle phThePict`
The picture object.

`ImageDescription FAR` `*idImageInfo`
The address of the image descriptor.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The image descriptor record referenced by the second parameter is populated with information about the image. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

Pictures are created using `GetMoviePict`, `GetMoviePosterPict` and `GetPictureFromFile`. *Note: this routine only returns information about the first image in the picture. Future releases of QuickTime for Windows will upgrade this function.*

Example

```
Movie mMovie;
PicHandle phThePict;
ImageDescription idImageInfo;
•
•
if ((phThePict = GetMoviePosterPict (mMovie)) != NULL)
   {
   idImageInfo.idSize = sizeof (ImageDescription);
   GetPictureInfo (phThePict, &idImageInfo);
   }
```

See Also

Functions

`GetPictureFileHeader, GetPictureFileInfo, GetMoviePict, GetMoviePosterPict, GetMoviesError, GetMoviesStickyError`

Data Types

`ImageDescription`

GetPicturePalette

Syntax `HPALETTE GetPicturePalette (PicHandle phThePict)`

`GetPicturePalette` retrieves a palette from a picture.

Parameters *`PicHandle`* `phThePict`
A picture object.

Return A handle to the picture's palette, `NULL` if the picture has no palette. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments The returned `HPALETTE` can be used to display pictures using a Windows palette. You must free it, when you are done with it, using `DeleteObject`. `GetPicturePalette` always attempts to return a palette. If the picture does not have one, it returns a default palette.

Example

```
PicFile pfPicture;
PicHandle phThePict;
HPALETTE hPal;
•
•
if (!OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ))
   {
   phThePict = GetPictureFromFile (pfPicture);
   hPal = GetPicturePalette (phThePict);
   ClosePictureFile (pfPicture);
   }
```

See Also

Functions `ClosePictureFile, GetMoviesError, OpenPictureFile, GetMoviesStickyError, GetPictureFromFile,`

GetSoundInfo

Syntax `OSErr GetSoundInfo (Movie, SoundDescription FAR *)`

`GetSoundInfo` retrieves information about a movie's sound track.

Parameters

Movie mMovie

The movie object.

SoundDescription FAR *sdSoundInfo

The address of the sound description data.

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values. The sound description record is populated with data about the movie's sound track. You can use the routines GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments

GetSoundInfo retrieves useful information about a movie's sound track, such as number of channels, sample size and sampling rate.

Note: This routine is obsolete. Use GetMediaSampleDescription instead.

Example

```
Movie mMovie;
SoundDescription sdSoundInfo;
•
•
sdSoundInfo.descSize = sizeof (SoundDescription);
GetSoundInfo (mMovie, &sdSoundInfo);
if ((SHORT) sdSoundInfo.numChannels == 1)
   {
   /* Tell user sound is mono. */
   }
```

See Also

Functions

GetVideoInfo, GetMediaSampleDescription, GetMoviesError, GetMoviesStickyError

Data Types

SoundDescription

GetTrackDimensions

Syntax

```
void GetTrackDimensions(Track trkTrack, Fixed FAR
*width, Fixed FAR *height)
```


Parameters `*Track* trkTrack`

The track object.

`*Fixed* *width`

The width of the track before it has been transformed by the Track and Movie matrices. You may pass NULL for width, if you don't require this information.

`*Fixed* *height`

The height of the track before it has been transformed by the Track and Movie matrices. You may pass NULL for height, if you don't require this information.

Return You can use the routines `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments You use GetTrackDimensions in conjunction with GetTrackMatrix, GetMovieMatrix, and ConcatMatrix to determine the current screen location of any track in a movie.

See Also

Functions GetMovieMatrix, GetTrackMatrix, ConcatMatrix

Data Types `Track`

GetTrackMatrix

Syntax
```
void GetTrackMatrix(Track trkTrack, MatrixRecord FAR
*mtrxMatrix)
```

Parameters

Return

Comments

See Also

Functions

Data Types `Track, MatrixRecord`

GetTrackMedia

Syntax `Media GetTrackMedia(Track trkTrack)`

Parameters *`Track`* `trkTrack`

The track object.

Return The media associated with the specified track. If the track is not valid, 0 is returned.

Comments Use GetTrackMedia to obtain the media associated with a particular track. Some QuickTime for Windows calls require that the media, and not the track, be used to access media specific information. You can use the routines `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Example

```
Track trkTrack;
Media mdMedia;
OSType mediaType;

trkTrack = GetMovieIndTrack(mMovie, 1);
mdMedia = GetTrackMedia(trkTrack);
GetMediaHandlerDescription(mdMedia, &mediaType, NULL, NULL);
```

See Also

Functions GetMovieIndTrack, GetMovieIndTrackType, GetMediaTrack

Data Types `Media, Track`

GetTrackMovie

Syntax `Movie GetTrackMovie(Track trkTrack)`

Parameters *`Track`* `trkTrack`

The track object.

Return The movie associated with the specified track. If the track is invalid, 0 is returned for the movie.

Comments Use GetTrackMovie in cases where you are provided with a track but need to get back to its owner movie. You can use the routines `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Example

```
void myTrackFunction(Track trkTrack)
{
  Movie mMovie;

  mMovie = GetTrackMovie(trkTrack);

.
.
.
}
```

See Also

Functions GetMovieIndTrack, GetMovieIndTrackType, GetMediaTrack

Data Types `Movie, Track`

GetTrackPict

Syntax `PicHandle GetTrackPict(Track trkTrack, TimeValue tvTime)`

Parameters *`Track`* `trkTrack`
The track object.
TimeValue tvTime
The time within the track to retrieve the picture from.

Return A picture object. A NULL return indicates failure. You can also use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments This function may be called whether a movie is playing or not.

Use this function to retrieve the picture of a specified track, as opposed to the entire movie. This is useful when the movie contains multiple tracks with visual data, such as video and text.

The picture object returned is unusable by Windows directly. Use the function `PictureToDIB` to convert the image to a Windows Device Independent Bitmap (DIB). An alternative to converting the image is using `DrawPicture` to display it at specified coordinates.

See Also

Functions GetMoviePict, DrawPicture, KillPicture

Data Types `Track, PicHandle, TimeValue`

GetUserData

Syntax
```
OSErr GetUserData (UserData udData,
   LPHANDLE lphData, OSType ostType, LONG lIndex,
   LPLONG lplSize)
```

`GetUserData` retrieves data from an item in a user data list.

Parameters

`UserData` `udData`
The handle to the user data list.

`LPHANDLE` `lphData`
A handle for a block memory that will receive the requested data. This function will reallocate this memory to accommodate the data, if necessary.

`OSType` `ostType`
The user data type.

`LONG` `lIndex`
Each user data item is identified by a unique index value. Index values are assigned sequentially within a user data type starting with 1.

`LPLONG` `lplSize`
The size of the data returned.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use the routines `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments A movie's user data list is placed in a movie by its creator and may contain items of various types. A common type is text containing copyright data, names of people involved in the movie's production, special hardware and software requirements, and other types of information about the movie. By convention, text user data types start with a "©" symbol. A list of commonly used text user data types may be found in Part 15 of QuickTime for Windows Concepts in the overview.

Example See the example in the description of `GetUserDataText`.

See Also

Functions `CountUserDataType, GetMovieUserData, GetUserDataText, GetNextUserDataType, GetMoviesError, GetMoviesStickyError`

Data Types `UserData`

GetUserDataText

Syntax
```
OSErr GetUserDataText (UserData udData, LPHANDLE
   lphData, OSType ostType, LONG lIndex,
   UINT uRegionTag, LPLONG lplSize)
```

`GetUserDataText` retrieves text from an item in a user data list. Each user data text item may have alternative text. For example, multiple languages may be supported. Each alternative text value is identified by a region code. A table of these codes is provided in Appendix B.

Parameters

`UserData` `udData`
The handle to the user data list.

`LPHANDLE` `lphData`
A handle for a block memory that will receive the requested data. This function will reallocate this memory to accommodate the data, if necessary.

`OSType` `ostType`
The user data type.

`LONG` `lIndex`
Each user data item is identified by a unique index value. Index values are assigned sequentially within a user data type starting with 1.

`UINT` `uRegionTag`
A region tag that may identify alternate text. A table of these codes is provided in Appendix B.

`LPLONG` `lplSize`
The size of the text value returned.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use the routines `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

A movie's user data list is placed in a movie by its creator and may contain items of various types. A common type is text containing copyright data, names of people involved in the movie's production, special hardware and software requirements, and other types of information about the movie. By convention, text user data types start with a "©" symbol. A list of commonly used text user data types may be found in Part 15 of QuickTime for Windows Concepts in the overview.

Example

```
// A function that steps through the user data list

void CheckUserDataFunctions (Movie mCheck, UINT uRegionTag)
   {
   UserData udMovie;
   OSType   osType;
   LONG     lUserDataCount;
   LONG     i;
   LONG     lByteCount;
   HGLOBAL  hgMem;
   char     szText [256];
   LPSTR    lpszText;

// Get the user data handle

   udMovie = GetMovieUserData (mCheck);

// Allocate memory - note 128 is arbitrary amount

   hgMem = GlobalAlloc (GMEM_MOVEABLE, 128);

// Find the first user data type

   osType = GetNextUserDataType (udMovie, 0);

// Parse the user data list

   while ( osType != 0)
      {
      lUserDataCount = CountUserDataType (udMovie, osType);
      for ( i = 1; i <= lUserDataCount; i++)
         {
         if (GetUserDataText (udMovie, &hgMem, osType, i,
            uRegionTag, &lByteCount) == 0)
            {
```



```
            lpszText = (LPSTR) GlobalLock (hgMem);
            lpszText [lByteCount] = '\0';
            wsprintf (szText, "User Data of Type: %ld/%ld/%s",
               osType, i, lpszText);
            /* Display the text. */
            GlobalUnlock (hgMem);
            }
         }
         osType = GetNextUserDataType (udMovie, osType);
      }

// The program must free the memory

   GlobalFree (hgMem);
   }
```

See Also

Functions `CountUserDataType, GetMovieUserData, GetUserData, GetNextUserDataType, GetMoviesError, GetMoviesStickyError`

Data Types `UserData, OSType`

GetVideoInfo

Syntax
```
OSErr GetVideoInfo (Movie mMovie,
   ImageDescription FAR *)
```

`GetVideoInfo` retrieves information about a movie's video track.

Parameters

`Movie` `mMovie`
The movie object.

`ImageDescription FAR` `*idVideoInfo`
The address of the image description data.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The image description data is populated with information about the movie's video track. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments *Note: This routine is obsolete. Use GetMediaSampleDescription instead.*

Example

```
Movie mMovie;
ImageDescription idVideoInfo;
•
•
idVideoInfo.idSize = sizeof (ImageDescription);
GetVideoInfo (mMovie, &idVideoInfo);
```

See Also

Functions `GetSoundInfo, GetMediaSampleDescription, GetMoviesError, GetMoviesStickyError`

Data Types `ImageDescription`

HGetState

Syntax `signed char HGetState(Handle theHandle)`

Parameters *`Handle`* `theHandle`

The memory handle

Return A byte containing the current state of the handle.

Comments Use HGetState to store the current lock state of the handle before calling HLock. You can then use HSetState to restore the state later. This is necessary as HLock and HUnlock do not use a counter on the lock state, only a boolean flag.

Example

```
signed char saveState;
LPVOID lpvPtr;

saveState = HGetState(hHandle);
HLock(saveState);
lpvPtr = DereferenceHandle(hHandle);
.
.
.
HSetState(hHandle, saveState);
```

See Also

Functions HSetState, HLock, NewHandle

Data Types `Handle`

HLock

Syntax `void HLock(Handle theHandle)`

Parameters *`Handle`* `theHandle`
The memory handle

Return Use MemError to check for errors.

Comments HLock locks down the memory block referenced by theHandle. The contents of the block can only be accessed if the Handle is locked. Use HUnlock to unlock the handler. The lock state is stored as a boolean, not as a counter. Use HGetState and HSetState to save and restore the current lock state.

See Also

Functions HUnlock, HGetState, HSetState

Data Types `Handle`

HSetState

Syntax `void HSetState(Handle theHandle, signed char state)`

Parameters *`Handle`* `theHandle`
The memory handle
`signed char` `state`
A byte containing the new state of the handle

Return Use MemError to check for failure

Comments Use HSetState to restore the handle's lock state to the state previously obtained using HGetState. Because the handle's lock state is stored as a boolean flag instead of using a counter, HGetState and HSetState are provided to allow you to save and restore a Handle's current lock state.

Example

```
signed char saveState;
LPVOID lpvPtr;

saveState = HGetState(hHandle);
HLock(saveState);
lpvPtr = DereferenceHandle(hHandle);
.
.
.
HSetState(hHandle, saveState);
```

See Also

Functions HGetState, HLock, HUnlock

Data Types `Handle`

HUnlock

Syntax `void HUnlock(Handle theHandle)`

Parameters *`Handle`* `theHandle`
The memory handle

Return Use MemError to check for failure

Comments HUnlock unlocks the memory block referenced by theHandle. The contents of the block can only be accessed if the Handle is locked. Use HLock to lock the handler. The lock state is stored as a boolean, not as a counter. Use HGetState and HSetState to save and restore the current lock state.

See Also

Functions HLock, DereferenceHandle, HGetState, HSetState

Data Types `Handle`

KillPicture

Syntax `VOID KillPicture (PicHandle phPicture)`

`KillPicture` frees any memory being used by a QuickTime for Windows picture. Your program should call this routine when it is done working with a QuickTime for Windows picture.

Parameters *`PicHandle`* `phPicture`
The picture object whose memory is being released.

Return None. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments Either `KillPicture` or `DisposePicture` must be called, ultimately, for each picture instantiated by your program. It does not affect the DOS file containing the picture.

Example

```
PicHandle phPicture;
PicFile pfPicture;
•
•
if (!OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ))
   {
   phPicture = GetPictureFromFile (pfPicture);
   ClosePictureFile (pfPicture);
   }
•
•
KillPicture (phPicture);
```

See Also

Functions `GetPictureFromFile, OpenPictureFile, ClosePictureFile, DisposePicture, GetMoviesError, GetMoviesStickyError`

MAKELFIXED

Syntax `MAKELFIXED(integer, fract)`

`MAKELFIXED` is a macro used to construct an `LFIXED` variable.

Parameters *integer*

A signed sixteen-bit value representing the integral part of the LFIXED variable.

fract

An unsigned sixteen-bit value representing the fractional part of the LFIXED variable.

