CGFont Reference

Graphics & Imaging > Quartz

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CGFont Reference

Derived From:	CFType
Framework:	ApplicationServices/ApplicationServices.h
Companion guide	Quartz 2D Programming Guide
Declared in	CGFont.h

Overview

The `CGFontRef` opaque type encapsulates font information. A font is a set of shapes or glyphs associated with a character set. A glyph can represent a single character (such as 'b'), more than one character (such as the "fi" ligature), or a special character such as a space. Quartz retrieves the glyphs for the font from ATS (Apple Type Services) and paints the glyphs based on the relevant parameters of the current graphics state.

Quartz provides a limited, low-level interface for drawing text. For information on text-drawing functions, see *CGContext Reference*. For full Unicode and text-layout support, use the services provided by Core Text or ATSUI).

Functions by Task

Retaining and Releasing a CGFont Object

`CGFontRelease` (page 20)
Decrements the retain count of a Quartz font.

`CGFontRetain` (page 21)
Increments the retain count of a Quartz font.

Creating a CGFont Object

`CGFontCreateWithDataProvider` (page 12)
Creates a font object from data supplied from a data provider.

`CGFontCreateWithFontName` (page 13)
Creates a font object corresponding to the font specified by a PostScript or full name.

`CGFontCreateCopyWithVariations` (page 11)
Creates a copy of a font using a variation specification dictionary.

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`CGFontCreateWithPlatformFont` (page 13)
Creates a font object from an Apple Type Services (ATS) font.

Working With PostScript Fonts

`CGFontCopyPostScriptName` (page 8)
Obtains the PostScript name of a font.

`CGFontCanCreatePostScriptSubset` (page 7)
Determines whether Quartz can create a subset of the font in PostScript format.

`CGFontCreatePostScriptSubset` (page 12)
Creates a subset of the font in the specified PostScript format.

`CGFontCreatePostScriptEncoding` (page 11)
Creates a PostScript encoding of a font.

Working With Font Tables

`CGFontCopyTableTags` (page 9)
Returns an array of tags that correspond to the font tables for a font.

`CGFontCopyTableForTag` (page 9)
Returns the font table that corresponds to the provided tag.

Getting Font Information

`CGFontGetTypeID` (page 19)
Returns the Core Foundation type identifier for Quartz fonts.

`CGFontCopyVariationAxes` (page 10)
Returns an array of the variation axis dictionaries for a font.

`CGFontCopyVariations` (page 10)
Returns the variation specification dictionary for a font.

`CGFontCopyFullName` (page 7)
Returns the full name associated with a font object.

`CGFontGetAscent` (page 14)
Returns the ascent of a font.

`CGFontGetDescent` (page 15)
Returns the descent of a font.

`CGFontGetLeading` (page 18)
Returns the leading of a font.

`CGFontGetCapHeight` (page 14)
Returns the cap height of a font.

`CGFontGetXHeight` (page 20)
Returns the x-height of a font.

`CGFontGetFontBBox` (page 15)
Returns the bounding box of a font.

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`CGFontGetItalicAngle` (page 18)
Returns the italic angle of a font.

`CGFontGetStemV` (page 19)
Returns the thickness of the dominant vertical stems of glyphs in a font.

`CGFontGetGlyphBBoxes` (page 17)
Get the bounding box of each glyph in an array.

`CGFontGetGlyphWithGlyphName` (page 17)
Returns the glyph for the font name associated with the specified font object.

`CGFontCopyGlyphNameForGlyph` (page 8)
Returns the glyph name associated with a font object.

`CGFontGetNumberOfGlyphs` (page 18)
Returns the number of glyphs in a font.

`CGFontGetGlyphAdvances` (page 16)
Gets the bound box of each glyph in the provided array.

`CGFontGetUnitsPerEm` (page 20)
Returns the number of glyph space units per em for the provided font.

Functions

CGFontCanCreatePostScriptSubset

Determines whether Quartz can create a subset of the font in PostScript format.

```
bool CGFontCanCreatePostScriptSubset (
   CGFontRef font,
   CGFontPostScriptFormat format
);
```

Parameters

font
A font object.

Return Value

Returns `true` if a subset in the PostScript format can be created for the font; `false` otherwise.

Discussion

For more information on PostScript format, see *Adobe Type 1 Font Format*, which is available from http://partners.adobe.com/.

Availability

Available in Mac OS X v10.4 and later.

Declared In

`CGFont.h`

CGFontCopyFullName

Returns the full name associated with a font object.

