

controlSUITE™ Getting Started Guide

controlSUITE for C2000 microcontrollers is a cohesive set of software infrastructure and software tools designed to minimize software development time. From device-specific drivers and support software to complete system examples in sophisticated system applications, controlSUITE provides libraries and examples at every stage of development and evaluation.

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1 Getting Started

controlSUITE's main features include:

- Centralized, interactive repository for all C2000 software
- Graphical user interface (GUI) for intuitive navigation of software, development kits, libraries, user guides, application notes, and more.
 - Auto-loading of Code Composer Studio example projects
- Device software and support
 - Access header files, Flash API, Boot ROM source code
 - Example projects
 - Device-specific documentation
 - Block diagrams
 - Online resources
- Kit software and support
 - Kit overviews
 - Example projects with modular builds to guide users through development
 - Documentation – quick start guides (QSG), hardware guides, application guides, and more
 - Graphical user interface (GUI)
 - Complete hardware developers packages featuring schematics, BOM, gerber files, and source code
- Libraries
 - Application specific libraries – motor control, digital power
 - Math libraries – IQMath™, CLA, floating point
 - DSP libraries – fixed and floating point
 - Signal generation libraries
 - Flash API and Boot ROM
 - All including example projects
- Datasheets and users' guides
- Application notes

1.1 Directory Structure

With controlSUITE, all C2000 software is organized into a consolidated, intuitive file structure.

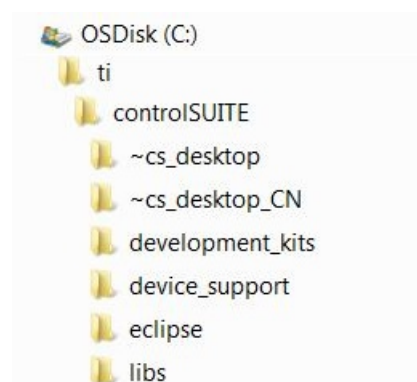


Figure 1. controlSUITE Directory Structure

Maintaining the default installation location, controlSUITE files are all located in a single directory:
C:\ti\controlSUITE

The root level directories are described in [Table 1](#).

Table 1. controlSUITE Root Directories

Directory	Description
~cs_desktop	Contains controlSUITE GUI files. Do not modify.
~cs_desktop_CN	Contains controlSUITE GUI files. Do not modify.
development_kits	All development kit software is located in this directory. This includes launchpads, experimenter's kits, hardware schematics, development kits, and more.
device_support	All device-specific software files are located in this directory. This includes header files, source files, and device examples.
eclipse	Eclipse framework required for controlSUITE GUI. Do not modify.
libs	All library files are located in this directory. This includes application, DSP, math, and utility libraries.

1.2 Development Kits

The development kits within controlSUITE offer a variety of hardware development tools designed to accelerate and simplify the design process. Each tool comes with completely open source hardware schematics and software framework. Combined with controlSUITE software, C2000 tools provide an effective way to evaluate devices and seamlessly transition into.

To view all C2000 tools, visit <http://www.ti.com/c2000tools>.

A variety of development tools are included within controlSUITE. Some categories of tools include:

- C2000 Launchpad hardware design schematics, documentation, and example files
- C2000 controlSTICK hardware design schematics, documentation, and example files
- C2000 controlCARD hardware design schematics and documentation
- C2000 Experimenter's kits' hardware design schematics and documentation
- Development Kit software and hardware documentation including examples for the following applications:
 - Motor control
 - Digital power
 - Solar energy
 - LED lighting

1.3 Device Support

The controlSUITE device support contains the necessary software and documentation to jumpstart development for C2000 real-time control microcontrollers. This includes device-specific header and source files, example projects, and API drivers. Documentation is provided within the specific device directory to describe how to setup a CCS project for the device as well as provide an overview of the included example projects and assist with troubleshooting.

To learn more about C2000 microcontrollers, visit <http://www.ti.com/c2000>.