Comments LFIXED variables are normally used to hold movie rates in QuickTime for Windows. For example, the LFIXED value 0x0028000 could be used to represent a rate of 2.5.

Example

```
LFIXED lfxRate;

// Set the movie rate to 2.5

   lfxRate = MAKELFIXED(0x0002, 0x8000);
```

See Also

Functions MAKESFIXED (macro)

Data Types LFIXED, SFIXED

MAKESFIXED

Syntax MAKESFIXED(integer, fract)

MAKESFIXED is a macro used to construct an SFIXED variable.

Parameters *integer*

A signed eight-bit value representing the integral part of the SFIXED variable.

fract

An unsigned eight-bit value representing the fractional part of the SFIXED variable.

Comments SFIXED variables are normally used to hold movie sound track volumes in QuickTime for Windows. For example, the SFIXED value 0x0080 could be used to represent a sound volume of 0.5.

Example

```
SFIXED sfxVolume;

// Set the movie sound volume to 0.5

   sfxVolume = MAKESFIXED(0x00, 0x80);
```

See Also

Functions `MAKELFIXED` (macro)

Data Types `LFIXED, SFIXED`

MCActionFilter

Syntax

```
Boolean CALLBACK MCActionFilter (MovieController
   mcController, UINT uAction, LPVOID lpParam,
   LONG lRefCon)
```

`MCActionFilter` is the prototype for the filter function set by the routine `MCSetActionFilter`. It shows the parameters you must pass to your filter, and the value your filter must return.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
The action to be filtered, which is the same as the one passed to `MCDoAction`.

`LPVOID` `lpParam`
The optional extra parameter that modifies the action referenced by `uAction`, which is the same as the one passed to `MCDoAction`.

`LONG` `lRefcon`
Additional data of use to the filter when processing the action. Should be coded as `0L` if not used.

Return

`TRUE` indicates that the movie controller doesn't have to handle the action (since your filter has taken appropriate action), `FALSE` that it does.

Comments

`MCActionFilter` is not a defined QuickTime for Windows function. It is a prototype only, used as a template for your filter functions.

Example

```
Boolean CALLBACK __export MyFilter (MovieController, UINT,
   LPVOID, LONG);
•
•
Boolean CALLBACK __export MyFilter (MovieController
mcController,
   UINT uAction, LPVOID lpVoid, LONG lRefCon)
   {
   switch (uAction)
      {
      /* cases */
      }

   return FALSE;
   }
```

See Also

Functions `MCSetActionFilter`

MCActivate

Syntax

```
ComponentResult MCActivate (MovieController
   mcController, HWND hWnd, Boolean bActivate)
```

`MCActivate` sets a movie controller's state to active or inactive.

Parameters

`MovieController` `mcController`
The movie controller object.

`HWND` `hWnd`
The controller parent's window handle.

`Boolean` `bActivate`
`TRUE` to set the controller active.
`FALSE` to set the controller inactive.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

An inactive movie controller cannot receive mouse clicks and its appearance is grayed. Movie controllers are created with an active state by default.

A movie/movie controller pair can have opposing states. For example, a playing movie's controller can be deactivated, graying it and prohibiting further mouse input, but the movie will keep playing. In the case where the controller is active and the movie is inactive, the movie will receive no service from the QuickTime for Windows scheduler and will not play even though the controller is functional.

More than one movie controller can be active at a time. Both attached and detached movie controllers can be made inactive.

There is no QuickTime for Windows function to query the active state of a movie controller.

Example

```
MovieController mcController;
HWND hWndParent;
•
•
// Make the controller inactive to prevent its use

   MCActivate (mcController, hWndParent, FALSE);
```

See Also

Functions `GetMovieActive, SetMovieActive`

MCDoAction `mcActionActivate`

MCDoActionSee also the index entries for individual mcActions used by MCDoAction

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` causes a movie controller perform a specified action, based on the parameters passed to it.

Parameters

MovieController mcController
: The movie controller object.

UINT uAction
: An action flag parameter with the prefix "mcAction...". Each action flag parameter is documented in detail in the following pages.

LPVOID lpvParams
: A modifier of the uAction parameter.

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

MCDoAction is a powerful and versatile routine, often called by QuickTime for Windows internally, that is used to dictate most of the movie controller's behavior by taking particular defined actions. There are many mcActions in the QuickTime for Windows API, ranging from starting the movie to toggling low-level attributes. In most cases, an additional parameter is required to modify the task of the mcAction parameter. Often this is a Boolean value which can turn a certain attribute on or off, or a pointer to a value holding state information.

For example, your application might define a menu item that stops all currently playing movies. When the user selects this menu item, your application could use the MCDoAction function to instruct each controller to stop playing. You would do so by specifying the mcActionPlay action with the last parameter set to specify that the controller stop playing the movie.

Often you will issue a MCDoAction call in response to a user action, such as a menu selection. More importantly, you can trap a MCDoAction event issued by QuickTime for Windows itself in a filter, since QuickTime for Windows passes all MCDoAction calls through your filter (if you have one) before processing them. For further details, see MCSetActionFilter.

Example

```
MovieController mcController;
•
•
// Disable the keyboard interface

   MCDoAction (mcController, mcActionSetKeysEnabled,
      (LPVOID) FALSE);
```


See Also

Functions `MCSetActionFilter`

MCDoAction *mcActionActivate*

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionActivate` parameter causes the movie controller to be activated.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionActivate`

`LPVOID` `lpvParams`
NULL

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments An inactive movie controller cannot receive mouse clicks and its appearance is grayed. Movie controllers are created with an active state by default.

A movie/movie controller pair can have opposing states. For example, a playing movie's controller can be deactivated, graying it and prohibiting further mouse input, but the movie will keep playing. In the case where the controller is active and the movie is inactive, the movie will receive no service from the QuickTime for Windows scheduler and will not play even though the controller is functional.

More than one movie controller can be active at a time. Both attached and detached movie controllers can be made inactive.

Example
```
MovieController mcController;
•
•
// Activate the movie controller

   MCDoAction (mcController, mcActionActivate, NULL);
```


See Also

Functions	`MCActivate, MCDoAction, MCSetActionFilter`
MCDoAction	`mcActionDeactivate`

MCDoAction *mcActionBadgeClick*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

Your filter receives a `mcActionBadgeClick` notification when the user has clicked on a movie's badge.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionBadgeClick`

`LPVOID` `lpvParams`
Contains an LPBOOL which points to a boolean which is initially set to false. Your filter routine can set this boolean to false to cause the movie controller to ignore the click in the badge. This can be useful in cases where your application may wish to temporarily disable the use of badge clicks, while allowing the badge to remain visible.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Your application should normally never issue this action. An action filter function may trap it when the user has clicked on a movie's badge. See the description of `MCSetActionFilter` for details on the filter procedure.

If a controller's badge capability is enabled, then the badge is displayed whenever the controller is not visible. When the controller is visible, the badge is not displayed. If the badge capability is disabled, the badge is never displayed.

Example

See the sample program listing FILTERS.C in the QuickTime for Windows Tutorial section of this manual for further information about filters.

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetUseBadge`

MCDoAction mcActionControllerSizeChanged

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

Your filter receives a `mcActionControllerSizeChanged` notification when the user has resized the movie controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionControllerSizeChanged`

`LPVOID` `lpvParams`
NULL

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments Your application should normally never issue this action. An action filter function may trap it when the user has resized the movie controller. See the description of `MCSetActionFilter` for details on the filter procedure.

Example See the sample program listing FILTERS.C in the QuickTime for Windows Tutorial section of this manual for further information about filters.

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction *mcActionDeactivate*

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```


`MCDoAction` with the `mcActionDeactivate` parameter causes the movie controller to be deactivated.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionDeactivate`

`LPVOID` `lpvParams`
NULL

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

An inactive movie controller cannot receive mouse clicks and its appearance is grayed. Movie controllers are created with an active state by default.

A movie/movie controller pair can have opposing states. For example, a playing movie's controller can be deactivated, graying it and prohibiting further mouse input, but the movie will keep playing. In the case where the controller is active and the movie is inactive, the movie will receive no service from the QuickTime for Windows scheduler and will not play even if the controller is functional.

More than one movie controller can be active at a time. Both attached and detached movie controllers can be made inactive.

Example

```
MovieController mcController;
•
•
// Deactivate the movie controller

   MCDoAction (mcController, mcActionDeactivate, NULL);
```

See Also

Functions `MCActivate, MCDoAction, MCSetActionFilter`

MCDoAction `mcActionActivate`

MCDoAction *mcActionDraw*

Syntax

```
ComponentResult MCDoAction (MovieController
  mcController, UINT uAction, LPVOID lpvParams)
```


`MCDoAction` with the `mcActionDraw` parameter causes the movie image to be redrawn.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionDraw`

`LPVOID` `lpvParams`
NULL

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Your application can use `MCDoAction` with this parameter to send an update event to a movie controller.

Example

```
MovieController mcController;
•
•
// Update the movie image

   MCDoAction (mcController, mcActionDraw, NULL);
```

See Also

Functions

`MCDoAction, MCDraw, MCSetActionFilter`

MCDoAction *mcActionGetFlags*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetFlags` parameter retrieves a set of flag values that determine the behavior of the Movie Controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetFlags`

`LPVOID` `lpvParams`

A pointer to a long integer that contains the set of flag values:

```
mcFlagsUseWindowPalette
mcFlagSuppressStepButtons
mcFlagSuppressSpeakerButton
```

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments The retrieved flags are defined as follows:

`mcFlagSuppressStepButtons` - Determines whether the movie controller displays the step buttons. The step buttons allow the user to step the movie forward or backward one frame at a time. If this flag is set, the controller does not display the step buttons.

`mcFlagSuppressSpeakerButton` - Determines whether the movie controller displays the speaker button. The speaker button allows the user to control the movie's sound. If this flag is set, the controller does not display the speaker button.

`mcFlagsUseWindowPalette` - Determines whether the movie controller constructs a custom color palette, based on the color values found in the movie. This flag only works with display drivers that support palettes, typically those drivers that handle colors at pixel depth eight.

Example

```
MovieController mcController;
LONG lFlags;
•
•
// Hide the speaker button

MCDoAction (mcController, mcActionGetFlags
, (LPVOID) &lFlags);
lFlags |= mcFlagSuppressSpeakerButton;
MCDoAction (mcController, mcActionSetFlags, (LPVOID) lFlags);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetFlags`

MCDoAction *mcActionGetKeysEnabled*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetKeysEnabled` parameter determines whether a movie controller's keyboard interface is enabled.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetKeysEnabled`

`LPVOID` `lpvParams`
A pointer to a Boolean, set to `TRUE` if keyboard interface is enabled, `FALSE` if not.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

An inactive keyboard interface is the default attribute for a new movie controller. All key presses are ignored if the controller is in an inactive state.

Example

```
MovieController mcController;
Boolean bEnabled;
•
•
// Enable keystrokes for movie if they're disabled

   MCDoAction (mcController, mcActionGetKeysEnabled,
      (LPVOID) &bEnabled);
   if (!bEnabled)
      MCDoAction (mcController, mcActionSetKeysEnabled,
         (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetKeysEnabled`

MCDoAction *mcActionGetLooping*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetLooping` determines whether looping is enabled for a movie controller

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetLooping`

`LPVOID` `lpvParams`
A pointer to a Boolean, set to `TRUE` if looping is enabled, `FALSE` if not.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

A movie controller with looping enabled plays a movie continuously, starting over at the beginning of the movie when the end is reached. Palindrome looping makes the movie play backward to the beginning before starting over.

Example

```
MovieController mcController;
Boolean bLoop;
•
•
// Turn looping on for a movie if it is off

   MCDoAction (mcController, mcActionGetLooping,
      (LPVOID) &bLoop);
   if (!bLoop)
      MCDoAction (mcController, mcActionSetLooping,
         (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetLooping, mcActionSetLoopIsPalindrome`

MCDoAction *mcActionGetLoopIsPalindrome*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetLoopIsPalindrome` determines whether palindrome looping is enabled for a movie controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetLoopIsPalindrome`

`LPVOID` `lpvParams`
A pointer to a Boolean, set to `TRUE` if palindrome looping is enabled, `FALSE` if not.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

A movie controller with looping enabled plays a movie continuously, starting over at the beginning of the movie when the end is reached. Palindrome looping makes the movie play backward to the beginning when it reaches the end. Normal looping must also be enabled in order for palindrome looping to work.

Example

```
MovieController mcController;
Boolean bLoop;
•
•
// Turn palindrome looping on for a movie if it is off

   MCDoAction (mcController, mcActionGetLoopIsPalindrome,
      (LPVOID) &bLoop);
   if (!bLoop)
      {
      MCDoAction (mcController, mcActionSetLooping,
         (LPVOID) TRUE);
      MCDoAction (mcController, mcActionSetLoopIsPalindrome,
         (LPVOID) TRUE);
      }
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetLooping, mcActionSetLooping, mcActionSetLoopingIsPalindrome`

MCDoAction *mcActionGetPlayEveryFrame*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetPlayEveryFrame` parameter determines if the movie controller has been instructed to play every frame in the movie.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetPlayEveryFrame`

`LPVOID` `lpvParams`
A pointer to a Boolean, set to `TRUE` if movie controller set to play every frame in the movie, `FALSE` if not.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

If the movie is playing every frame, the sound will automatically be muted.

Example

```
MovieController mcController;
Boolean bPlay;
•
•
// See if every frame is being played. If not, make it so.

   MCDoAction (mcController, mcActionGetPlayEveryFrame,
      (LPVOID) &bPlay);
   if (!bPlay)
      MCDoAction (mcController, mcActionSetPlayEveryFrame,
         (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetPlayEveryFrame`

MCDoAction *mcActionGetPlayRate*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetPlayRate` parameter determines the movie's play rate.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetPlayRate`

`LPVOID` `lpvParams`
Pointer to a LFIXED play rate value.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Rate of play values greater than 0 correspond to forward rates; values less than 0 play the movie backward. A value of 0 stops the movie. The integer portion of the `LFIXED` value is signed. The fractional part is not.

The `LFIXED` value is the rate of the movie expressed as a multiplier of the recorded rate. For example, a value of 1.0 means play the movie at the recorded rate. A value of 1.5 would mean play the movie one and 1/2 times faster than its recorded rate.

Use `MCDoAction` with `mcActionPlay` to set a movie's playback rate.

Example

```
MovieController mcController;
LFIXED lfxRate;
•
•
// Get the movie's play rate.