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```
CFStringRef CGFontCopyFullName (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The full name associated with the font.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
CGFont.h

CGFontCopyGlyphNameForGlyph

Returns the glyph name associated with a font object.

```
CFStringRef CGFontCopyGlyphNameForGlyph (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
A glyph name, or `NULL` if there isn't a glyph associated with the font object.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
CGFont.h

CGFontCopyPostScriptName

Obtains the PostScript name of a font.

```
CFStringRef CGFontCopyPostScriptName (
   CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The PostScript name of the font.

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Discussion

Availability
Available in Mac OS X v10.4 and later.

Declared In
`CGFont.h`

CGFontCopyTableForTag

Returns the font table that corresponds to the provided tag.

```
CFDataRef CGFontCopyTableForTag(
    CGFontRef font,
    uint32_t tag
);
```

Parameters

font
A font object.

tag
The tag for the table you want to obtain.

Return Value
The font table that corresponds to the tag, or `NULL` if no such table exists.

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

Declared In
`CGFont.h`

CGFontCopyTableTags

Returns an array of tags that correspond to the font tables for a font.

```
CFArrayRef CGFontCopyTableTags(
    CGFontRef font
);
```

Parameters

font
A CGFont object.

Return Value
An array of font table tags.

Discussion
Each entry in the returned array is a four-byte value that represents a single TrueType or OpenType font table tag. To obtain a tag at index `k` in a manner that is appropriate for 32-bit and 64-bit architectures, you need to use code similar to the following:

```
tag = (uint32_t)(uintptr_t)CFArrayGetValue(table, k);
```


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

Declared In
`CGFont.h`

CGFontCopyVariationAxes

Returns an array of the variation axis dictionaries for a font.

```
CFArrayRef CGFontCopyVariationAxes (
   CGFontRef font
);
```

Parameters

font

A CGFont object.

Return Value
An array of the variation axis dictionaries. Returns `NULL` if the font doesn't support variations.

Discussion
A variation axis is a range included in a font by the font designer that allows a font to produce different type styles. Each variation axis dictionary contains key-value pairs that specify the variation axis name and the minimum, maximum, and default values for that variation axis.

Availability
Available in Mac OS X v10.4 and later.

Declared In
`CGFont.h`

CGFontCopyVariations

Returns the variation specification dictionary for a font.

```
CFDictionaryRef CGFontCopyVariations (
   CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The variation specification dictionary for the font. Returns `NULL` if the font doesn't support variations.

Discussion
The variation specification dictionary contains keys that correspond to the variation axis names of the font. Each key is a variation axis name. The value for each key is the value specified for that particular variation axis represented as a CFNumber object.

Availability
Available in Mac OS X v10.4 and later.

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Declared In
`CGFont.h`

CGFontCreateCopyWithVariations

Creates a copy of a font using a variation specification dictionary.

```
CGFontRef CGFontCreateCopyWithVariations (
   CGFontRef font,
   CFDictionaryRef variations
);
```

Parameters

font

The Quartz font to copy.

variations

A variation specification dictionary that contains keys corresponding to the variation axis names of the font. Each key in the dictionary is a variation axis name. The value for each key is the value specified for that particular variation axis represented as a CFNumber object. If a variation axis name is not specified in `variations`, then the current value from `font` is used.

Return Value
The font object.

Availability
Available in Mac OS X v10.4 and later.

Declared In
`CGFont.h`

CGFontCreatePostScriptEncoding

Creates a PostScript encoding of a font.

```
CFDataRef CGFontCreatePostScriptEncoding (
   CGFontRef font,
   const CGGlyph encoding[256]
);
```

Parameters

font

A CGFont object.

encoding

The encoding to use.

Return Value
A PostScript encoding of the font that contains glyphs in the specified encoding.

Discussion
For more information on PostScript format, see *Adobe Type 1 Font Format*, which is available from http://partners.adobe.com/.

Availability
Available in Mac OS X v10.4 and later.

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Declared In
`CGFont.h`

CGFontCreatePostScriptSubset

Creates a subset of the font in the specified PostScript format.

