

Before calling `NewMovie`, you need to prepare the first frame of your movie as the target graph, page layout, or Gizmo window.

If you will be using audio you also need to prepare a sound wave. The sound wave can be of any time duration but usually will either be the entire length of the movie or will be the length of one video frame. As of Igor Pro 7, sound is not supported on Macintosh.

After creating the file and the first video frame and optional audio, you use `AddMovieFrame` to add as many video frames as you wish. You may also add more audio using the `AddMovieAudio` operation. Finally you use the `CloseMovie` and `PlayMovie` operations.

When you write a procedure to generate a movie, you need to call the `DoUpdate` operation after all modifications to the graph, page layout, or Gizmo window and before calling `AddMovieFrame`. This allows Igor to process any changes you have made to the window.

In addition to creating a movie from a window, you can also create movies from pictures in the picture gallery (see **Pictures** on page III-509) using the `/PICT` flag with `NewMovie` and `AddMovieFrame`. You can put pictures of Igor graphs, tables, page layouts, and Gizmo plots in the gallery using `SavePICT`.

Extracting Movie Frames

You can extract individual frames from a movie and can control movie playback using `PlayMovieAction`.

Movie Programming Examples

For examples of programming with movies, choose `File→Example Experiments→Movies & Audio`.

Timing

There are two methods you can use when you want to measure elapsed time:

- The ticks counter using the `ticks` function
- The microsecond timer using `StartMSTimer` and `StopMSTimer`

Ticks Counter

You can easily measure elapsed time with a precision of 1/60th of a second using the `ticks` function. It returns the tick count which starts at zero when you first start your computer and is incremented at a rate of approximately 60 Hz rate from then on.

Here is an example of typical use:

```
...
Variable t0
...
t0= ticks
<operations you wish to time>
printf "Elapsed time was %g seconds\r", (ticks-t0)/60
...
```

Microsecond Timer

You can measure elapsed time to microsecond accuracy for durations up to 35 minutes using the microsecond timer. See the `StartMSTimer` function (page V-906) for details and an example.

Packages

A package is a set of files that adds significant functionality to Igor. Packages consist of procedure files and may also include XOPs, help files and other supporting files.