   McDoAction (mcController, mcActionGetPlayRate,
      (LPVOID) &lfxRate);
```

See Also

Functions `GetMoviePreferredRate, MCDoAction, MCSetActionFilter`

MCDoAction `mcActionPlay`

MCDoAction *mcActionGetPlaySelection*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetPlaySelection` parameter determines whether a movie is constrained to playing a selected portion of a movie.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetPlaySelection`

`LPVOID` `lpvParams`
A pointer to a Boolean, set to `TRUE` if the movie will play only its selected portion, `FALSE` if not.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

A selection can be made and cleared using the movie controller. A darkened section of its slider represents the selected part of the movie.

Example

```
MovieController mcController;
Boolean bPlaySel;
•
•
// Turn off play selection if it is on

   MCDoAction (mcController, mcActionGetPlaySelection,
      (LPVOID) &bPlaySel);
   if (bPlaySel)
      MCDoAction (mcController, mcActionSetPlaySelection,
         (LPVOID) FALSE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetPlaySelection, mcActionSetSelectionBegin, mcActionSetSelectionDuration`

MCDoAction *mcActionGetTimeSliderRect*

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetTimeSliderRect` parameter returns the rectangle enclosing the slider in the Movie Controller. This action is useful, for example, in applications that display additional information, such as SMPTE time code, in a window that tracks the current position of the slider.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetTimeSliderRect`

`LPVOID` `lpvParams`
A pointer to a RECT. Set to empty if no slider exists. Otherwise, set to the smallest rectangle enclosing the slider. This rectangle is expressed in the co-ordinate space of the Movie Controller parent window.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

MCDoAction *mcActionGetUseBadge*

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetUseBadge` parameter determines whether a movie controller's ability to display a badge is enabled or disabled.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetUseBadge`

`LPVOID` `lpvParams`
A pointer to a Boolean, set to `TRUE` if the badge can be used, `FALSE` if not.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments If a controller's badge capability is enabled, then the badge is displayed whenever the controller is not visible. When the controller is visible, the badge is not displayed. If the badge capability is disabled, the badge is never displayed.

Example

```
MovieController mcController;
Boolean bBadge;
•
•
// Turn on the badge if it is off

   MCDoAction (mcController, mcActionGetUseBadge,
      (LPVOID) &bBadge);
   if (!bBadge)
      MCDoAction (mcController, mcActionSetUseBadge,
         (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetUseBadge, mcActionBadgeClick`

MCDoAction *mcActionGetVolume*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGetVolume` parameter retrieves the movie's volume.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGetVolume`

`LPVOID` `lpvParams`
A pointer to an `SFIXED` which will receive the volume.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments Volume ranges in value from -256 to +256. A negative value indicates the sound is muted, while preserving the absolute value of the volume.

Example

```
MovieController mcController;
SFIXED sfxVolume;
•
•
// Get the movie's volume

   MCDoAction (mcController, mcActionGetVolume,
      (LPVOID) &sfxVolume);
```

See Also

Functions `GetMoviePreferredVolume, MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetVolume`

MCDoAction *mcActionGoToTime*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionGoToTime` parameter causes the movie to be positioned at the specified time value.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionGoToTime`

`LPVOID` `lpvParams`
The address of a time record specifying the position at which the movie will be set.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

The minimum `TimeValue` you can supply in the `TimeRecord` pointed to in the third parameter is 0, which is the very beginning of the movie. The `TimeValue` is expressed in time units which are related to the movie's time scale.

The time coordinate system contains a time scale scored in time units. The number of units that pass per second quantifies the scale: a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

When the duration of all or part of a movie is needed, it is expressed as a number of time units. Particular points in a movie can be identified by a time value, which is the number of time units to that point from the beginning of the movie.

Different movies may have different time scales. Use `ConvertTimeScale` to compare `TimeValues` between different movies.

Example

```
MovieController mcController;
TimeValue tvLocation;
Movie mMovie;
TimeRecord trRecord;
•
•
// Advance the movie to the poster frame

tvLocation = GetMoviePosterTime (mMovie);
trRecord.value.dwLo = tvLocation;
trRecord.value.dwHi = 0;
trRecord.scale = GetMovieTimeScale (mMovie);
trRecord.base = 0;
MCDoAction (mcController, mcActionGoToTime,
   (LPVOID) &trRecord);
```

See Also

Functions

`ConvertTimeScale, GetMoviePosterTime, GetMovieTimeScale, MCDoAction, MCGetCurrentTime, MCSetActionFilter`

MCDoAction *mcActionIdle*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionIdle` parameter allocates processing time to a movie controller.

Parameters *MovieController* mcController
The movie controller object.

UINT uAction
mcActionIdle

LPVOID lpvParams
NULL

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments This action is used internally by QuickTime for Windows to keep movies playing. A filter you create can trap it and initiate further processing based on its being issued. In unusual cases where your program cannot use `MCIsPlayerMessage`, this action can be used directly to yield time to a movie to play.

Example See the sample program listing FILTERS.C in the QuickTime for Windows Tutorial section of this manual for further information about filters.

See Also

Functions `MCDoAction, MCIdle, MCSetActionFilter`

MCDoAction *mcActionKey*

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionKey` parameter causes a Windows `WM_KEYDOWN` or `WM_KEYUP` message to be passed to a movie controller.

Parameters *MovieController* mcController
The movie controller object.

UINT uAction
mcActionKey

LPVOID lpvParams
The address of a Windows `MSG` structure..

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments This action is normally issued by QuickTime for Windows internally when a key is pressed. A filter you create can trap it and initiate further processing based on its being issued. In unusual cases where your program cannot use `MCIsPlayerMessage`, this action could be used directly to facilitate playing a movie.

Example See the sample program listing FILTERS.C in the QuickTime for Windows Tutorial section of this manual for further information about filters.

See Also

Functions `MCDoAction, MCSetActionFilter, MCKey`

MCDoAction *mcActionMouseDown*

Syntax
```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

Your filter receives a `mcActionMouseDown` notification when the user has clicked on some part of the movie, its badge or the controller. For more specific notifications of what was clicked on, see mcActionMovieClick and mcActionBadgeClick.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionMouseDown`

`LPVOID` `lpvParams`
EventRecordPtr for the click. The event record contains the coordinates of the click.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments Your application should normally never issue this action. An action filter function may trap it when the user has clicked on some part of the movie, its badge or the controller. See the description of `MCSetActionFilter` for details on the filter procedure.

See Also

Functions	`MCDoAction, MCSetActionFilter`
MCDoAction	`mcActionMovieClick, mcActionBadgeClick`

MCDoAction *mcActionMovieClick*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

Your filter receives a `mcActionMovieClick` notification when the user has clicked on the movie iteself, and not the badge or the controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionMovieClick`

`LPVOID` `lpvParams`
EventRecordPtr for the click. The event record contains the coordinates of the click.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Your application should normally never issue this action. An action filter function may trap it when the user has clicked in the movie's content. See the description of `MCSetActionFilter` for details on the filter procedure.

See Also

Functions	`MCDoAction, MCSetActionFilter`
MCDoAction	`mcActionMouseDown, mcActionBadgeClick`

MCDoAction *mcActionPlay*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionPlay` parameter causes the movie to play at a specified play rate.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionPlay`

`LPVOID` `lpvParams`
`LFIXED` play rate value.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Play rate values greater than 0 correspond to forward rates; values less than 0 play the movie backward. A value of 0 stops the movie. The integer portion of the `LFIXED` value is signed. The fractional part is not.

The `LFIXED` value is the rate of the movie expressed as a multiplier of the recorded rate. For example, a value of 1.0 means play the movie at its normal rate. A value of 1.5 would mean play the movie one and 1/2 times faster than its normal rate.

Use `MCDoAction` with `mcActionGetPlayRate` to determine a movie's playback rate.

Example

```
Movie mMovie;
MovieController mcController;
LFIXED lfxRate;
•
•
// Play the movie at 1.5 times its preferred rate.

   lfxRate = MAKELFIXED(0x0001, 0x8000);
   McDoAction (mcController, mcActionPlay, (LPVOID) lfxRate);
```

See Also

Functions `GetMoviePreferredRate, MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetPlayRate`

MCDoAction *mcActionSetFlags*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetFlags` parameter sets a defined collection of flags that determine the behavior of the Movie Controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetFlags`

`LPVOID` `lpvParams`
A long integer that contains the flags to be set:

`mcFlagsUseWindowPalette`
`mcFlagSuppressStepButtons`
`mcFlagSuppressSpeakerButton`

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

The following flags are defined:

`mcFlagSuppressStepButtons` - Determines whether the movie controller displays the step buttons. The step buttons allow the user to step the movie forward or backward one frame at a time. If this flag is set, the controller does not display the step buttons.

`mcFlagSuppressSpeakerButton` - Determines whether the movie controller displays the speaker button. The speaker button allows the user to control the movie's sound. If this flag is set, the controller does not display the speaker button.

`mcFlagsUseWindowPalette` - Determines whether the movie controller constructs a custom color palette, based on the color values found in the movie. This flag only works with display drivers that support palettes, typically those drivers that handle colors at a pixel depth of eight.

Example

```
MovieController mcController;
LONG lFlags;

// Show the speaker button

   MCDoAction (mcController, mcActionGetFlags, &lFlags);
   lFlags &= ~mcFlagSuppressSpeakerButton;
   MCDoAction (mcController, mcActionSetFlags, (LPVOID)
      lFlags);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetFlags`

MCDoAction *mcActionSetGrowBoxBounds*

Syntax

```
ComponentResult MCDoAction (MovieController
  mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetGrowBoxBounds` sets the size of the rectangle in which a movie can be resized.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetGrowBoxBounds`

`LPVOID` `lpvParams`
A pointer to the bounds rectangle which defines the new limits.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments Using an empty rectangle results in a movie controller not having a grow box. Using the current bounds rectangle (see `MCGetControllerBoundsRect`) allows resizing the movie smaller only. Using the client window rectangle allows resizing the movie up to the size of the client window.

Example

```
MovieController mcController;
RECT rcBounds;
•
•
// Allow resizing only less than current bounds

   MCGetControllerBoundsRect (mcController, &rcBounds);
   MCDoAction (mcController, mcActionSetGrowBoxBounds,
      (LPVOID) &rcBounds);
```

See Also

Functions `MCDoAction, MCGetControllerBoundsRect, MCSetActionFilter`

MCDoAction *mcActionSetKeysEnabled*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetKeysEnabled` sets a movie controller's keyboard interface to the active or inactive state.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetKeysEnabled`

`LPVOID` `lpvParams`
A Boolean, set to `TRUE` to enable a keyboard interface, `FALSE` to disable it.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

An inactive keyboard interface is the default attribute for a new movie controller. If the movie controller is made inactive, all key presses are ignored.

Example

```
MovieController mcController;
•
•
// Enable a movie controller's keyboard interface

   MCDoAction (mcController, mcActionSetKeysEnabled,
      (LPVOID) TRUE);
```


See Also

Functions	`MCDoAction, MCKey, MCSetActionFilter`
MCDoAction	`mcActionGetKeysEnabled, mcActionKey`

MCDoAction *mcActionSetLooping*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetLooping` parameter enables or disables looping for a movie controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetLooping`

`LPVOID` `lpvParams`
A Boolean, set to `TRUE` to enable looping, `FALSE` to disable it.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

A movie controller with looping enabled plays a movie continuously, starting over at the beginning of the movie when the end is reached. Palindrome looping makes the movie play backward to the beginning before starting over.

Example

```
MovieController mcController;
•
•
// Turn looping on for a movie

   MCDoAction (mcController, mcActionSetLooping,
      (LPVOID) TRUE);
```

See Also

Functions	`MCDoAction, MCSetActionFilter`
MCDoAction	`mcActionGetLooping, mcActionSetLoopIsPalindrome`

MCDoAction *mcActionSetLoopIsPalindrome*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetLoopIsPalindrome` parameter enables or disables palindrome looping for a movie controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetLoopIsPalindrome`

`LPVOID` `lpvParams`
A Boolean, set to `TRUE` to enable palindrome looping, `FALSE` to disable it.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

A movie controller with looping enabled plays a movie continuously, starting over at the beginning of the movie when the end is reached. Palindrome looping makes the movie play backward to the beginning when it reaches the end. Normal looping must also be enabled in order for palindrome looping to work.

Example

```
MovieController mcController;
•
•
// Turn palindrome looping on for a movie

   MCDoAction (mcController, mcActionSetLooping,
      (LPVOID) TRUE);
   MCDoAction (mcController, mcActionSetLoopIsPalindrome,
      (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionSetLooping, mcActionGetLoopIsPalindrome`

MCDoAction *mcActionSetPlayEveryFrame*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetPlayEveryFrame` parameter instructs the movie controller to play every frame in the movie.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetPlayEveryFrame`

`LPVOID` `lpvParams`
A Boolean, set to `TRUE` to play every frame in the movie, `FALSE` to play movie frames normally.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Issuing this instruction will automatically mute the movie's sound.

Example

```
MovieController mcController;
•
•
// Instruct the movie controller to play every frame

   MCDoAction (mcController, mcActionSetPlayEveryFrame,
      (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetPlayEveryFrame, mcActionPlay`

MCDoAction *mcActionSetPlaySelection*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetPlaySelection` parameter constrains or unconstrains a movie controller to playing only the current selection.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetPlaySelection`

`LPVOID` `lpvParams`
A Boolean, set to `TRUE` to constrain the controller to playing only its current selection, `FALSE` to unconstrain the controller.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

A selection can be made and cleared using the movie controller. A darkened section of its slider represents the selected part of the movie.