```
CFDataRef CGFontCreatePostScriptSubset (
   CGFontRef font,
   CFStringRef subsetName,
   CGFontPostScriptFormat format,
   const CGGlyph glyphs[],
   size_t count,
   const CGGlyph encoding[256]
);
```

Parameters

font
A font object.

subsetName
The name of the subset.

format
The PostScript format of the font.

glyphs
An array that contains the glyphs in the subset.

count
The number of glyphs specified by the `glyphs` array.

encoding
The default encoding for the subset. You can pass `NULL` if you do not want to specify an encoding.

Return Value
A subset of the font created from the supplied parameters.

Discussion
For more information on PostScript format, see *Adobe Type 1 Font Format*, which is available from http://partners.adobe.com/.

Availability
Available in Mac OS X v10.4 and later.

Declared In
`CGFont.h`

CGFontCreateWithDataProvider

Creates a font object from data supplied from a data provider.

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```
CGFontRef CGFontCreateWithDataProvider (
    CGDataProviderRef provider
);
```

Parameters

provider

A data provider.

Return Value

The font object or `NULL` if the font can't be created. You are responsible for releasing this object using `CGFontRelease` (page 20).

Discussion

Before drawing text in a Quartz context, you must set the font in the current graphics state by calling the function `CGContextSetFontSize`.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

`CGFont.h`

CGFontCreateWithFontName

Creates a font object corresponding to the font specified by a PostScript or full name.

```
CGFontRef CGFontCreateWithFontName (
    CFStringRef name
);
```

Parameters

name

The PostScript or full name of a font.

Return Value

The font object or `NULL` if the font can't be created. You are responsible for releasing this object using `CGFontRelease` (page 20).

Discussion

Before drawing text in a Quartz context, you must set the font in the current graphics state by calling the function `CGContextSetFont`.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

`CGFont.h`

CGFontCreateWithPlatformFont

Creates a font object from an Apple Type Services (ATS) font.

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```
CGFontRef CGFontCreateWithPlatformFont (
   void *platformFontReference
);
```

Parameters

platformFontReference

A generic pointer to a font object. The font should be of a type appropriate to the platform on which your program is running. For Mac OS X, you should pass a pointer to an ATS font.

Return Value

The font object, or `NULL` if the platform font could not be located. You are responsible for releasing this object using `CGFontRelease` (page 20).

Discussion

Before drawing text in a Quartz context, you must set the font in the current graphics state. For ATS Fonts, call this function to create a Quartz font, and pass it to `CGContextSetFont`.

Availability

Available in Mac OS X version 10.0 and later.

Declared In

`CGFont.h`

CGFontGetAscent

Returns the ascent of a font.

```
int CGFontGetAscent (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value

The ascent of the font.

Discussion

The ascent is the maximum distance above the baseline of glyphs in a font. The value is specified in glyph space units.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

`CGFont.h`

CGFontGetCapHeight

Returns the cap height of a font.

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```
int CGFontGetCapHeight (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The cap height of the font.

Discussion
The cap height is the distance above the baseline of the top of flat capital letters of glyphs in a font. The value is specified in glyph space units.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
`CGFont.h`

CGFontGetDescent

Returns the descent of a font.

```
int CGFontGetDescent (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The descent of the font .

Discussion
The descent is the maximum distance below the baseline of glyphs in a font. The value is specified in glyph space units.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
`CGFont.h`

CGFontGetFontBBox

Returns the bounding box of a font.

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```
CGRect CGFontGetFontBBox (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The bounding box of the font.

Discussion
The font bounding box is the union of all of the bounding boxes for all the glyphs in a font. The value is specified in glyph space units.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
`CGFont.h`

CGFontGetGlyphAdvances

Gets the bound box of each glyph in the provided array.

```
bool CGFontGetGlyphAdvances (
    CGFontRef font,
    const CGGlyph glyphs[],
    size_t count,
    int advances[]
);
```

Parameters

font

The font object associated with the provided glyphs.

glyphs

An array of glyphs.

count

The number of glyphs in the array.

advances

On output, an array of of advances for the provided glyphs.

Return Value
`TRUE` unless the advances can't be provided for some reason.

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

Declared In
`CGFont.h`

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CGFontGetGlyphBBoxes

Get the bounding box of each glyph in an array.

```
bool CGFontGetGlyphBBoxes (
    CGFontRef font,
    const CGGlyph glyphs[],
    size_t count,
    CGRect bboxes[]
);
```

Parameters

font

A font object.

glyphs

A array of glyphs.

count

The number of items in the `glyphs` array.

bboxes

On return, the bounding boxes for each glyph.

Return Value

`false` if bounding boxes can't be retrieved for any reason; `true` otherwise.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

`CGFont.h`

CGFontGetGlyphWithGlyphName

Returns the glyph for the font name associated with the specified font object.