1.4 Libraries

The libraries included within controlSUITE range from Fixed Point Math and Floating Point Math libraries to specialized DSP libraries as well as various Application and Utility libraries. Each library is fully documented with User Guides and provides examples when applicable. An overview of several libraries included:

- Application Libraries
 - Motor control

- Digital power
- Solar
- Software frequency response analyzer
- PMBus
- Math Libraries
 - IQMath
 - CLA real-time coprocessor
 - Floating point
- DSP libraries
 - Fixed point
 - Floating point
 - VCU
 - Signal generation
- Utilities
 - Flash API
 - Boot ROM
 - HRCAP calibration

1.5 **controlSUITE GUI**

The controlSUITE graphical user interface (GUI) enables easy visual navigation of all C2000 design resources including the development kits, device support, libraries, user guides, powerSUITE tools, and more. The GUI is accessible in a standalone application view as well as a windowed view within Code Composer Studio. More details regarding the controlSUITE GUI can be found in [Section 3.1](#).

2 controlSUITE How-To

The following sections discuss how to use controlSUITE, beginning with the installer.

2.1 Installation

The controlSUITE installer has two variations, web installer and offline installer. The web installer offers a small initial download that later downloads the necessary files from the web during installation. The offline installer contains all the controlSUITE files upon initial download and doesn't require internet access during installation. To select one of these installers, visit the following link, and select "Get Software."

To download controlSUITE, visit <http://www.ti.com/controlSUITE>.

When running the installer, the installer will first compute space requirements for the installation which may take several minutes. On the next installer dialog, there is a prompt to read the license agreement and then continue once accepted. The following dialog offers a choice of setup type, either complete or custom. The "Complete" option is highly recommended, which will install all the controlSUITE files in the default directory location "C:\ti". Selecting "Custom" provides the choice of a different installation directory. This option also allows the selection of specific controlSUITE files to include and exclude from installation, however installing all the controlSUITE files is recommended.