Example

```
MovieController mcController;
•
•
// Constrain playing to the selection

   MCDoAction (mcController, mcActionSetPlaySelection,
      (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetPlaySelection, mcActionSetSelectionBegin, mcActionSetSelectionDuration`

MCDoAction *mcActionSetSelectionBegin*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetSelectionBegin` parameter sets the starting point of a selected portion of a movie.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetSelectionBegin`

`LPVOID` `lpvParams`
A pointer to a time record. You must specify the start time for the selection in the `TimeValue` field.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

This action has no effect unless a `mcActionSetPlaySelection` has been effected.

A selection can be made and cleared using the movie controller. A darkened section of its slider represents the selected part of the movie.

Example

```
MovieController mcController;
TimeRecord trRecord;
Movie mMovie;
TimeValue tvStart, tvDuration;
•
•
// Set the selection start time

   trRecord.value.dwLo = tvStart;
   trRecord.value.dwHi = 0;
   trRecord.scale = GetMovieTimeScale (mMovie);
   MCDoAction (mcController, mcActionSetSelectionBegin,
      (LPVOID) &trRecord);

// Set the selection duration

   trRecord.value.dwLo = tvDuration;
   trRecord.value.dwHi = 0;
   trRecord.scale = GetMovieTimeScale (mMovie);
   MCDoAction (mcController, mcActionSetSelectionDuration,
      (LPVOID) &trRecord);
```


See Also

Functions	`GetMovieActiveSegment, MCDoAction, MCSetActionFilter`
MCDoAction	`mcActionSetSelectionDuration, mcActionSetPlaySelection`
Data Types	`TimeScale, TimeValue`

MCDoAction *mcActionSetSelectionDuration*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetSelectionDuration` parameter sets the duration of a selected portion of a movie.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetSelectionDuration`

`LPVOID` `lpvParams`
The address of a time record. You must specify the duration of the selection in the `TimeValue` field.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

This action has no effect unless a `mcActionSetPlaySelection` has been effected. A selection can be made and cleared using the movie controller. A darkened section of its slider represents the selected part of the movie.

Example

```
MovieController mcController;
TimeRecord trRecord;
Movie mMovie;
TimeValue tvStart, tvDuration;
•
•
// Set the selection start time

   trRecord.value.dwLo = tvStart;
   trRecord.value.dwHi = 0;
   trRecord.scale = GetMovieTimeScale (mMovie);
   MCDoAction (mcController, mcActionSetSelectionBegin,
      (LPVOID) &trRecord);

// Set the selection duration

   trRecord.value.dwLo = tvDuration;
   trRecord.value.dwHi = 0;
   trRecord.scale = GetMovieTimeScale (mMovie);
   MCDoAction (mcController, mcActionSetSelectionDuration,
      (LPVOID) &trRecord);
```

See Also

Functions `GetMovieActiveSegment, MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetSelectionBegin, mcActionSetPlaySelection, mcActionGetPlaySelection`

Data Types `TimeScale, TimeValue`

MCDoAction *mcActionSetUseBadge*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetUseBadge` parameter enables or disables a movie controller's ability to display a badge.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetUseBadge`

`LPVOID` `lpvParams`
A Boolean, set to `TRUE` to enable the ability to display a badge, `FALSE` to disable it.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments If a controller's badge capability is enabled, then the badge is displayed whenever the controller is not visible. When the controller is visible, the badge is not displayed. If the badge capability is disabled, the badge is never displayed.

Example

```
MovieController mcController;
•
•
// Turn on the ability to display a badge

   MCDoAction (mcController, mcActionSetUseBadge,
      (LPVOID) TRUE);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetUseBadge`

MCDoAction *mcActionSetVolume*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionSetVolume` parameter sets the movie's volume.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionSetVolume`

`LPVOID` `lpvParams`
A `SFIXED` value indicating the volume.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments Volume ranges in value from -256 to +256. A negative value indicates the sound is muted, while preserving the absolute value of the volume.

Example

```
MovieController mcController;
Movie mMovie;
SFIXED sfxVolume;
•
•
// Set the movie's volume to its preferred level

   sfxVolume = GetMoviePreferredVolume (mMovie);
   MCDoAction (mcController, mcActionSetVolume,
      (LPVOID) sfxVolume);
```

See Also

Functions `GetMoviePreferredVolume, MCDoAction, MCSetActionFilter`

MCDoAction `mcActionGetVolume`

MCDoAction *mcActionStep*

Syntax

```
ComponentResult MCDoAction (MovieController
   mcController, UINT uAction, LPVOID lpvParams)
```

`MCDoAction` with the `mcActionStep` parameter causes the movie to play a specified number of frames at a time.

Parameters

`MovieController` `mcController`
The movie controller object.

`UINT` `uAction`
`mcActionStep`

`LPVOID` `lpvParams`
A `SHORT` indicating the number of frames in the step.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Using a positive number of frames steps the movie forward. Using a negative number steps the movie backward.

Example

```
MovieController mcController;
•
•
// Step the movie forward three frames

   MCDoAction (mcController, mcActionStep, (LPVOID) 3);
```

See Also

Functions `MCDoAction, MCSetActionFilter`

MCDoAction `mcActionPlay`

MCDraw

Syntax

```
ComponentResult MCDraw (MovieController
   mcController, HWND hWnd)
```

`MCDraw` redraws the movie image.

Parameters

`MovieController` `mcController`
The movie controller object.

`HWND` `hWnd`
The handle to the window.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments `MCDraw` calls `MCDoAction` with `mcActionDraw`. `MCDraw` is typically used to manually refresh the movie image.

Example

```
MovieController mcController;
HWND hWnd;
•
•
MCDraw (mcController, hWnd);
```

See Also

Functions `MCIsPlayerMessage`

MCDoAction `mcActionDraw`

MCDrawBadge

Syntax

```
ComponentResult MCDrawBadge (MovieController
   mcController, HRGN hrgnMovieRgn,
   HRGN FAR *lphrgnBadgeRgn)
```

`MCDrawBadge` displays a movie controller's badge.

Parameters

`MovieController` `mcController`
The movie controller object.

`HRGN` `hrgnMovieRgn`
Must be set to NULL

`HRGN FAR` `*lphrgnBadgeRgn`
The address of the handle to a windows region which will be set to the region occupied by the badge. If called as NULL, no region is returned.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The window region referenced by the third parameter will be populated with information about the badge.

Comments

The second parameter must be NULL.

A badge may be drawn whether the movie is paused or playing. Any new movie frame, however, will overlay it. The recommended method for displaying a badge is to specify the `mcWithBadge` flag when `NewMovieController` is called, which will display it automatically when the movie controller is hidden. You can also enable a controller to display a badge by using `MCDoAction` with `mcActionSetUseBadge`.

`MCDrawBadge` ignores the `mcWithBadge` flag and will work even if the flag was not specified when the movie controller was created.

`MCSetVisible` also may be used to draw a badge by side effect, if the movie controller's visibility is set to `FALSE` and its badge flag is turned on.

Example

```
MovieController mcController;
HRGN hrgnBadge;
•
•
MCDrawBadge (mcController, NULL, &hrgnBadge);
```


See Also

Functions	`MCSetVisible`
MCDoAction	`mcActionGetUseBadge, mcActionSetUseBadge`

MCGetControllerBoundsRect

Syntax

```
ComponentResult MCGetControllerBoundsRect
   (MovieController mcController, LPRECT lprcBounds)
```

`MCGetControllerBoundsRect` retrieves the bounds rectangle of the movie and movie controller, or just the controller, depending on whether they are attached or detached.

Parameters

`MovieController` `mcController`
The movie controller object.

`LPRECT` `lprcBounds`
The address of the bounds rectangle.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The bounds rectangle is populated with the bounds coordinates.

Comments

If the movie controller is attached to the movie, the bounds rectangle referenced by the second parameter is the smallest rectangle completely encompassing both the movie and movie controller. When a controller is detached, its dimensions alone determine the bounds rectangle. See the illustrations in subsection A, Part 10 of the overview.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
RECT rcBounds;
MovieController mcController;
•
•
MCGetControllerBoundsRect (mcController, &rcBounds);
```

See Also

Functions	`MCNewAttachedController, MCSetControllerAttached, MCSetControllerBoundsRect`

MCGetControllerInfo

Syntax

```
ComponentResult MCGetControllerInfo (MovieController
   mcController, LPLONG lplMcInfoFlags)
```

`MCGetControllerInfo` determines the current status of a set of movie controller flags.

Parameters

`MovieController` `mcController`
The movie controller object.

`LPLONG` `lplMCInfoFlags`
The address of a long integer which will contain the bit flags denoting various movie controller attributes:

```
mcInfoHasSound
mcInfoIsPlaying
mcInfoIsLooping
mcInfoIsInPalindrome
```

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. The long integer referenced by the second parameter will be populated with flag settings indicating controller attributes.

Comments

The `MCInfoFlags` are defined as follows:

`mcInfoHasSound` - Indicates the movie has a sound track.

`mcInfoIsPlaying` - Indicates the movie was playing when the call was made.

`mcInfoIsLooping` - Indicates the controller was playing the movie in looping mode when the call was made.

`mcInfoIsInPalindrome` - Indicates the controller was playing the movie in palindrome mode when the call was made.

Example

```
MovieController mcController;
LONG lMCInfoFlags;
•
•
// See if the movie has sound

   MCGetControllerInfo (mcController, &lMCInfoFlags);
   if (lMCInfoFlags & mcInfoHasSound)
      /* Appropriate action if movie has sound. */
   else
      /* Appropriate action if movie has no sound. */
```

See Also

Functions `MCDoAction`

MCDoAction `mcActionSetLooping, mcActionSetLoopIsPalindrome, mcActionPlay`

MCGetCurrentTime

Syntax `TimeValue MCGetCurrentTime (MovieController mcController, TimeScale FAR *tsScale)`

`MCGetCurrentTime` retrieves the time value represented by the slider control on the movie controller. It can also be used to obtain the time scale for this time value.

Parameters

`MovieController` `mcController`
The movie controller object.

`TimeScale FAR` `*tsScale`
A pointer to the `TimeScale` value. May be set to NULL if it is not needed.

Return The `TimeValue` represented by the slider on the controller. If there are no movies associated with the controller, the returned `TimeValue` is set to zero.

Comments This function may be called whether a movie is playing or not.

Example

```
Movie mMovie;
MovieController mcController;
PicHandle phPicture;
RECT rcPicture;
HDC hdc;
TimeValue tvTime;
•
•
// Retrieve frame at current movie time plus two seconds

   tvTime = MCGetCurrentTime (mcController, NULL) +
      (2 * GetMovieTimeScale (mMovie));
   if ((phPicture = GetMoviePict (mMovie, tvTime)) != NULL)
      DrawPicture (hdc, phPicture, &rcPicture, NULL);
```

See Also

Functions `MCDoAction`

MCDoAction `mcActionGoToTime`

Data Types `TimeScale, TimeValue`

MCGetMovie

Syntax `Movie MCGetMovie (MovieController mcController)`

`MCGetMovie` retrieves the movie object associated with a specified movie controller.

Parameters *`MovieController`* `mcController`

The movie controller object.

Return The movie object associated with the movie controller. NULL is returned if no movie is associated with the controller.

Comments The associated movie object is retrieved whether the controller is attached or not.

Example

```
MovieController mcController;
Movie mMovie;
•
•
mMovie = MCGetMovie (mcController);
```

See Also

Functions `MCSetMovie`

MCGetVisible

Syntax
```
ComponentResult MCGetVisible (MovieController
   mcController)
```

`MCGetVisible` determines whether a movie controller is visible.

Parameters
`MovieController` `mcController`
The movie controller object.

Return
`FALSE` if the movie controller is invisible. `TRUE` if the movie controller is visible. See Appendix A for error condition values.

Comments
Use the function `MCSetVisible` to make a movie controller visible or invisible.

Example
```
MovieController mcController;
•
•
// Make controller invisible if it is visible

   if (MCGetVisible (mcController))
      {
      MCSetVisible (mcController, FALSE);
      }
```

See Also

Functions
`MCSetVisible, MCActivate`

MCIdle

Syntax
```
ComponentResult MCIdle (MovieController
   mcController)
```

`MCIdle` is used to keep a movie playing when your program is unable to use `MCIsPlayerMessage`.

Parameters
`MovieController` `mcController`
The movie controller object.

Return
`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments `MCIdle` calls `MCDoAction` with `mcActionIdle`. Using the routine `MCIsPlayerMessage` is the recommended method to keep a movie playing, and you should use `MCIdle` only in special circumstances where you must micro-manage the movie controller or cannot use `MCIsPlayerMessage`.

See Also

Functions `MCDoAction, MCIsPlayerMessage`

MCDoAction `mcActionIdle`

MCIsControllerAttached

Syntax
```
ComponentResult MCIsControllerAttached
   (MovieController mcController)
```

`MCIsControllerAttached` determines whether a movie controller is attached to a movie.

Parameters *`MovieController`* `mcController`
The movie controller object.

Return `TRUE` if the controller is attached, `FALSE` if not. Otherwise an error condition. See Appendix A for error condition values.

Comments Use the `MCSetControllerAttached` function to attach or detach a movie controller. Remember not to confuse attachment with association. An attached controller is physically adjacent to the movie on the screen. An associated controller is used to run a movie, and need not be attached.

Example
```
MovieController mcController;
RECT rcMovie, rcController;
•
•
// Detach the controller and move it away from movie
// But only if it is attached

   if (MCIsControllerAttached (mcController))
      {
      MCSetControllerAttached (mcController, FALSE);
      MCPositionController (mcController, &rcMovie,
         &rcController, 0L);
      }
```


See Also

Functions `MCPositionController, MCSetControllerAttached`

MCIsPlayerMessage

Syntax
```
ComponentResult MCIsPlayerMessage (MovieController
   mcController, HWND hWnd, UINT wMessage,
   WPARAM wParam, LPARAM lParam)
```

`MCIsPlayerMessage` is the routine normally used to keep a movie playing. It is called in a program's window procedure and redirects all messages targeted for the movie controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`HWND` `hWnd`
The argument received by the window procedure.

`UINT` `wMessage`
The argument received by the window procedure.

`WPARAM` `wParam`
The argument received by the window procedure.

`LPARAM` `lParam`
The argument received by the window procedure.

Return

If a message received by the window procedure is not meant for the movie controller, `MCIsPlayerMessage` returns `FALSE` and the message gets processed normally. If the message is handled by the movie controller, `MCIsPlayerMessage` returns `TRUE`.

Comments

For each movie controller you create, you will have to code a separate call to `MCIsPlayerMessage` with the corresponding movie controller object as the first parameter.

`MCIsPlayerMessage` is not the only method of playing a movie. However, it is highly recommended. See the descriptions of `MCIdle` and `MCKey`.

Example

```
LONG FAR PASCAL WndProc (HWND hWnd, UINT msg, WPARAM wParam,
   LPARAM lParam)
   {
// Drive the movie controller

   if (MCIsPlayerMessage (mcController, hWnd, msg, wParam, lParam))
      return 0;