```
CGGlyph CGFontGetGlyphWithGlyphName (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value

A glyph, or `0` if there isn't a name associated with the font object.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

`CGFont.h`

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CGFontGetItalicAngle

Returns the italic angle of a font.

```
CGFloat CGFontGetItalicAngle (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value

The italic angle of the font, measured in degrees counter-clockwise from the vertical.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

CGFont.h

CGFontGetLeading

Returns the leading of a font.

```
int CGFontGetLeading (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value

The leading of the font.

Discussion

The leading is the spacing between consecutive lines of text in a font. The value is specified in glyph space units.

Availability

Available in Mac OS X version 10.5 and later.

Declared In

CGFont.h

CGFontGetNumberOfGlyphs

Returns the number of glyphs in a font.

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```
size_t CGFontGetNumberOfGlyphs (
    CGFontRef font
);
```

Parameters

font

A `CGFont` object.

Return Value
The number of glyphs in the provided font.

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

Declared In
`CGFont.h`

CGFontGetStemV

Returns the thickness of the dominant vertical stems of glyphs in a font.

```
CGFloat CGFontGetItalicAngle (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The thickness of the dominant vertical stems of glyphs in a font.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
`CGFont.h`

CGFontGetTypeID

Returns the Core Foundation type identifier for Quartz fonts.

```
CFTypeID CGFontGetTypeID (
   void
);
```

Return Value
The Core Foundation identifier for the opaque type `CGFontRef` (page 21).

Availability
Available in Mac OS X version 10.2 and later.

Declared In
`CGFont.h`

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CGFontGetUnitsPerEm

Returns the number of glyph space units per em for the provided font.

```
int CGFontGetUnitsPerEm (
    CGFontRef font
);
```

Parameters

font

A `CGFont` object.

Return Value
The number of glyph space units per em for the provided font.

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

Declared In
`CGFont.h`

CGFontGetXHeight

Returns the x-height of a font.

```
int CGFontGetXHeight (
    CGFontRef font
);
```

Parameters

font

A font object.

Return Value
The x-height of the font.

Discussion
The x-height is the distance above the baseline of the top of flat, non-ascending lowercase letters (such as `x`) of glyphs in a font. The value is specified in glyph space units.

Availability
Available in Mac OS X version 10.5 and later.

Declared In
`CGFont.h`

CGFontRelease

Decrements the retain count of a Quartz font.

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```
void CGFontRelease (
   CGFontRef font
);
```

Parameters

font

The Quartz font to release.

Discussion

This function is equivalent to `CFRelease`, except that it does not cause an error if the `font` parameter is `NULL`.

Availability

Available in Mac OS X version 10.0 and later.

Declared In

`CGFont.h`

CGFontRetain

Increments the retain count of a Quartz font.

```
CGFontRef CGFontRetain (
   CGFontRef font
);
```

Parameters

font

The Quartz font to retain.

Return Value

The same font you specified in the `font` parameter.

Discussion

This function is equivalent to `CFRetain`, except that it does not cause an error if the `font` parameter is `NULL`.

Availability

Available in Mac OS X version 10.0 and later.

Declared In

`CGFont.h`

Data Types

CGFontRef

An opaque type that encapsulates font information.

```
typedef struct CGFont *CGFontRef;
```

Availability

Available in Mac OS X v10.0 and later.

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Declared In
`CGFont.h`

CGFontIndex

An index into a font table.

```
typedef unsigned short CGFontIndex;
```

Discussion
This integer type provides an additional way to specify a glyph identifier. `CGFontIndex` is equivalent to `CGGlyph` (page 22), and you can use constants of either type interchangeably.

Availability
Available in Mac OS X version 10.2 and later.

Declared In
`CGFont.h`

CGGlyph

An index into the internal glyph table of a font.

```
typedef unsigned short CGGlyph;
```

Discussion
When drawing text, you typically specify a sequence of characters. However, Quartz also allows you to use `CGGlyph` values to specify glyphs. In either case, Quartz renders the text using font data provided by the Apple Type Services (ATS) framework.

You provide `CGGlyph` values to the functions `CGContextShowGlyphs` and `CGContextShowGlyphsAtPoint`. These functions display an array of glyphs at the current text position or at a position you specify, respectively.

Availability
Available in Mac OS X v10.0 and later.

Declared In
`CGFont.h`

Constants

CGFontPostScriptFormat

Possible formats for a PostScript font subset.

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```
enum CGFontPostScriptFormat {
    kCGFontPostScriptFormatType1 = 1,
    kCGFontPostScriptFormatType3 = 3,
    kCGFontPostScriptFormatType42 = 42
};
typedef enum CGFontPostScriptFormat CGFontPostScriptFormat;
```

Constants

`kCGFontPostScriptFormatType1`

This is documented in *Adobe Type 1 Font Format*, which is available from http://partners.adobe.com/.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

`kCGFontPostScriptFormatType3`

This is documented in *PostScript Language Reference, 3rd edition*, which is available from http://partners.adobe.com/.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

`kCGFontPostScriptFormatType42`

This is documented in *Adobe Technical Note 5012, The Type 42 Font Format Specification*, which is available from http://partners.adobe.com/.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

Availability

Available in Mac OS X v10.4 and later.