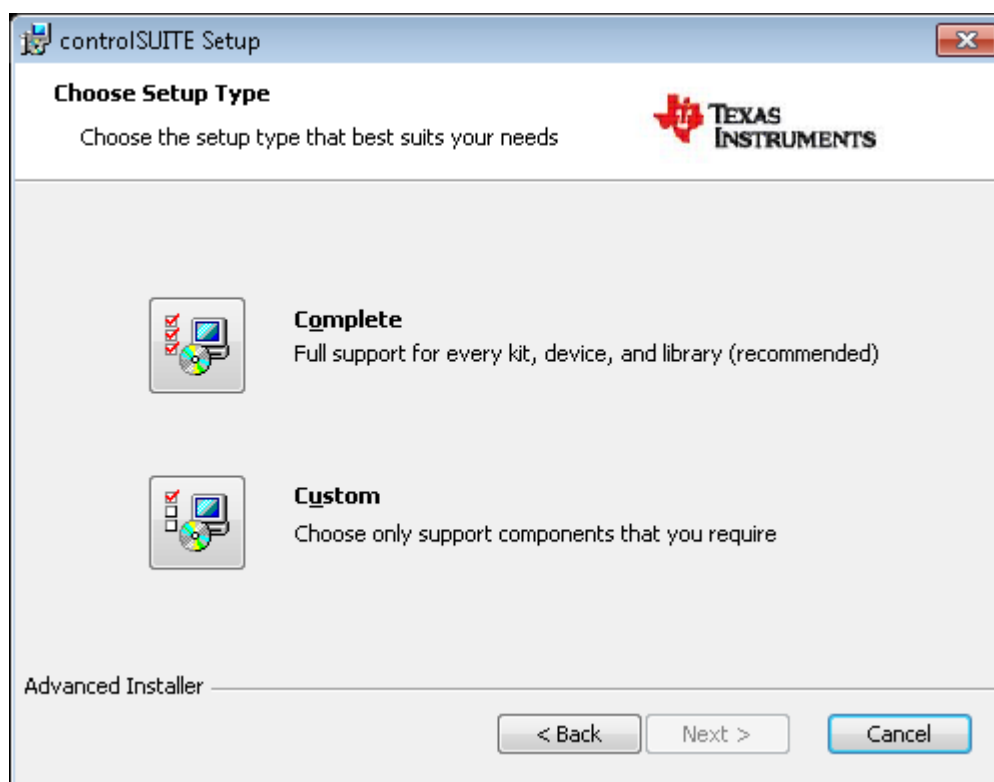


Figure 2. Setup Type Installation Dialog

2.2 Updating

Within controlSUITE, there is an update feature that checks for the latest version. To perform a manual update check, the controlSUITE GUI and internet connection are required. First, the GUI executable, “controlSUITE.exe”, has to be run with admin permissions. In the navigation categories on the left side of the GUI, locate the “Check for controlSUITE Updates” option. The page on the right side of the GUI contains a link, “Check for controlSUITE Updates”, that must be selected to perform the update check. Upon selection, the updater will check and report back if there is a new controlSUITE version available or if the current version is already up to date. If a new version is available, a window describing the version changes will be displayed before continuing to download the updates. The updates will be applied to the current controlSUITE installation.