// Process the windows message

   switch (msg)
      {
      •
      •
      }
   }
```

See Also

Functions `MCIdle, MCKey`

MCKey

Syntax

```
ComponentResult MCKey (MovieController mcController,
   WPARAM wParam, LPARAM lParam);
```

`MCKey` calls `MCDoAction` with `mcActionKey`, which causes a Windows `WM_KEYDOWN` or `WM_KEYUP` message to be passed to a movie controller.

Parameters

`MovieController` `mcController`
The movie controller object.

`WPARAM` `wParam`
The argument received by the window procedure.

`LPARAM` `lParam`
The argument received by the window procedure.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

`MCKey` and `MCIdle` can be used instead of `MCIsPlayerMessage`, when your program is unable to use `MCIsPlayerMessage`.

See Also

Functions `MCIsPlayerMessage, MCIdle`

MCMovieChanged

Syntax
```
ComponentResult MCMovieChanged (MovieController
mcController, Movie m);
```

Parameters

MovieController mcController
The movie controller object.

Movie m
The associated movie.

Return
`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments
You must call `MCMovieChanged` after a series of one or more `SetTrackEnabled` calls to instruct the Movie Controller to rebuild its visual appearance.

Example
```
Movie m;
Track trkText;
      •
      •
trkText = GetMovieIndTrackType (m, 1,
            TextMediaType movieTrackMediaType);
SetTrackEnabled (trkText, FALSE);
      •
      •
MCMovieChanged (mc, m);
```

See Also

Functions
`GetMovieIndTrackType, SetTrackEnabled`

MCNewAttachedController

Syntax
```
ComponentResult MCNewAttachedController
   (MovieController mcController, Movie mMovie,
   HWND hWnd, POINT ptUpperLeft)
```

`MCNewAttachedController` attaches an existing movie to an existing movie controller.

Parameters

MovieController mcController
The existing movie controller object.

Movie mMovie
: The existing movie object.

HWND hWnd
: The parent window handle.

POINT ptUpperLeft
: The upper left corner of the movie rectangle.

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

When a movie is associated with a movie controller, a reference to the movie object is recorded in the controller's data structure. Movie data structures contain no elements which link them with movie controllers.

The point specified by ptUpperLeft becomes the new upper left corner of the bounds rectangle.

Once a movie is associated with a controller, it starts playing immediately (assuming it has a non-zero play rate, which is normally the case). To make a movie paused when first visible and associated with a new controller, you can use MCDoAction with an action of mcActionPlay and a play rate of 0. It is good style to do this as soon as possible after performing the association.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
Movie mMovie;
MovieController mcController;
POINT ptUpperLeft;
•
•
MCNewAttachedController (mcController, mMovie, hWnd,
  ptUpperLeft);
```

See Also

Functions

NewMovieController, MCSetMovie

MCPositionController

Syntax

```
ComponentResult MCPositionController
   (MovieController mcController, LPRECT
   lprcMovieRect, LPRECT lprcControllerRect,
   LONG lControllerCreationFlags)
```

`MCPositionController` sets the size and position of a movie and its controller. This function works with both attached and detached movie controllers.

Parameters

`MovieController` `mcController`
The movie controller object.

`LPRECT` `lprcMovieRect`
The address of a RECT structure specifying the coordinates of the movie's bounds rectangle.

`LPRECT` `lprcControllerRect`
The address of a RECT structure specifying the coordinates of the controller's bounds rectangle. Use NULL if the movie controller is attached.

`LONG` `lControllerCreationFlags`
A `LONG` containing flags that modify the result of the routine. These are the same flags used with `NewMovieController`. If you set this parameter to 0, the movie will be centered in the movie rectangle and the movie will be scaled to fit in that rectangle. These flags are:

`mcTopLeftMovie` - Places the movie at the top left hand corner of the movie rectangle specified.

`mcScaleMovieToFit` - Resizes the movie to fit into the movie rectangle specified (excluding the area taken up by the controller).

See subsection A, part 10 of the overview for further information on how these flags function.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

This is the recommended call to reposition and resize a movie with a detached controller. Remember not to confuse attachment with association. An attached controller is physically adjacent to the movie.

An associated controller is used to run a movie, and need not be attached.

Whenever the controller bounds rectangle changes, your action filter, if any, will get called with the `mcActionControllerSizeChanged` after the changes to the rectangle have occurred.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
MovieController mcController;
RECT rcMovie, rcController;
•
•
// Detach the controller and move it away from movie

   MCSetControllerAttached (mcController, FALSE);
   MCPositionController (mcController, &rcMovie,
      &rcController, 0L);
•
•
// Re-attach the controller

   MCSetControllerAttached (mcController, TRUE);
```

See Also

Functions `MCIsControllerAttached, MCSetControllerAttached, NewMovieController, SetMovieBox`

MCSetActionFilter

Syntax

```
ComponentResult MCSetActionFilter (MovieController
   mcController, MCActionFilter lpfnFilter,
   LONG lRefCon)
```

`MCSetActionFilter` sets an action filter function for a movie controller.

Parameters

MovieController mcController
The movie controller object.

MCActionFilter lpfnFilter
The address of the user-defined filter function.

LONG lRefCon
Additional data of use to the filter when processing the action. Should be coded as 0L if not used.

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

An action filter intercepts the MCDoAction call, providing the opportunity to process the action item before the movie controller.

The filter function must return a Boolean: TRUE indicates the controller doesn't have to handle the action. FALSE tells the controller to complete any appropriate processing of the action item.

To remove the filter, you must call MCSetActionFilter with the filter function address set to NULL.

If you compile your program using Borland *smart callbacks* or Microsoft's -GEs compiler option, or your filter function is in a dynamic link library, you do not need to use MakeProcInstance on your filter address before calling MCSetActionFilter.

Example

```
// Filter function declaration

 Boolean CALLBACK __export MyFilter (MovieController mcController,
      UINT uAction, LPVOID lpParam, LONG lRefCon);

----------------------------------------------------------------

// The application window procedure

   MovieController mcController;
   struct {...} *pData;
   •
   •
   MCSetActionFilter (mcController, MyFilter, (LONG) pData);

// The filter function

   Boolean CALLBACK __export MyFilter (MovieController mcController,
      UINT uAction, LPVOID lpParam, LONG lRefCon)
      {
      PVOID pStruct;

      switch (uAction)
         {
         case mcActionControllerSizeChanged:

            pStruct = (PVOID) lRefCon;

         /* Do something with structure whose address was passed. */
            •
            •
            return TRUE;

         default:
            return FALSE;
         }
      }
```

See Also

Functions `MCDoAction, MCActionFilter`

MCSetControllerAttached

Syntax

```
ComponentResult MCSetControllerAttached
   (MovieController mcController, Boolean bAttach)
```

`MCSetControllerAttached` attaches or detaches a movie controller from a movie.

Parameters

`MovieController` `mcController`
The movie controller object.

`Boolean` `bAttach`
`TRUE` attaches the movie controller, `FALSE` detaches it.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Remember not to confuse attachment with association. An attached controller is physically adjacent to the movie on the screen. An associated controller is used to run a movie, and need not be attached.

If the controller is physically removed from the movie prior to attachment, it will jump to its normal attached position directly below the movie when `MCSetControllerAttached` is executed with `TRUE`.

Example

```
MovieController mcController;
RECT rcMovie, rcController;
•
•
// Detach the controller and move it away from movie

   MCSetControllerAttached (mcController, FALSE);
   MCPositionController (mcController, &rcMovie,
      &rcController, 0L);

// Re-attach the controller to the movie

   MCSetControllerAttached (mcController, TRUE);
```

See Also

Functions `MCIsControllerAttached, MCPositionController`

MCSetControllerBoundsRect

Syntax

```
ComponentResult MCSetControllerBoundsRect
   (MovieController mcController,
   const LPRECT lprcBounds)
```

`MCSetControllerBoundsRect` resets the dimensions of a movie controller. If the controller is attached, the movie may be resized as well.

Parameters

`MovieController` `mcController`
The movie controller object.

`const LPRECT` `lprcBounds`
The address of the new bounds rectangle.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

When a movie controller is detached, its dimensions alone will be determined by the new bounds rectangle. A movie controller's height cannot be reset. If the rectangle has a height larger than the standard controller height, the movie controller is centered vertically.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

When a movie controller is attached, the controller will use part of the new bounds rectangle for itself. The movie will be sized to fit the remaining portion of the rectangle.

Whenever the controller bounds rectangle changes, your action filter, if any, will get called with the `mcActionControllerSizeChanged` after the changes to the rectangle have occurred.

Example

```
RECT rcBounds;
MovieController mcController;
•
•
MCSetControllerBoundsRect (mcController, &rcBounds);
```

See Also

Functions

`MCGetControllerBoundsRect, MCNewAttachedController, MCSetControllerAttached`

MCSetMovie

Syntax

```
ComponentResult MCSetMovie (MovieController
   mcController, Movie mMovie, HWND hWndMovieWindow,
   POINT ptUpperLeft)
```

`MCSetMovie` associates or disassociates an existing movie controller with an existing movie. If the `mMovie` parameter is set to NULL, the movie controller is not associated with any movie.

Parameters

`MovieController` `mcController`
The existing movie controller object.

`Movie` `mMovie`
The existing movie object.

`HWND` `hWndMovieWindow`
The parent window handle.

`POINT` `ptUpperLeft`
A new location on the screen for the movie controller bounds rectangle.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

`MCSetMovie` is identical to `MCNewAttachedController` except that it is possible to specify NULL as the movie object. The point specified by `ptUpperLeft` becomes the new upper left corner of the bounds rectangle.

This routine is the best way to associate a different movie with a controller. If appropriate, the location of the controller can be changed. When the movie controller is attached, this moves the movie to another location of the screen.

When a controller is associated with a movie, a reference to the movie object is recorded in the controller's data structure. A movie controller can be associated with many movies during its existence, but only one at a time. Movie data structures contain no elements which link them with movie controllers.

Movie controllers remain associated with movies regardless of their states. If a controller is made invisible or inactive, for instance, it stays associated with its movie. Conversely, movies continue to play even if the states of their associated controllers are changed while they are playing. If either one of an associated pair is destroyed, the other is not affected.

Once a movie is associated with a controller, it starts playing immediately (assuming it has a non-zero play rate, which is normally the case). To make a movie paused when first visible and associated with a new controller, you can use `MCDoAction` with an action of `mcActionPlay` and a play rate of 0. It is good style to do this as soon as possible after performing the association.

Association implies nothing about the proximity of movies and their controllers on the screen. It is simply the means by which any movie can be plugged in to any controller and played.

Whenever the controller bounds rectangle changes, your action filter, if any, will be called with the `mcActionControllerSizeChanged` after the changes to the rectangle have occurred.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
MovieController mcController;
POINT ptUpperLeft;
•
•
// Disassociate the movie controller from its movie

   MCSetMovie (mcController, NULL, hWnd, ptUpperLeft);
```

See Also

Functions `NewMovieController, MCNewAttachedController, MCSetControllerAttached`

MCSetVisible

Syntax

```
ComponentResult MCSetVisible (MovieController
   mcController, Boolean bShow)
```

`MCSetVisible` hides a visible movie controller and makes visible a hidden movie controller.

Parameters

MovieController mcController
: The movie controller object.

Boolean bShow
: TRUE makes the movie controller visible, FALSE hides it.

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

Invisible movie controllers can be attached, detached, active or inactive. You just can't see them. To query the visibility state of a movie controller, use MCGetVisible.

Calling MCSetVisible with FALSE displays the badge if the badge flag is turned on. See the description of MCDrawBadge for more information about badges.

Example

```
MovieController mcController;
•
•
// Hide the movie controller

   MCSetVisible (mcController, FALSE);
```

See Also

Functions

MCDrawBadge, MCGetVisible, NewMovieController

MemError

Syntax

OSErr MemError(void)

Parameters

none

Return

noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values.

Comments

MemError returns the error from the last Memory Manager call made. Because some QuickTime for Windows routines may also make Memory Manager calls you should not depend on MemError remaining unchanged after any QuickTime for Windows call.

Example

```
Size hSize;

hSize = GetHandleSize(theHandle);
if (MemError())
   ;     // the handle was probably invalid
```

See Also

Functions NewHandle, GetHandleSize, SetHandleSize, HGetState, HSetState, HLock, HUnlock, DereferenceHandle

Data Types `OSErr`

MovieSearchText

Syntax

```
OSErr MovieSearchText (Movie m, LPBYTE pbText,
   LONG cbText, SearchTextFlags flags,
   LPVOID pv,TimeValue FAR * ptvSearch,
   LPLONG plOffset)
```

Summary `MovieSearchText` searches the text media in a movie for a target string you specify. If found, the target string can be highlighted. Similarly, `MovieSearchText` can be instructed to automatically reposition the movie to the time of the found text.

Parameters

`Movie m`
The movie object.

`LPBYTE pbText`
A pointer to the search text.

`LONG cbText`
The length of the search text.

`SearchTextFlags flags`
A mask of flags, qualifying the search and specifying which side-effect actions are to take place. See below for details..

`LPVOID pv`
Ignored. For future compatability, code NULL.

`TimeValue FAR *ptvSearch`
If non-NULL, `ptvSearch` must point to a `TimeValue` field. After a successful search, `MovieSearchText` returns the movie time of the found text in this field.

LPLONG plOffset

If non-NULL, `plOffset` must point to a `LONG` field. After a successful search, `MovieSearchText` returns the offset of the found text within its text sample. This value is only useful in conjunction with the `findTextUseOffset` flag described below.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Search Strategy

`MovieSearchText` begins its search from the current movie time. The following values can be set in the flags parameter to control the search. Values can be used in any combination using the C `+` or `|` operator.

findTextCaseSensitive

By default, the text pointed to by `pbText` is matched against data in text samples without regard to case. However, if this value is set, a case-sensitive search is performed. See the notes below on how `MovieSearchText` handles case-sensitivity.

findTextReverseSearch

By default, the search starts at the current movie time and proceeds through each successive text sample, in ascending movie time. However, if this value is set, the search proceeds in descending movie time.

findTextWrapAround

By default, the search ends when the last text sample (if proceeding in ascending movie time) or the first text sample (if proceeding in descending movie time) has been searched. However, if this value is set, `MovieSearchText` wraps from the end of the text media to the beginning (or *vice versa*) in an attempt to find the requested text. The search then ends at the current movie time.

findTextUseOffset

By default, the search starts at the first byte of each text sample (if proceeding in ascending movie time) or the last byte of each text sample (if proceeding in descending movie time). However, this strategy fails if a text sample contains more than one occurrence of the search string, because MovieSearchText would not be able to locate the second and subsequent occurrences. If `findTextUseOffset` is set, `MovieSearchText` starts the search in the first text sample at the offset specified in `plOffset`. Subsequent samples are searched normally. You do not set `plOffset` itself (other than to zero in the initial conditions of a search loop); rather, `MovieSearchText` uses it as state information in order to repeat a search.

