

How to Use the ThinkGear API in Xcode (Mac OS X)

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Contents

Introduction	4
Setting up Xcode	5
Importing ThinkGear Functions	6
Using Imported ThinkGear Functions	8
Conclusion	9
References	10

Introduction

Loadable modules (containing dynamic libraries or plugins) on Mac OS X are often packaged as bundles. These are generally analogous to `.dll` files in Windows or `.so` files in Linux and other *NIX platforms, though bundles also provide a richer set of functionality, e.g. facilities for loading non-executable assets such as localization strings or images.

Developers that want to integrate ThinkGear functionality into their OS X applications should utilize the `CFBundle` API in the Core Foundation framework to hook into `ThinkGear.bundle`. This document will describe the process of getting your Xcode project up and running with ThinkGear.

Note: The `NSBundle` API in the Cocoa framework applies strictly to bundles containing Objective-C classes. Since ThinkGear is a C-only API, discussions of `NSBundle` are inappropriate in this context.

Setting up Xcode

The only requirement for loading `ThinkGear.bundle` is that the Core Foundation framework be included in your project's list of external frameworks and libraries. This can be done by right-clicking on the **External Frameworks and Libraries** folder in your Xcode project window.

Then, choose **Add**, then **Existing Frameworks...**. Look for the `CoreFoundation.framework` folder in the directory browser, and click **Add**. The image below shows what your project window should look like once the Core Foundation framework has been added.

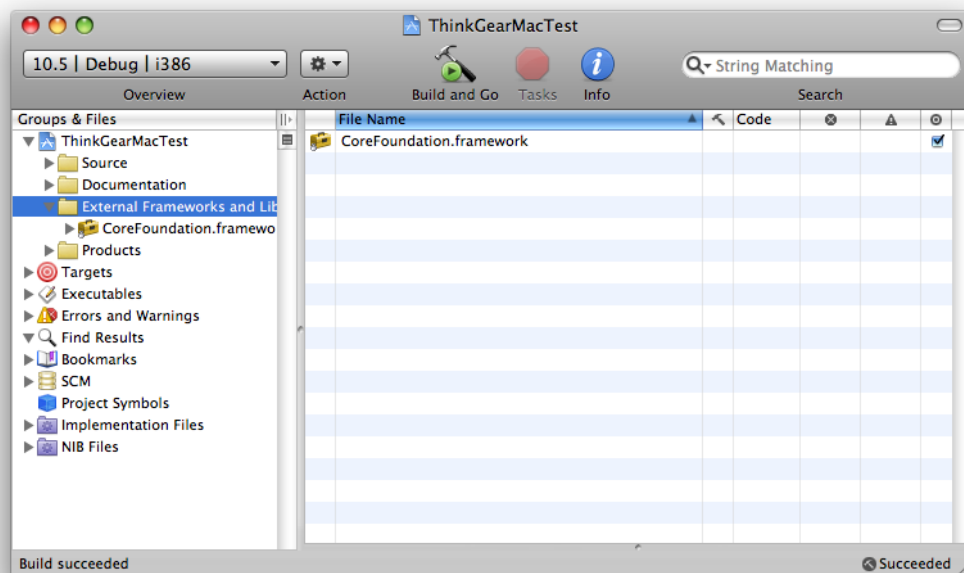


Figure 2.1: Xcode project window

Importing ThinkGear Functions

At the top of your header or implementation, you should include the Core Foundation library:

```
#include <CoreFoundation/CoreFoundation.h>
```

Before importing the functions, a bundle reference (`CFBundleRef`) must first be created for the bundle. This is constructed from a path describing the location of the bundle, which is encapsulated in a `CFURLRef` object. Let's first declare these objects.

```
CFURLRef bundleURL;
CFBundleRef thinkGearBundle;
```

And now, to instantiate them:

```
bundleURL = CFURLCreateWithFileSystemPath(kCFAllocatorDefault,
                                          CFSTR("ThinkGear.bundle"),
                                          kCFURLPOSIXPathStyle,
                                          true);

thinkGearBundle = CFBundleCreate(kCFAllocatorDefault, bundleURL);
```

`CFBundleCreate` returns `NULL` if the `bundleURL` points to an invalid bundle, so it's a good idea to check that for validity before continuing. Note that the path above is a relative path, so the executable will need the bundle to be located in the same directory. Apple provides documentation on [different ways of locating bundles](#).

We then need to declare some function pointers that reference the functions inside `ThinkGear.bundle`. It is recommended to use the same naming scheme for the functions as is used in the API. A few examples are provided below for clarity. Refer to `ThinkGear.h` (provided in the ThinkGear SDK) for the function prototypes.

```
int (*TG_GetDV)() = NULL;    // TG_GetDriverVersion
int (*TG_GetNCId)() = NULL;  // TG_GetNewConnectionId
int (*TG_Connect)(int, const char *, int, int) = NULL;
```

Finally, we'll want to create the references to the ThinkGear functions. This is done using the `CFBundleGetFunctionPointerForName` function, which takes the bundle reference as one of its parameters. This should be done for any ThinkGear functions that you plan on using in your application.

```
TG_GetDV = (void*)CFBundleGetFunctionPointerForName(thinkGearBundle,
                                                    CFSTR("TG_GetDriverVersion"));
TG_GetNCId = (void*)CFBundleGetFunctionPointerForName(thinkGearBundle,
                                                       CFSTR("TG_GetNewConnectionId"));
TG_Connect = (void*)CFBundleGetFunctionPointerForName(thinkGearBundle,
                                                       CFSTR("TG_Connect"));
```

Before using these imported functions, it is prudent to check that they were successfully imported.

Chapter 3 – Importing ThinkGear Functions

```
if(!TG_Connect)
    return -1;
```

Before your application quits (or when you're done using the functions), you'll need to release the allocated Core Foundation objects; namely, the `CFURLRef` and `CFBundleRef` objects. This is effectively equivalent to an object destructor.

```
CFRelease(bundleURL);
CFRelease(thinkGearBundle);
```

Using Imported ThinkGear Functions

The imported functions can be used as if they were normally declared and implemented in your code, e.g.

```
int retVal = TG_Connect(connectionID, "/dev/tty.MindsetMSEMI-DevB-1", 9600, 0);  
printf("TG_Connect returned: %d\n", retVal);
```


Conclusion

By reading this document, you have familiarized yourself on how to integrate the ThinkGear library into your OS X application. A sample Xcode project, implementing a simple command-line data streamer for the headset, is included in the MindKit SDK.

References

- <http://developer.apple.com/DOCUMENTATION/CoreFoundation/Conceptual/CFBundles/CFBundles.htm>
- ThinkGear API and Reference Manual
- ThinkGear API MacOSX Example