# CAMediaTiming Protocol Reference

**Graphics & Imaging > Quartz**

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# CAMediaTiming Protocol Reference

| | |
|---|---|
| **Adopted by** | CAAnimation<br>CALayer |
| **Framework** | /System/Library/Frameworks/QuartzCore.framework |
| **Availability** | Available in Mac OS X v10.5 and later. |
| **Declared in** | CAMediaTiming.h |
| **Companion guides** | Core Animation Programming Guide<br>Core Animation Cookbook |

## Overview

The `CAMediaTiming` protocol models a hierarchical timing system, with each object describing the mapping of time values from the object's parent to local time.

Absolute time is defined as mach time converted to seconds. The `CACurrentMediaTime` function is provided as a convenience for getting the current absolute time.

The conversion from parent time to local time has two stages:

1. Conversion to "active local time". This includes the point at which the object appears in the parent object's timeline and how fast it plays relative to the parent.
2. Conversion from "active local time" to "basic local time". The timing model allows for objects to repeat their basic duration multiple times and, optionally, to play backwards before repeating.

## Tasks

### Animation Start Time

`beginTime` (page 6) *property*
Specifies the begin time of the receiver in relation to its parent object, if applicable.

`timeOffset` (page 8) *property*
Specifies an additional time offset in active local time.


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### Repeating Animations

`repeatCount` (page 7) *property*
Determines the number of times the animation will repeat.

`repeatDuration` (page 8) *property*
Determines how many seconds the animation will repeat for.

### Duration and Speed

`duration` (page 7) *property*
Specifies the basic duration of the animation, in seconds.

`speed` (page 8) *property*
Specifies how time is mapped to receiver's time space from the parent time space.

### Playback Modes

`autoreverses` (page 6) *property*
Determines if the receiver plays in the reverse upon completion.

`fillMode` (page 7) *property*
Determines if the receiver's presentation is frozen or removed once its active duration has completed.

## Properties

For more about Objective-C properties, see "Properties" in *The Objective-C 2.0 Programming Language*.

### autoreverses

Determines if the receiver plays in the reverse upon completion.

```
@property BOOL autoreverses
```

**Discussion**
When `YES`, the receiver plays backwards after playing forwards. Defaults to `NO`.

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

### beginTime

Specifies the begin time of the receiver in relation to its parent object, if applicable.


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```
@property CFTimeInterval beginTime
```

**Discussion**
Defaults to 0.

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

## duration

Specifies the basic duration of the animation, in seconds.

```
@property CFTimeInterval duration
```

**Discussion**
Defaults to 0.

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

## fillMode

Determines if the receiver's presentation is frozen or removed once its active duration has completed.

```
@property(copy) NSString *fillMode
```

**Discussion**
The possible values are described in "Fill Modes" (page 9). The default is `kCAFillModeRemoved` (page 9).

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

## repeatCount

Determines the number of times the animation will repeat.

```
@property float repeatCount
```

**Discussion**
May be fractional. If the `repeatCount` is 0, it is ignored. Defaults to 0. If both `repeatDuration` (page 8) and `repeatCount` (page 7) are specified the behavior is undefined.


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**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

## repeatDuration

Determines how many seconds the animation will repeat for.

```
@property CFTimeInterval repeatDuration
```

**Discussion**
Defaults to 0. If the `repeatDuration` is 0, it is ignored. If both `repeatDuration` (page 8) and `repeatCount` (page 7) are specified the behavior is undefined.

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

## speed

Specifies how time is mapped to receiver's time space from the parent time space.

```
@property float speed
```

**Discussion**
For example, if `speed` is 2.0 local time progresses twice as fast as parent time. Defaults to 1.0.

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`

## timeOffset

Specifies an additional time offset in active local time.

```
@property CFTimeInterval timeOffset
```

**Discussion**
Defaults to 0. .

**Availability**
Available in Mac OS X v10.5 and later.

**Declared In**
`CAMediaTiming.h`


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# Constants

## Fill Modes

These constants determine how the timed object behaves once its active duration has completed. They are used with the `fillMode` (page 7) property.

```
NSString * const kCAFillModeRemoved;
NSString * const kCAFillModeForwards;
NSString * const kCAFillModeBackwards;
NSString * const kCAFillModeBoth;
NSString * const kCAFillModeFrozen;
```

**Constants**

`kCAFillModeRemoved`

The receiver is removed from the presentation when the animation is completed.

Available in Mac OS X v10.5 and later.

Declared in `CAMediaTiming.h`.

`kCAFillModeForwards`

The receiver remains visible in its final state when the animation is completed.

Available in Mac OS X v10.5 and later.

Declared in `CAMediaTiming.h`.

`kCAFillModeBackwards`

The receiver clamps values before zero to zero when the animation is completed.

Available in Mac OS X v10.5 and later.

Declared in `CAMediaTiming.h`.

`kCAFillModeBoth`

The receiver clamps values at both ends of the object's time space

Available in Mac OS X v10.5 and later.

Declared in `CAMediaTiming.h`.

`kCAFillModeFrozen`

The mode was deprecated before Mac OS X v10.5 shipped.

Deprecated in Mac OS X v10.5 and later.

Declared in `CAMediaTiming.h`.

**Declared In**

`CAMediaTiming.h`


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# Document Revision History

This table describes the changes to *CAMediaTiming Protocol Reference*.

| Date | Notes |
| --- | --- |
| 2009-03-04 | Documented kCAFillModeFrozen as deprecated. |
| 2007-07-24 | New document that describes the protocol that defines the timespace of an object. |



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Document Revision History



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