Side-Effects

`MovieSearchText` can be instructed to execute side-effect actions as a result of a successful search. The following values can be set in the flags parameter to control these side-effects. Values can be used in any combination using the C `+` or `|` operator.

searchTextDontGoToFoundTime

By default, `MovieSearchText` changes movie time to that of the text sample in which the search text was found. However, if this value is set, `MovieSearchText` does not change movie time.

searchTextDontHiliteFoundText

By default, `MovieSearchText` highlights the search text after a successful search. However, if this value is set, `MovieSearchText` does not highlight the text. If `searchTextDontGoToFoundTime` is set, the search text is highlighted when movie time reaches that of the text sample in which the text was found. When movie time changes from that of the found text (for example, if the movie is playing), the highlight is removed. `MovieSearchText` does not maintain a queue of highlight requests; rather, each request supercedes the one before it.

Case Sensitivity

When the `findTextCaseSensitive` flag is *not* set, `MovieSearchText` translates the characters in the search text and in each text sample to upper-case for the purposes of comparison. Movies can contain special translation tables to facilitate this; if it detects one in the movie, `MovieSearchText` uses the table to perform the translation. If no special table is found, `MovieSearchText` uses a default translation table, which assumes the OEM character set.

DBCS Considerations

The characters encoded in text media samples can use either SBCS (single-byte character sets) or DBCS (double-byte character sets). It is the responsibility of the program to determine which encoding is used, and supply a matching encoding in `pbText`. In addition, `MovieSearchText` validates `cbText` to ensure that it is even; if not, the search fails.

Example

```
Movie m;
LPBYTE pbText;
LONG cbText;
SearchTextFlags flags;
TimeValue tvSearch;
LONG lOffset;
•
•
// Find all the occurrences of "airplane" in movie m
lpText = (LPBYTE) "airplane";
cbText = lstrlen (lpText);
flags = findTextWrapAround + findTextUseOffset;
lOffset = 0;
while (MovieSearchText (m, pbText, cbText, flags, NULL,
                        &tvSearch, &lOffset) == noErr) {
   /* by default, movie time advances to the found text,
         and it is highlighted */
}
```

NewHandle

Syntax

`Handle NewHandle(Size byteCount)`

Parameters

Return

`none`

Comments

Use NewHandle to allocate a new block of memory. Use DisposeHandle to dispose of it when you are done. The contents of the handle may only be used if the handle has been locked using HLock. Use DereferenceHandle to access the contents of the handle.

You can check MemError to see if this routine failed.

Example

```
Handle hHandle;

hHandle = NewHandle(10);
if (!hHandle)
   ;  // allocation failed
```

See Also

Functions DisposeHandle, HLock, DereferenceHandle

Data Types `Handle`

NewMovieController

Syntax

```
MovieController NewMovieController (Movie mMovie,
   const LPRECT lprcMovieRect,
   LONG lControllerCreationFlags, HWND hWndParent)
```

`NewMovieController` creates and attaches a movie controller to a movie.

Parameters

`Movie` `mMovie`

The movie object to be associated with the new movie controller. This movie object was assigned by QuickTime for Windows when it processed `NewMovieFromFile`. It can be NULL, which means that the new controller will not be associated with any movie.

`const LPRECT` `lprcMovieRect`

The address of a bounds rectangle which will determine the movie and movie controller's size and position, depending on the creation flags.

`LONG` `lControllerCreationFlags`

A `LONG` containing flags that modify the result of the routine. If you set this parameter to 0, the movie will be centered in the movie rectangle and the movie will be scaled to fit in that rectangle. These flags are:

`mcScaleMovieToFit` - Resizes the movie to fit into the movie rectangle specified (excluding the area taken up by the controller).

`mcTopLeftMovie` - Places the movie at the top left hand corner of the movie rectangle specified.

both `mcTopLeftMovie` and `mcScaleMovieToFit` - Resizes the movie to fit into the movie rectangle specified, then expands the bounds rectangle to include the movie controller (without cutting into the movie area).

`mcWithBadge` - Determines whether the controller can display a badge.

`mcNotVisible` - Determines the initial visibility state of the movie controller.

See subsection A, part 10 of the overview for further information on how the first two flags function.

`HWND` `hWndParent`

The parent window handle of the new movie controller.

Return

A `MovieController` object. NULL indicates an error condition.

Comments

`NewMovieController` creates the new controller within the bounds rectangle even when the movie object is NULL. For all but one configuration of the controller creation flags, the movie controller takes a portion out of the specified rectangle. The exception is when both `mcTopLeftMovie` and `mcScaleMoveToFit` are specified, in which case the movie controller is connected abutting the specified bounds rectangle.

To display the movie at optimum size with the correct aspect ratio, call `GetMovieBox` before `NewMovieController`, and use the retrieved rectangle as the bounds rectangle. Then specify both the `mcTopLeftMovie` and `mcScaleMoveToFit` flags. Use the `mcWithBadge` flag to enable badge availability. This is the recommended method of working with badges.

Movies and movie controllers are not permanently associated. Movie controllers can be dynamically reassigned to movies at any point in the program provided they are properly initialized. Destroying one does not destroy the other, nor does disconnecting a movie from a movie controller disable either component.

When a controller is associated with a movie, a reference to the movie object is recorded in the controller's data structure. A movie controller can be associated with many movies during its existence, but only one at a time. Movie data structures contain no elements which link them with movie controllers.

Once a movie is associated with a controller, it starts playing immediately (assuming it has a non-zero play rate, which is normally the case). To make a movie paused when first visible and associated with a new controller, you can use `MCDoAction` with an action of `mcActionPlay` and a play rate of 0. It is good style to do this as soon as possible after performing the association.

To play *n* cases of the same movie simultaneously, the movie file must be opened *n* times to get *n* unique movie objects and then create or associate *n* movie controllers.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
Movie mMovie;
MovieController mcController;
HWND hWndParent;
RECT rcMovie;
•
•
// Instantiate movie controller
// Movie to display at optimum size & aspect ratio

   GetMovieBox (mMovie, &rcMovie);
   OffsetRect (&rcMovie, -rcMovie.left, -rcMovie.top);
   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit, hWndParent);
```

See Also

Functions `DisposeMovieController, MCNewAttachedController, MCSetMovie`

NewMovieFromDataFork

Syntax

```
OSErr NewMovieFromDataFork (Movie FAR *fpmMovie,
   HFILE hFile, LONG lOffset, UINT uiNewMovieFlags)
```

`NewMovieFromDataFork` initializes a movie object and associated storage in the same manner as `NewMovieFromFile`, except that movie data is retrieved from an open DOS file, beginning at a specified offset.

Parameters

`Movie FAR` `*fpmMovie`
The address of the movie object to be allocated.

`HFILE` `hFile`
The file handle of an open DOS file containing the movie data.

`LONG` `lOffset`
An offset into the DOS file representing the start of the movie data.

`UINT` `uiNewMovieFlags`
`newMovieActive` sets movie active, 0 sets it inactive.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

This routine provides an alternative to `NewMovieFromFile` when movie data is stored in a non-standard movie file. Note that the movie object will be in a non-active state when it is extracted.

Also be aware that, unlike `NewMovieFromFile`, you must not close the DOS file containing the movie until after you have called `DisposeMovie`.

Example

```
Movie mMovie;
OFSTRUCT ofstruct;
LONG lOffset
HFILE fhHandle;
   •
   •
// Open the DOS file containing the movie data

   fhHandle = OpenFile ("NEWSREEL.BIN", &ofstruct, OF_READ);

// Extract a movie object

   NewMovieFromDataFork (&mMovie, fhHandle, lOffset);
   •
   •
// Free the movie memory

   DisposeMovie (mMovie);

// Close the DOS file

   _lclose (fhHandle);
```

See Also

Functions `OpenMovieFile, CloseMovieFile, GetMoviesError, GetMoviesStickyError, NewMovieFromFile`

NewMovieFromFile

Syntax

```
OSErr NewMovieFromFile (Movie FAR *fpmMovie,
   MovieFile mfMovie, SHORT FAR *lpsResID,
   LPSTR lpstrResName, UINT uiNewMovieFlags,
   Boolean FAR *lpbDataRefWasChanged)
```

`NewMovieFromFile` initializes a movie object, allocates and initializes all storage required for the movie and performs various internal tasks such as telling QuickTime for Windows' scheduler to add the movie to its tables.

Parameters

`Movie FAR` `*fpmMovie`
The address of the movie object.

`MovieFile` `mfMovie`
The reference value that refers to the open movie file. This is obtained from `OpenMovieFile`.

`SHORT FAR` `*lpsResID`
Set to NULL.

LPSTR lpstrResName
Set to NULL.

UINT uiNewMovieFlags
`newMovieActive` sets movie active, 0 sets it inactive.

Boolean FAR *lpbDataRefWasChanged
Set to NULL.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

For each movie you wish to play, you must call `OpenMovieFile` followed by `NewMovieFromFile`. As soon as possible after `NewMovieFromFile`, the movie file may be closed with `CloseMovieFile`.

To play *n* cases of the same movie simultaneously, the movie file must be opened *n* times to get *n* unique movie objects and then associated with *n* movie controllers.

Example

```
MovieFile mfMovie;
Movie mMovie;
MovieController mcController;
RECT rcMovie;
•
•
// Open the movie file

   OpenMovieFile ("NEWSREEL.MOV", &mfMovie, OF_READ);

// Establish a movie object

   NewMovieFromFile (&mMovie, mfMovie, NULL, NULL, 0, NULL);

// Close the movie file

   CloseMovieFile (mfMovie);

// Get a bounds rectangle

   GetMovieBox (mMovie, &rcMovie);
   OffsetRect (&rcMovie, -rcMovie.left, -rcMovie.top);

// Create a movie controller

   mcController = NewMovieController (mMovie, &rcMovie,
      mcTopLeftMovie + mcScaleMovieToFit, hWndParent);

// Make the movie active

   SetMovieActive (mMovie, TRUE);
```


See Also

Functions `OpenMovieFile, CloseMovieFile, GetMoviesError, GetMoviesStickyError`

NormalizeRect

Syntax `VOID NormalizeRect (LPRECT lprcRect)`

`NormalizeRect` adjusts the width and height of a rectangle such that its aspect ratio matches that of a similar rectangle on the Macintosh.

Parameters *`LPRECT`* `lprcRect`

The address of the rectangle to normalize.

Return None. The normalized rectangle is placed in the rectangle referenced. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments `NormalizeRect` uses the LOGPIXELSX and LOGPIXELSY values returned from the Windows function `GetDeviceCaps` to adjust the width and height of a rectangle. It ensures the correct aspect ratio of the movie rectangle.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
PicFile pfPicture;
OpenCPicParams ocppHeader;
OFSTRUCT ofsOpenFileStr;
RECT rcFrame;
•
•
OpenPictureFile ("HOUSE.PIC", &pfPicture, OF_READ);
GetPictureFileHeader  (pfPicture, &rcFrame, &ocppHeader);
ClosePictureFile (pfPicture);
NormalizeRect (&rcFrame);
```

See Also

Functions `GetMoviesError, GetMoviesStickyError`

OpenMovieFile

Syntax

```
OSErr OpenMovieFile (LPCSTR lpstrFileSpec,
   SHORT FAR *MovieFile, int sOFlag)
```

`OpenMovieFile` opens a file containing a movie.

Parameters

`LPCSTR` `lpstrFileSpec`

The name of a string containing the movie file name.

`SHORT FAR` `*MovieFile`

The address of a reference value which will be assigned by this function, and which will be used by `NewMovieFromFile` and `CloseMovieFile`. Valid values are in the range `0x000` through `0xFFFE`. `0xFFFF` indicates and invalid value.

`int` `sOFlag`

An integer expressed as a standard file open flag as defined for the Windows `OpenFile` function. Movie files are normally opened as read only (use the OF_READ flag).

Return

`noErr` if no error condition. Non-zero if error condition.

Comments

QuickTime for Windows movie file names have the DOS suffix ".MOV".

To play *n* cases of the same movie simultaneously, the movie file must be opened *n* times to get *n* unique movie objects and then associate *n* movie controllers.

Example

```
MovieFile mfMovie;
Movie mMovie;
•
•
if (!OpenMovieFile ("MOVIE.MOV", &mfMovie, OF_READ))
   {
   NewMovieFromFile (&mMovie, mfMovie, NULL, NULL,
      newMovieActive, NULL);
   CloseMovieFile (mfMovie);
   }
else
   {
   MessageBox (hWnd, "OpenMovieFile failure",
      "Movie Initialization", MB_OK);
   }
```


See Also

Functions `NewMovieFromFile, CloseMovieFile, GetMoviesError, GetMoviesStickyError`

OpenPictureFile

Syntax
```
OSErr OpenPictureFile (LPCSTR lpstrFileSpec,
   PicFile FAR *pfPicture, int sOFlag)
```

`OpenPictureFile` opens a file containing a picture.

Parameters

`LPCSTR` `lpstrFileSpec`
A pointer to a string containing the picture file name.

`PicFile FAR` `*pfPicture`
The address of a reference value which will be assigned by this function, and which will be used by `ClosePictureFile` and other routines that reference picture data. `0xFFFF` indicates and invalid value.

`int` `sOFlag`
An integer expressed as a standard file open flag as defined for the Windows `OpenFile` function. Picture files are normally opened as read only (use the OF_READ flag).

Return noErr if no error condition. Non-zero if error condition.

Comments QuickTime for Windows picture files are characterized by the DOS suffix ".PIC".

Example
```
PicFile pfPicture;
•
•
if (OpenPictureFile ("PICTURE.PIC", &pfPicture, OF_READ))
   {
   /* Inform user of failure. */
   }
```

See Also

Functions `ClosePictureFile, GetMoviesError, GetMoviesStickyError`

PictureToDIB

Syntax

```
DIBHandle PictureToDIB (PicHandle pcThePict)
```

`PictureToDIB` converts a QuickTime for Windows format picture to a Windows compatible Device Independent Bitmap (DIB) format.