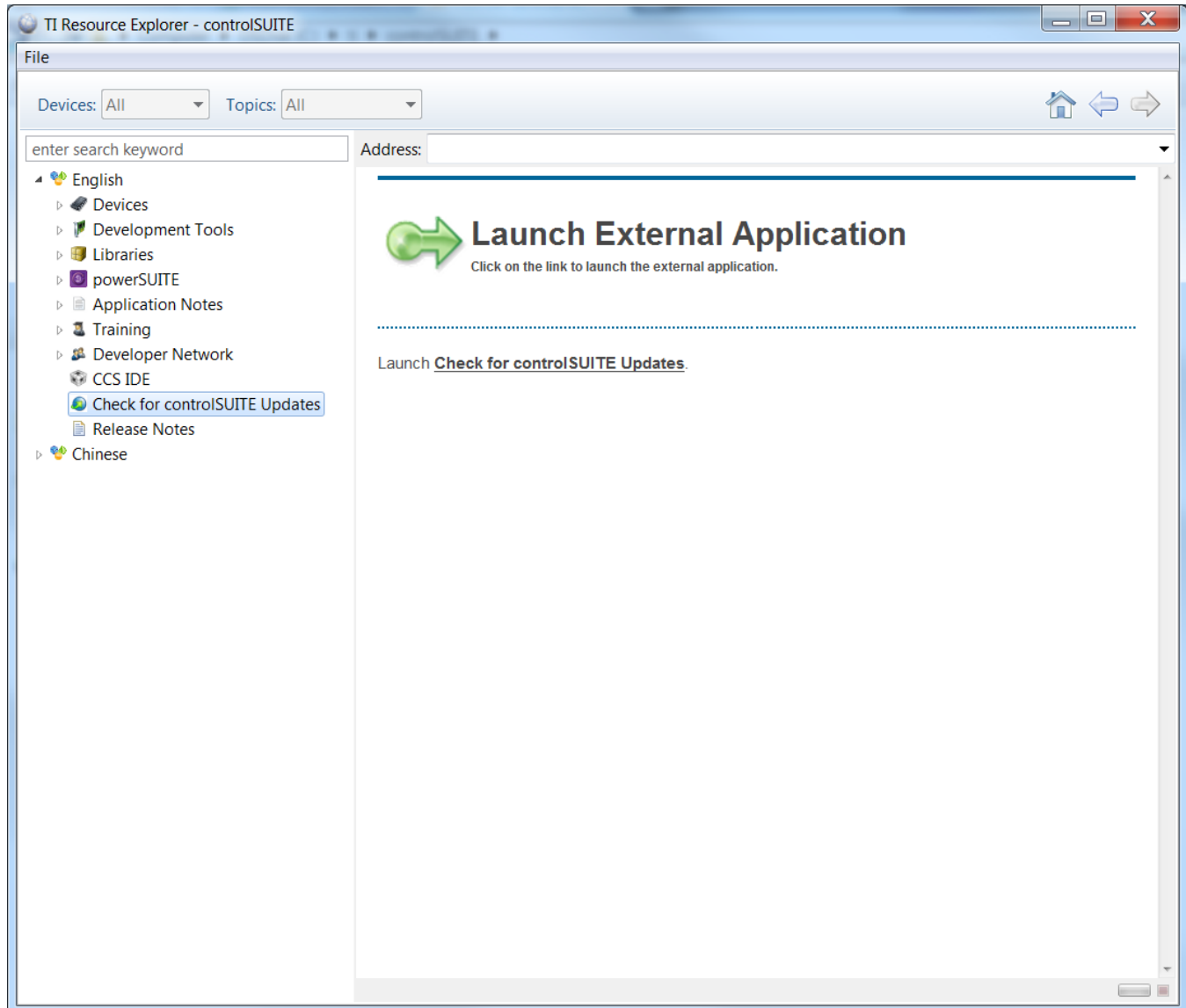


Figure 3. Updating from the GUI

2.3 Code Composer Studio

Code Composer Studio is an integrated development environment (IDE) that supports TI's Microcontroller and Embedded Processors portfolio. Code Composer Studio comprises a suite of tools used to develop and debug embedded applications. The latest version of Code Composer Studio can be obtained at the following link:

<http://www.ti.com/ccstudio>

All projects and examples in controlSUITE are built for and tested with TI's Code Composer Studio. Although Code Composer Studio is not included with the controlSUITE installer, it is easily obtainable in a variety of versions. Both paid and free licenses are available for download.

3 controlSUITE GUI

The controlSUITE graphical user interface (GUI) presents a simple, visual navigation of all the controlSUITE directory resources including the development kits, device support, libraries, user guides, and more. Additionally, powerSUITE is accessible within the GUI and offers a suite of intuitive software tools targeted at simplifying the development of digital power supply designs. The GUI also provides helpful product descriptions and actions such as the ability to import example projects into Code Composer Studio. Furthermore, the GUI offers a variety of additional online resource links to product manuals, device web pages, and online learning workshops.

3.1 Using the GUI

To launch the controlSUITE GUI, locate the “controlSUITE.exe” within the root folder of the controlSUITE installation. Default location is C:/ti/controlSUITE.

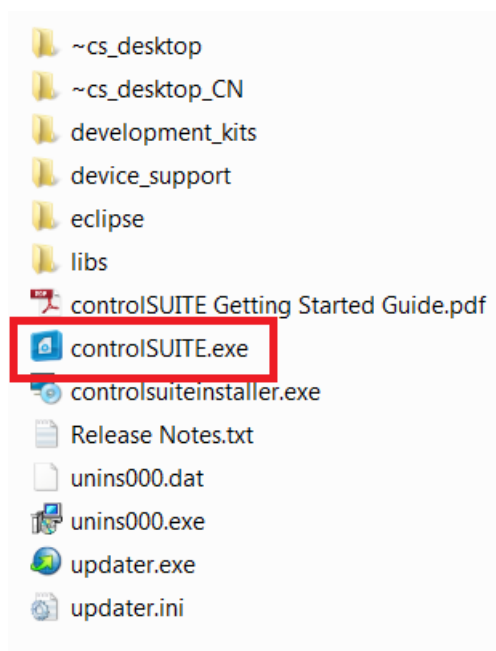


Figure 4. Launching the GUI

Upon launch, the GUI window will be displayed. To navigate the GUI, use the categories and the search functionality on the left side of the window. Expand and collapse the various categories using the “arrows” to the left of the selection.