Declared In

`CGFont.h`

Font Table Index Values

Possible values for an index into a font table.

```
enum {
    kCGFontIndexMax = ((1 << 16) - 2),
    kCGFontIndexInvalid = ((1 << 16) - 1),
    kCGGlyphMax = kCGFontIndexMax
};
```

Constants

`kCGFontIndexMax`

The maximum allowed value for `CGFontIndex` (page 22).

Available in Mac OS X v10.1 and later.

Declared in `CGFont.h`.

`kCGFontIndexInvalid`

An invalid font index (a value which never represents a valid glyph).

Available in Mac OS X v10.1 and later.

Declared in `CGFont.h`.

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`kCGGlyphMax`
The same as `kCGFontIndexMax`.

Available in Mac OS X v10.1 and later.

Declared in `CGFont.h`.

Discussion
See `CGFontIndex` (page 22).

Declared In
`CGFont.h`

Font Variation Axis Keys

Keys used for a font variation axis dictionary.

```
const CFStringRef kCGFontVariationAxisName
const CFStringRef kCGFontVariationAxisMinValue
const CFStringRef kCGFontVariationAxisMaxValue
const CFStringRef kCGFontVariationAxisDefaultValue
```

Constants
`kCGFontVariationAxisName`
The key used to obtain the variation axis name from a variation axis dictionary. The value obtained with this key is a `CFStringRef` that specifies the name of the variation axis.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

`kCGFontVariationAxisMinValue`
The key used to obtain the minimum variation axis value from a variation axis dictionary. The value obtained with this key is a `CFNumberRef` that specifies the minimum value of the variation axis.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

`kCGFontVariationAxisMaxValue`
The key used to obtain the maximum variation axis value from a variation axis dictionary. The value obtained with this key is a `CFNumberRef` that specifies the maximum value of the variation axis.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

`kCGFontVariationAxisDefaultValue`
The key used to obtain the default variation axis value from a variation axis dictionary. The value obtained with this key is a `CFNumberRef` that specifies the default value of the variation axis.

Available in Mac OS X v10.4 and later.

Declared in `CGFont.h`.

Availability
Available in Mac OS X v10.4 and later.

Declared In
`CGFont.h`

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Document Revision History

This table describes the changes to *CGFont Reference*.

Date	Notes
2007-07-17	Updated for Mac OS X v10.5.
	Added the functions `CGFontCreateWithDataProvider` (page 12), `CGFontCreateWithFontName` (page 13), `CGFontCopyFullName` (page 7), `CGFontGetAscent` (page 14), `CGFontGetDescent` (page 15), `CGFontGetLeading` (page 18), `CGFontGetCapHeight` (page 14), `CGFontGetXHeight` (page 20), `CGFontGetFontBBox` (page 15). `CGFontGetItalicAngle` (page 18), `CGFontGetStemV` (page 19), `CGFontGetGlyphBBoxes` (page 17), `CGFontGetGlyphWithGlyphName` (page 17), `CGFontCopyGlyphNameForGlyph` (page 8), `CGFontCopyTableTags` (page 9), `CGFontCopyTableForTag` (page 9), `CGFontGetNumberOfGlyphs` (page 18), `CGFontGetGlyphAdvances` (page 16), and `CGFontGetUnitsPerEm` (page 20).
2005-04-29	Updated for Mac OS X v10.4.
	Added the functions `CGFontCreateCopyWithVariations` (page 11), `CGFontCopyPostScriptName` (page 8), `CGFontCopyVariationAxes` (page 10), `CGFontCopyVariations` (page 10), `CGFontCanCreatePostScriptSubset` (page 7), `CGFontCreatePostScriptSubset` (page 12), and `CGFontCreatePostScriptEncoding` (page 11).
	Added the constants "`Font Variation Axis Keys`" (page 24) and "`CGFontPostScriptFormat`" (page 22).
2004-08-31	Added introductory material.
2004-02-26	First version of this document. An earlier version of this information appeared in *Quartz 2D Reference*.

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