Parameters

`PicHandle` `pcThePict`
The QuickTime for Windows picture object.

Return

A handle to a Windows Device Independent Bitmap (DIB). You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure.

Comments

The QuickTime for Windows format picture may be drawn directly to the screen without conversion to a Windows DIB by using the `DrawPicture` function. The object returned by `PictureToDIB` must be freed by the Windows `GlobalFree` function when you are through using it. It is, however, created with the `GMEM_SHARE` flag, so you can conveniently load the DIB to the Windows clipboard.

Example

```
Movie mMovie;
PicHandle phPicture;
DIBHandle hdPicture;
•
•
// Get the poster frame and convert to Windows DIB

   phPicture = GetMoviePosterPict (mMovie);
   hdPicture = PictureToDIB (phPicture);

// Put the DIB in the clipboard

   OpenClipboard (hWnd);
   EmptyClipboard ();
   SetClipboardData (cf_DIB, hdPicture);
   CloseClipboard ();
   DisposePicture (phPicture);
```

See Also

Functions

`DrawPicture, GetMoviePosterPict, GetMoviePosterTime, MCGetCurrentTime, GetMoviesError, GetMoviesStickyError`

PrerollMovie

Syntax

```
OSErr PrerollMovie (Movie mMovie, TimeValue tvTime,
   LFIXED lfxRate)
```

`PrerollMovie` prepares a portion of a movie for playback, to enhance playback performance.

Parameters

`Movie` `mMovie`
The movie object.

`TimeValue` `tvTime`
A `TimeValue` specifying the starting time of the movie segment to play.

`LFIXED` `lfxRate`
Specifies the anticipated rate at which the movie will play. Positive values indicate forward rates, negative values reverse rates. The rate is used as a multiplier for the movie's recorded rate.

Return

`noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

Playback performance can be improved if `PrerollMovie` is called prior to playing a movie.

Example

```
Movie mMovie;
TimeValue tvTime;
LFIXED lfxRate;
•
•
PrerollMovie (mMovie, tvTime, lfxRate);
```

See Also

Functions `GetMoviesError, GetMoviesStickyError`

Data Types `TimeValue, LFIXED`

PtInMovie

Syntax `Boolean PtInMovie (Movie mMovie, POINT ptPoint)`

`PtInMovie` determines whether a specified point lies in a movie.

Parameters *`Movie`* `mMovie`
The movie object.

`POINT` `ptPoint`
The point to test, in window coordinates.

Return `TRUE` if the point is in the movie rectangle, `FALSE` if not. You can use `GetMoviesError` and `GetMoviesStickyError` to test for error conditions.

Comments The specified point must be supplied in window coordinates.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example
```
Movie mMovie;
POINT ptTest;
•
•
if (PtInMovie (mMovie, ptTest))
   {
   /* Take appropriate action. */
   }
```

See Also

Functions `GetMovieBox, GetMoviesError, GetMoviesStickyError`

PtInTrack

Syntax `Boolean PtInTrack(Track trkTrack, POINT thePoint)`

Parameters *`Track`* `trkTrack`
The track object.
`POINT` `ptPoint`
The point to test, in window coordinates.

Return `TRUE` if the point is in the movie rectangle, `FALSE` if not. You can use `GetMoviesError` and `GetMoviesStickyError` to test for error conditions.

Comments `PtInMovie` determines whether a specified point lies in a movie.

The specified point must be supplied in window coordinates.

Note: All QuickTime for Windows routines referencing a RECT or POINT assume client device coordinates.

Example

```
Track trkTrack;
POINT ptTest;
•
•
if (PtInTrack (trkTrack, ptTest))
   {
   /* Take appropriate action. */
   }
```

See Also

Functions `PtInTrack, GetMoviesError`

Data Types `Track, Point, BOOLEAN`

PutMovieIntoTypedHandle

Syntax

```
OSErr PutMovieIntoTypedHandle(Movie mMovie, Track
targetTrack, OSType handleType, Handle theHandle,
TimeValue start, TimeValue duration, long flags,
ComponentInstance userComp)
```

Parameters

Movie `mMovie`

Specifies the movie to extract information from.

Track `targetTrack`

Allows you to specify a particular track to extract data from. If you want the data to come from all possible tracks in the movie, pass NULL.

OSType `handleType`

Specifies the type of data to extract from the movie. For example, passing `TextMediaType` will provide a handle of text, if a text track is present in the movie.

Handle theHandle
: A Handle to put the extracted data into. This handle is automatically resized to hold the data requested. You must create the handle using NewHandle. If you pass NULL for the handle, the extracted data will be placed on the system clipboard for you.

TimeValue start
: Indicates the starting movie time to begin extracting data from.

TimeValue duration
: Indicates the duration of the sample data to be extracted.

long flags
: (there is a flag here to indicate that the handle is actually a pointer to a handle, so that you can obtain DIB's from this call. Contact Apple Computer Developer Support Group for more information)

ComponentInstance userComp
: Pass NULL.

Return
: noErr if the call completes successfully.

Comments
: Use PutMovieIntoTypedHandle to extract data in a particular format from a movie. For example, you can obtain a Device Independent BitMap from a movie or track using this call. If you extract text using this call, all character codes are automatically translated from Macintosh to MS Windows character set. PutMovieIntoTypedHandle can be viewed as a high level version of GetMediaSample.

See Also

Functions
: GetMediaSample, NewHandle

Data Types
: Movie, Track, Handle, TimeValue

QTFOURCC

Syntax
: QTFOURCC(ch0, ch1, ch2, ch3)

QTFOURCC is a macro used to construct a four-character constant, normally used to extract user data from a movie.

Parameters
: *ch0...ch3*

The four characters to be concatenated.

Comments Each parameter must be enclosed in single quotes.

Example

```
UserData udData;
OSType osType;
•
•
osType = QTFOURCC('©','d','a','y');
osType = GetNextUserDataType (udData, osType);
```

QTInitialize

Syntax `OSErr QTInitialize (LPLONG lplVersion)`

`QTInitialize` binds applications to QuickTime for Windows at run time. It must be called before any other QuickTime for Windows function.

Parameters `LPLONG lplVersion`

The address of a value that will be filled with the current QuickTime for Windows version number.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments This function must be called before any other QuickTime for Windows function. It is recommended that it be called before your program creates its main window. If your program employs DLLs that make QuickTime for Windows calls, each DLL must call `QTInitialize`, preferably in the `LibMain` function. `QTInitialize` only needs to be called once during the life of your program. The return codes can be used to determine whether QuickTime for Windows is installed and if the hardware is capable of running it.

If `lplVersion` is not coded as `NULL`, `QTInitialize` fills the value it points to with the current QuickTime for Windows version: bits 31-16, reserved, always 0; bits 15-12, major release level; bits 11-8, minor release level; bits 7-0, revision number. For example, `0x00001000L` is QuickTime for Windows version 1.0.0. A program can use this data to check if it is running under a certain QuickTime for Windows version, then react accordingly.

Example

```
LONG lVersion;
•
•
if ((QTInitialize (&lVersion) != QTI_OK)
   || (lVersion < 0x00001000L))
   {
   MessageBox (hWnd, "QuickTime for Windows not loaded"
      " or wrong version present.",
      "QuickTime for Windows Initialization", MB_OK);
   return 0;
   }
```

See Also

Functions `QTTerminate, EnterMovies`

QTTerminate

Syntax `VOID QTTerminate (VOID)`

`QTTerminate` severs links to QuickTime for Windows.

Parameters None.

Return None.

Comments If your program uses DLLs, each must call `QTTerminate`, preferably in the `WEP` function.

Example

```
// Cut the connections to QuickTime for Windows

   QTTerminate ();
```

See Also

Functions `QTInitialize, ExitMovies`

SetMovieActive

Syntax `VOID SetMovieActive (Movie mMovie, Boolean bActive)`

`SetMovieActive` sets a movie's state to active or inactive.

Parameters

Movie mMovie

The movie object whose state is to be changed.

Boolean bActive

TRUE sets the movie state to active, FALSE to inactive.

Return

None. Use GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments

An inactive movie does not receive cycles from QuickTime for Windows' internal scheduler, so it will not play. Setting a movie inactive can be used to control which one of several simultaneously playing movies will receive system resources. You can query a movie's active state using GetMovieActive.

Simply setting a movie to the active state does not affect any of its attributes, such as visibility. You have to explicitly update a window in which a movie appears if the movie is made active.

Example

```
Movie mMovie;
•
•
// Deactivate the movie

   SetMovieActive (mMovie, FALSE);

// Re-activate the movie

   SetMovieActive (mMovie, TRUE);
```

See Also

Functions

GetMovieActive, GetMoviesError, GetMoviesStickyError, MCActivate

SetHandleSize

Syntax

```
void SetHandleSize(Handle theHandle, Size byteCount)
```

Parameters

Movie mMovie

The handle.

Size byteCount

The new size in bytes for the specified handle

Return

none

Comments

Use SetHandleSize to resize the contents of the memory block referenced by the Handle. An attempt to resize a locked block may fail. When the handle is resized its contains are maintained. Any references obtained to the contents of the handle by DereferenceHandle may be invalid after calling SetHandleSize.

Use MemError to check for failure of this call.

Example

```
Handle hHandle;

hHandle = NewHandle(12);
SetHandleSize(hHandle, 43);
if (err = MemError())
  ; // no more memory
```

See Also

Functions GetHandleSize, NewHandle

Data Types `Handle, Size`

SetMovieCoverProcs

Syntax

```
VOID SetMovieCoverProcs (Movie mMovie,
   CoverProc UncoverProc, CoverProc CoverProc,
   LONG lRefCon)
```

`SetMovieCoverProcs` sets cover and uncover procedures for your movie.

Parameters

`Movie` `mMovie`
The movie object.

`CoverProc` `UncoverProc`
The address of the uncover procedure.

`CoverProc` `CoverProc`
The address of the cover procedure.

`LONG` `lRefCon`
A reference constant that is passed to the cover procedure.

Return

None. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments

This routine allows your program to perform custom processing whenever one of your movies covers a screen region or reveals a region that was previously covered. This activity is performed in cover procedures, of which there are two types: those called when your movie covers a screen region, and those called when your movie uncovers a screen region that was previously covered. The former is responsible for saving the region (you may choose to save the hidden region in an offscreen buffer).

Cover procedures called when your movie reveals a hidden screen region may redisplay the hidden region. If no uncover procedure is supplied, the default action is to paint the uncovered region with the background brush saved when the movie was created (`GetClassWord`, `GetObject` and `CreateBrushIndirect`). If no background brush is found, a solid white brush will be used. There is no default action if you do not supply a cover procedure.

If you compile your program using Borland *smart callbacks* or Microsoft's `-GEs` compiler option, or your filter function is in a dynamic link library, you do not need to use `MakeProcInstance` on your cover procedure address before calling `MCSetMovieCoverProcs`.

Example

```
OSErr CALLBACK __export MyCoverProc (Movie, HDC, LONG);

HWND hWnd;
Movie mMovie;
•
•
SetMovieCoverProcs (mMovie, MyCoverProc, NULL, 5879);
•
•
OSErr CALLBACK __export MyCoverProc (Movie m, HDC hdc, lID)
   {
   RECT rcClip;
   GetClipBox (hdc, &rcClip);
   FillRect (hdc, &rcClip, GetStockObject (WHITE_BRUSH));
   return 0;
   }
```

See Also

Functions `CoverProc, GetMoviesError, GetMoviesStickyError`

SetTrackEnabled

Syntax

```
OSErr SetTrackEnabled (Track trk,
   Boolean fEnable)
```


Parameters *Track trk*

The track, as returned by GetMovieIndTrackType.

Boolean fEnable

TRUE enable the track
FALSE disable the track

Return noErr if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use GetMoviesError and GetMoviesStickyError to test for failure of this call.

Comments Call MCMovieChanged after a series of one or more SetTrackEnabled calls.

A track that is enabled will not play unless its movie is also active.

Example

```
Movie m;
Track trkText;
      •
      •
trkText = GetMovieIndTrackType (m, 1,
            TextMediaType, movieTrackMediaType);
SetTrackEnabled (trkText, FALSE);
      •
      •
MCMovieChanged (mc, m);
```

See Also

Functions GetMovieIndTrackType, MCMovieChanged

SubtractTime

Syntax

```
VOID SubtractTime (TimeRecord FAR *lptrDst,
   const TimeRecord FAR *lptrSrc)
```

SubtractTime subtracts one time from another.

Parameters *TimeRecord FAR* *lptrDst

The address of a time record containing the first operand for the subtraction. The time record is overwritten by the result.

const TimeRecord FAR *lptrSrc

The address of a time record containing the second operand, which remains unmodified by the operation.

Return None. The result is in the time record referenced by the first parameter. Use `GetMoviesError` and `GetMoviesStickyError` to test for failure.

Comments If the time records have different time scales, `SubtractTime` converts them.

Example

```
MovieController mcController;
TimeRecord trOne, trTwo;
•
•
SubtractTime (&trOne, &trTwo);
MCDoAction (mcController, mcActionGoToTime, (LPVOID) &trOne);
```

See Also

Functions `ConvertTimeScale, GetMovieTimeScale, AddTime, GetMoviesError, GetMoviesStickyError`

MCDoAction `mcActionGoToTime`

Data Types `TimeRecord, TimeScale`

TrackTimeToMediaTime

Syntax `TimeValue TrackTimeToMediaTime(TimeValue tvTrackTime, Track trkTrack)`

Parameters

`TimeValue` `tvTrackTime`
Specifies the track's time value; must be expressed in the time scale of the movie that contains the track.

`Track` `trkTrack`
Specifies the track for the operation.

Return The corresponding time in the track's media. This value is in the media's time scale.

Comments You can use the TrackTimeToMediaTime function to determine whether a specified point in time contains any media. If the track time corresponds to empty space, this function returns a value of -1.

The TrackTimeToMediaTime function maps the track time through the track's edit list to come up with the media time. It is the edit list contained in the track which determines how many times a particular media time is referenced. This function provides a simple way to map from the movie's time to the corresponding time in the media. Because of the edit list, this is not necessarily a one to one mapping.

If the time you specified lies outside of the movie's active segment or corresponds to empty space in the track, the function returns a value of -1.