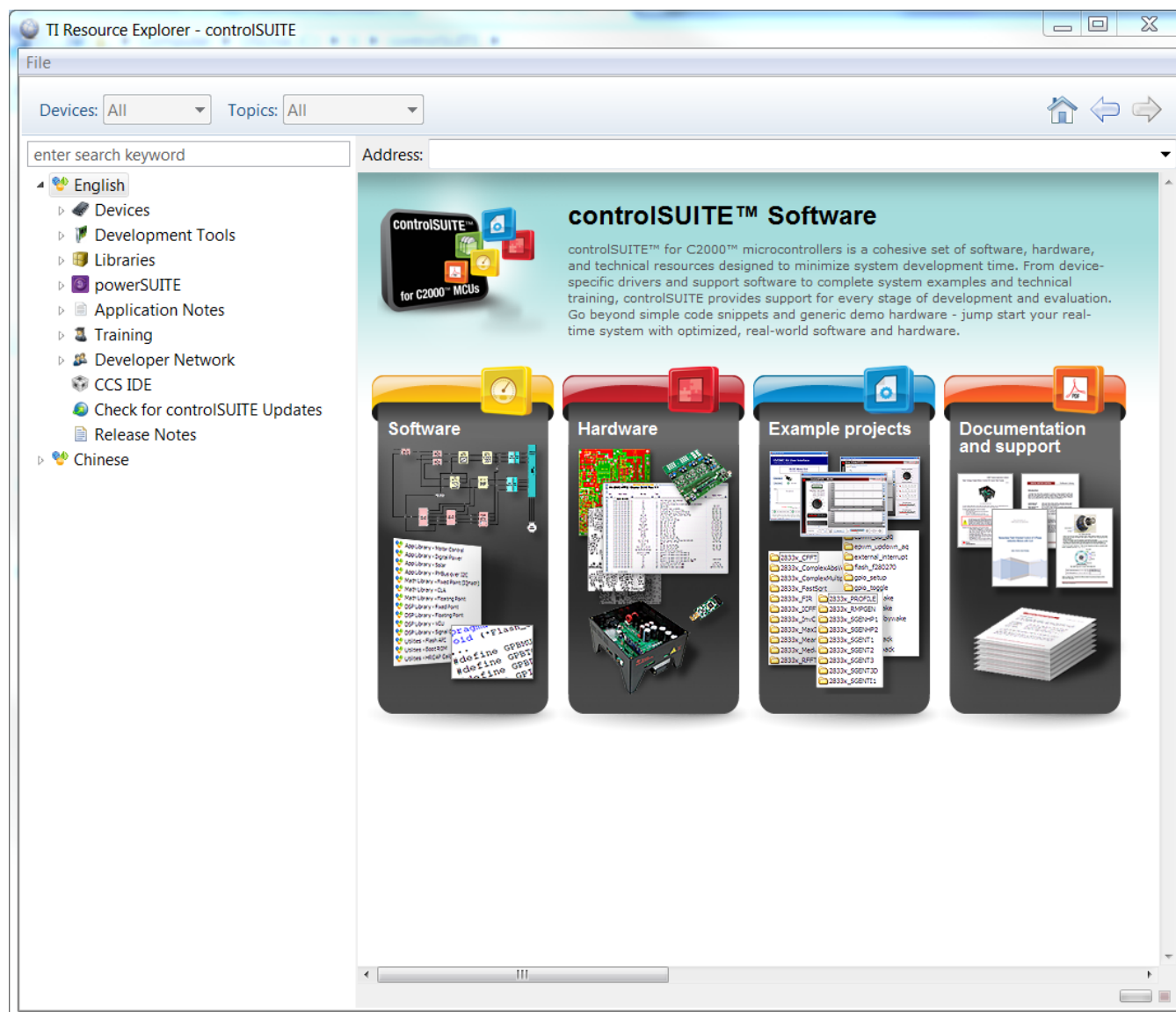


Figure 5. controlSUITE GUI

The GUI categories are further expanded into specific devices, tool kits, libraries, powerSUITE, and more. Each contain their own sub-categories listing examples, user guides, online resources, and other topics depending on the category. Online resources are loaded directly within the GUI application window such as links to documentation and web pages on www.ti.com.

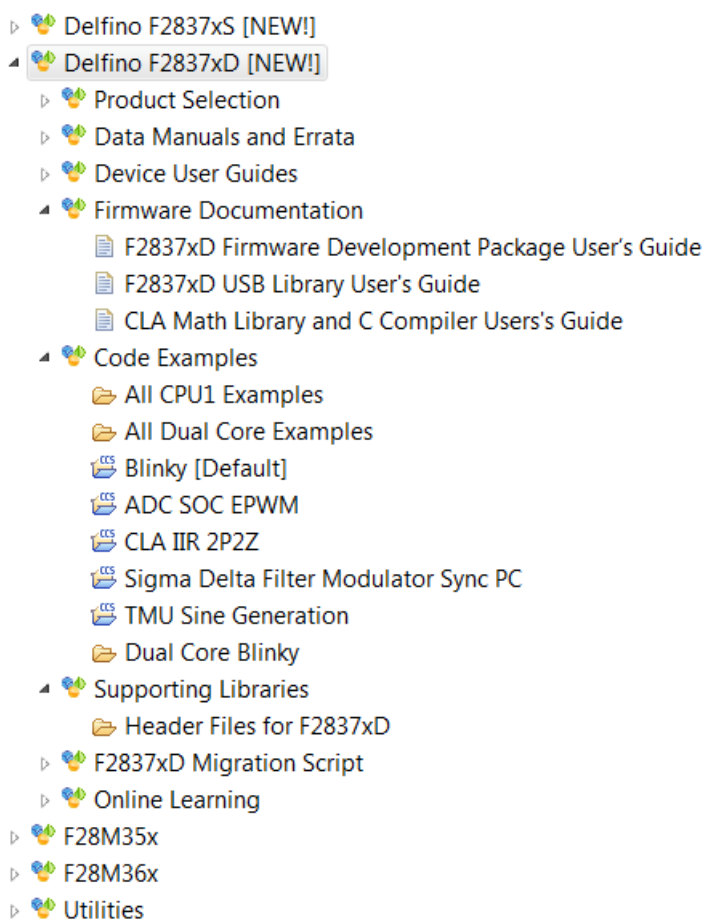


Figure 6. Example of Delfino F2837xD Device Sub-categories

3.2 Code Composer Studio Integration

Once controlSUITE is installed, Code Composer Studio (CCS) can be used to launch the GUI as an alternative to the method described in [Section 3.1](#). First, open Code Composer Studio and select a workspace. To access the GUI, select “View” on the top menu bar, and then select “Resource Explorer.”