See Also

Functions GetMovieTimeScale, GetMediaTimeScale, GetMovieIndTrack

Data Types `TimeValue, Track`

TransformRect

Syntax
```
Boolean TransformRect(const MatrixRecord
*mtrxMatrix, Rect *rctRect, LPVOID)
```

Parameters
MatrixRecord mtrxMatrix
Specifies the matrix for this operation.
Rect *rctRect
Contains a pointer to the rectangle to be transformed. The TransformRect function returns the updated coordinates into this rectangle.
LPVOID
Reserved for future use. Always pass NULL

Return If the resulting rectangle has been rotate or skewed (that is, the transformation involves operations other than sclaing and translation), the function sets the returned Boolean value to false and returns the coordinates of the rectangle that encloses the transformed rectangle. If the transformed rectangle and its boundary box are the same, the function returns true.

Comments Use TransformRect to map a rectangle through a matrix. This can be used to determine the display bounds of a particular track as shown below.

Example

```
MatrixRecord mtrxMovie, mtrxTrack;
FIXED fWidth, fHeight;
RECT r;

GetMovieMatrix(GetTrackMovie(trkTrack), &mtrxMovie);
GetTrackMatrix(trkTrack, &mtrxTrack);
ConcatMatrix(&mtrxTrack, &mtrxMovie);
// movie matrix now contains the track's display matrix

GetTrackDimensions(trkTrack, &fWidth, &fHeight);
r.top = 0;
r.left = 0;
r.bottom = fHeight >> 16;
r.right = fWidth >> 16;
TransformRect(&mtrxMovie, &r, NULL);
// r now contains the display coordinates of the track
```

See Also

Functions ConcatMatrix, GetTrackMatrix, GetMovieMatrix, GetTrackDimensions

Data Types `MatrixRecord, RECT`

UpdateMovie

Syntax `OSErr UpdateMovie (Movie mMovie)`

`UpdateMovie` paints the current movie image on demand, rather than at its scheduled time.

Parameters *`Movie`* `mMovie`

The movie object.

Return `noErr` if no error condition. Non-zero if error condition. See Appendix A for error condition values. You can use `GetMoviesError` and `GetMoviesStickyError` to test for failure of this call.

Comments `UpdateMovie` allows you to manually refresh the current movie image.

Example

```
Movie mMovie;
•
•
UpdateMovie (mMovie);
```

See Also

Functions `GetMoviesError, GetMoviesStickyError`

QuickTime for Windows API - Data Structures

ImageDescription

Description The `ImageDescription` structure contains information about a picture file.

Syntax

```
typedef struct  // Hungarian: id (ImageDescription)
  {
  LONG  idSize;
  DWORD CodecType;
  DWORD resvd1;
  WORD  resvd2;
  WORD  dataRefIndex;
  WORD  version;
  WORD  revLevel;
  DWORD vendor;
  DWORD temporalQuality;
  DWORD spatialQuality;
  WORD  width;
  WORD  height;
  LFIXED hRes;
  LFIXED vRes;
  DWORD dataSize;
  WORD  frameCount;
  char  name [32];
  WORD  depth;
  WORD  clutID;
 } ImageDescription;
```

Fields

`idSize`

Specifies the structure size.

`CodecType`

Specifies the Codec Type:

`'rpza'` = Apple video
`'jpeg'` = Apple JPEG
`'rle '` = Apple animation
`'raw '` = Apple raw
`'smc '` = Apple graphics

`rsvd1`

Reserved, always 0.

`rsvd2`
Reserved, always 0.

`dataRefIndex`
Reserved, always 1.

`version`
Reserved, always 0.

`revLevel`
Reserved, always 0.

`vendor`
Reserved, always 0.

`temporalQuality`
Reserved, always 0.

`spatialQuality`
Reserved, always 0.

`width`
Specifies the Source image width in pixels.

`height`
Specifies the Source image height in pixels.

`hRes`
Specifies the horizontal resolution (e.g. 72.0).

`vRes`
Specifies the vertical resolution (e.g. 72.0).

`dataSize`
Reserved, always 0.

`frameCount`
Reserved, always 0.

`name [32]`
Specifies the compression algorithm (e.g. Animation).

`depth`

Specifies the pixel depth of the source image.

`clutID`

Reserved, always 0.

Comments This structure is populated by QuickTime for Windows calls that request information about a picture file (for example, `GetPictureInfo`).

Int64

Description The `Int64` structure defines a quad word for use in other structures.

Syntax

```
typedef struct        // Hungarian: qw (quad word)
   {
   LONG  dwLo;
   DWORD dwHi;
   } Int64;
```

Fields `dwLo`

Specifies the low order double word.

`dwHi`

Specifies the high order double word.

Comments This structure is used by the `TimeRecord` structure.

LFIXED

Description The `LFIXED` type defines a long integer where the high-order sixteen bits define a signed short integer representing an integral value and the low-order sixteen bits define an unsigned short integer representing a fractional value.

Comments `LFIXED` variables are normally used to hold movie rates in QuickTime for Windows. For example, the `LFIXED` value `0x00028000` could be used to represent a rate of 2.5.

See Also

Functions `MAKELFIXED` (macro)

Data Types `SFIXED`

MusicDescription

Description The `MusicDescription` structure contains information about a movie's music track.

Syntax
```
typedef struct _ // Hungarian: md (MusicDescription)
  {LONG  descSize;
   DWORD dataFormat;
   DWORD resvd1;
   WORD  resvd2;
   WORD  dataRefIndex;
   DWORD musicFlags;
  } MusicDescription;
```

Fields

`descSize`
Specifies the structure size.

`dataFormat`
Specifies the data format (always 0).

`resvd1`
Reserved, always 0.

`resvd2`
Reserved, always 0.

`dataRefIndex`
Reserved, always 1.

`musicFlags`
Reserved, always 0.

Comments This structure is populated by QuickTime for Windows calls that request information about a movie file's music track (see `GetMusicInfo`).

OpenCPicParams

Description The `OpenCPicParams` structure defines the picture file header.

Syntax

```
typedef struct     // Hungarian: ocp
   {
   RECT  rect;
   LFIXED hRes;
   LFIXED vRes;
   WORD  wVersion;
   WORD  wReserved1;
   DWORD dwReserved2;
   } OpenCPicParams;
```

Fields

`rect`
Specifies a picture rectangle.

`hRes`
Specifies the horizontal resolution (e.g. 72.0).

`vRes`
Specifies the vertical resolution (e.g. 72.0).

`wVersion`
Specifies the version.

`wReserved1`
Reserved, always 0.

`dwReserved2`
Reserved, always 0.

Comments

This structure is populated by QuickTime for Windows calls that return the picture file header (for example, `GetPictureFileHeader`).

SFIXED

Description

The `SFIXED` type defines a short integer where the high-order eight bits define a signed integer value and the low-order eight bits define an unsigned fractional value.

Comments

`SFIXED` variables are normally used to hold movie sound track volumes in QuickTime for Windows. For example, the `SFIXED` value `0x0080` could be used to represent a sound volume of 0.5.

See Also

Functions

`MAKESFIXED` (macro)

Data Types `LFIXED`

SoundDescription

Description The `SoundDescription` structure contains information about a movie's sound.

Syntax
```
typedef struct   // Hungarian: sd (SoundDescription)
   {
   LONG  descSize;
   DWORD dataFormat;
   DWORD resvd1;
   WORD  resvd2;
   WORD  dataRefIndex;
   WORD  version;
   WORD  revLevel;
   DWORD vendor;
   WORD  numChannels;
   WORD  sampleSize;
   WORD  compressionID;
   WORD  packetSize;
   LFIXED sampleRate;
   } SoundDescription;
```

Fields

`descSize`
Specifies the structure size.

`dataFormat`
Specifies the data format (always 'raw').

`resvd1`
Reserved, always 0.

`resvd2`
Reserved, always 0.

`dataRefIndex`
Reserved, always 1.

`version`
Reserved, always 0.

`revLevel`
Reserved, always 0.

`vendor`
Reserved, always 0.

`numChannels`
Specifies the channels: 1 = mono, 2 = stereo.

`sampleSize`
Specifies the sample size: 8 = 8-bit sound, 16 = 16-bit sound.

`compressionID`
Reserved, always 0.

`packetSize`
Reserved, always 0.

`sampleRate`
Sample rate, e.g. 44100.0000 per second.

Comments This structure is populated by QuickTime for Windows calls that request information about a movie file's sound (see `GetSoundInfo`).

TimeRecord

Description The `TimeRecord` structure defines a point in a movie's time coordinate system.

Syntax
```
typedef struct        // Hungarian: tr (TimeRecord)
   {
   Int64     value;
   TimeScale scale;
   TimeBase  base;
   } TimeRecord;
```

Fields `value`
Specifies a movie time value.

`scale`
Specifies the movie's time scale.

`base`

NULL - means that the `TimeRecord` specifies a duration, or
TIMEBASE_DEFAULT - means that the `TimeRecord` specifies a time, relative to the start of the movie.

Comments

The minimum `TimeValue` is 0, which is the very beginning of a movie. A `TimeValue` is expressed in time units which are related to the movie's time scale.

The time coordinate system contains a time scale scored in time units. The number of units that pass per second quantifies the scale: a time scale of 26 means that 26 units pass per second and each time unit is 1/26 of a second.

When the duration of all or part of a movie is needed, it is expressed as the length of the portion of the movie in the number of time units it contains. Particular points in a movie can be identified by a time value, which is the number of time units to that point from the beginning of the movie.

Different movies may have different time scales. Use `ConvertTimeScale` to compare `TimeValues` between different movies.

Appendices

Appendix A. QuickTime for Windows Error Codes

		The following codes are indentical to those in QuickTime on the Macintosh.
-50	`paramErr`	An invalid parameter was supplied.
-102	`noTypeErr`	Type of requested data could not be generated
-108	`insufficientMemory`	An internal memory allocation request failed.
-111	`memWAErr`	A bad handle was provided.
-623	`notLockedErr`	The handle provided could not be locked or was not locked.
-2001	`badImageDescription`	Problem with this image description.
-2002	`badPublicMovieAtom`	Movie file corrupted.
-2004	`cantOpenHandler`	CODEC cannot be found.
-2008	`invalidMedia`	The movie or picture could not be accessed.
-2009	`invalidTrack`	This movie cannot be processed by QTW.
-2010	`invalidMovie`	This movie is corrupted or invalid.
-2011	`invalidSampleTable`	This movie cannot be processed by QTW.
-2012	`invalidDataRef`	This movie cannot be processed by QTW.
-2014	`invalidDuration`	This duration value is invalid.
-2015	`invalidTime`	This time value is invalid.
-2017	`badEditList`	This track's edit list is corrupted.
-2020	`movieToolboxUninitialized`	You haven't initialized the Movie Toolbox.
-2021	`wffileNotFound`	Cannot locate this file.
-2026	`userDataItemNotFound`	Cannot locate this user data item.
-2027	`maxSizeToGrowTooSmall`	Maximum size must be larger.
-2034	`internalQuickTimeError`	Internal value.
-2036	`invalidRect`	Specified rectangle has invalid coordinates.
-2039	`invalidSampleDescIndex`	Sample description index value invalid.
-2041	`invalidSampleDescription`	This sample description is invalid.
-2042	`dataNotOpenForRead`	Cannot read from this data source.
-2045	`dataAlreadyClosed`	You have already closed this data source.
-2046	`endOfDataReached`	No more data is available.
-2048	`noMovieInDataFork`	Toolbox cannot find a movie in the file.
-2053	`featureUnsupported`	Toolbox does not support this feature.
-2054	`noVideoTrackInMovie`	No video track found in this movie.
-2055	`noSoundTrackInMovie`	No sound track found in this movie.

-2062	`movieTextNotFound`	MovieSearchText request failed.
		Codes -2150 through -2200 are reseved for QuickTime for Windows.
-2150	`soundSupportNotAvailable`	Sound support unavailable.
-2151	`maxControllersExceeded`	The limit on movie controllers reached.
-2152	`unableToCreateMCWindow`	Cannot create the Movie Controller window.
-2153	`invalidUserDataHandle`	Request for user data failed.
-2154	`noPictureInFile`	File is valid but contains no pictures.
-2155	`invalidPictureFileHandle`	An invalid handle was detected.
-2156	`invalidPictureHandle`	An invalid handle was detected.
-2157	`badDisplayContext`	An invalid DC was detected.
-2158	`noMusicTrackInMovie`	No music track found in this movie.
-2159	`noTextTrackInMovie`	No text track found in this movie.
-2160	`noMPEGTrackInMovie`	No MPEG track found in this movie.
		The following codes are indentical to those in QuickTime on the Mac.
-3000	`invalidComponentID`	An invalid component ID was detected.
-8972	`codecConditionErr`	An error occurred during decompression.
-9995	`editingNotAllowed`	Editing is not supported.
-9996	`controllerBoundsNotExact`	The movie controller bounds are not exact.
		The following codes are unique to QuickTime for Windows.
0	`mcEventNotHandled`	Movie controller event not handled.
0	`mcOK`	Movie controller OK.
0	`noErr`	Action complete successfully.
0	`QTI_OK`	Initialization is OK.
1	`mcEventHandled`	Movie controller event handled.
1	`QTI_FAIL_NOEXIST`	Initialization failed, system not found.
2	`QTI_FAIL_CORRUPTDLL`	Corrupt DLL found at initialization.
3	`QTI_FAIL_286`	Cannot initialize on a 80286 platform.
4	`QTI_FAIL_WIN30`	Cannot initialize on Windows release 3.0.
0x80008001	`badComponentInstance`	Component instance not valid.
0x80008002	`badComponentSelector`	Component selector not valid.

Appendix B. Region Codes

The following codes are used to identify specific languages in the function `GetUserDataText` when alternative text or multiple languages are supported. See the description of `GetUserDataText` in the *Programmer's Reference* section for further information.

verUS	0	verIceland	21
verFrance	1	verMalta	22
verBritian	2	verCyprus	23
verGermany	3	verTurkey	24
verItaly	4	verYugoCroatian	25
verNetherlands	5	verIndiaHindi	33
verFrBelgiumLux	6	verPakistan	34
verSweden	7	verLithuania	41
verSpain	8	verPoland	42
verDenmark	9	verHungary	43
verPortugal	10	verEstonia	44
verFrCanada	11	verLatvia	45
verNorway	12	verLapland	46
verIsrael	13	verFaeroeIsl	47
verJapan	14	verIran	48
verAustralia	15	verRussia	49
verArabic	16	verIreland	50
verFinland	17	verKorea	51
verFrSwiss	18	verChina	52
verGrSwiss	19	verTaiwan	53
verGrverIceland	20	verThailand	54

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