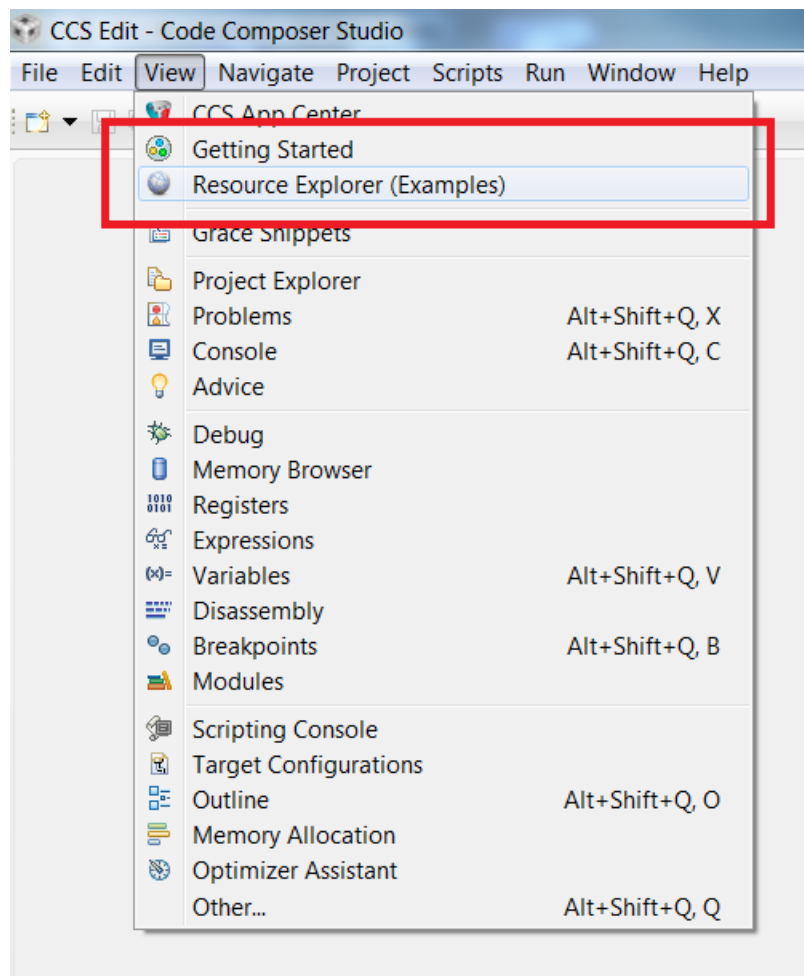


Figure 7. Select Resource Explorer Within CCS

A new window with CCS will open, titled “TI Resource Explorer.” Any packages CCS has discovered will be listed on the left side of the window. Select “controlSUITE” and the GUI categories will be displayed.

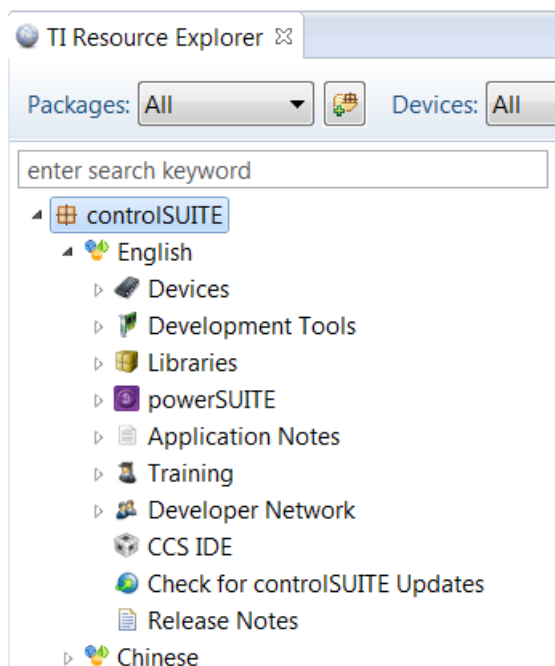


Figure 8. controlSUITE GUI Within CCS

Using the GUI within CCS enables the ability to import select example projects directly into the CCS workspace. The GUI also provides the functionality to build the project, select the debug configuration, and run the CCS debugger without using the standard CCS interface.

- ▶ Delfino F2837xD [NEW!]
- ▶ Product Selection
- ▶ Data Manuals and Errata
- ▶ Device User Guides
- ▶ Firmware Documentation
- ▶ Code Examples
 - ▶ All CPU1 Examples
 - ▶ All Dual Core Examples
 - ▶ Blinky [Default]
 - ▶ ADC SOC EPWM
 - ▶ CLA IIR 2P2Z
 - ▶ Sigma Delta Filter Modula
 - ▶ TMU Sine Generation
 - ▶ Dual Core Blinky
- ▶ Supporting Libraries
- ▶ F2837xD Migration Script
- ▶ Online Learning

These are the steps to import the project, build the project, and debug the project.

Step 1: [Import the example project into CCS](#)

Click on the link above to import the project. The imported project is a project to open the source file editor.

Step 2: [Build the imported project](#)

*To change build options, right click on the project and select **Properties***

Step 3: [Debugger Configuration](#)

*Connection: **none***
Click on the link above to change the device connection. Additionally,

Step 4: [Debug the imported project](#)

*Click on the link above to launch a debug session for the **Blinky [Default]** view and click on the bug toolbar button. To relaunch a previous debug*

Figure 9. Example of Project Importing through the GUI

Revision History

Changes from February 9, 2015 to February 12, 2015 (from B Revision (August 2011) to C Revision)	Page
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- | | |
|---|-------------------|
| <ul style="list-style-type: none">Revised the complete document and accompanying graphics. | 1 |
|---|-------------------|

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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