Code Composer Studio™ and Software Development Kit Installation for Texas Instrument's DRV9x Motor Drivers

MDBU - IMC

ABSTRACT

TI's DRV9x family of parts are motor driver integrated circuits (ICs) with an integrated MSP430 core and 3-phase brushless DC (BLDC) predriver. These ICs require Code Composer Studio™ (CCS), device drivers, and MSP430UIF tools to communicate via the JTAG communication. This document details the entire installation and programming tool setup using CCS. This integrated development environment (IDE) offers full debugging and developmental capabilities. A detailed pictorial step-by-step description of each block is also included in the document. All specific files needed for the DRV9x are included in the software development kit (SDK) install package, CCS must be installed separately.
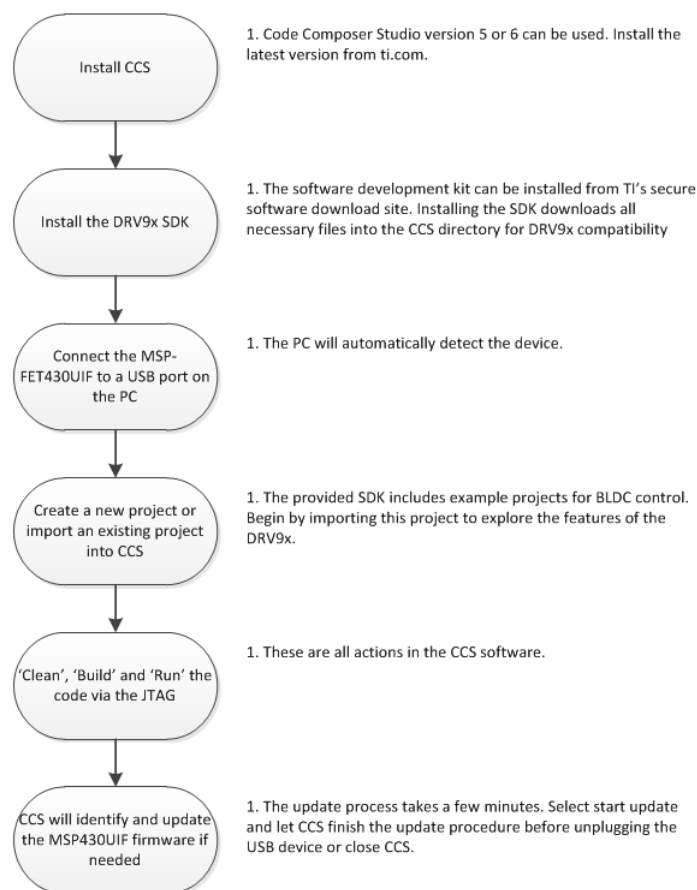

Figure 1. Flow Chart for Installing and Configuring Code Composer Studio for the DRV9x Family of Devices

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1   Installing CCS

CCS versions 5 and 6 have been tested with the DRV9x. An authorized version can be installed from http://www.ti.com/tool/ccstudio. Please note a myTI login account will be needed to download CCS as well as the SDK package. The following walk-through is the installation procedure for CCS5.4; however, installing other versions including v6.x is similar.

After following the necessary steps to download the CCS installer, there should be a file *ccs_setup_5.4.0.00091.exe* located in the specified download directory. See Figure 2 below showing this file.
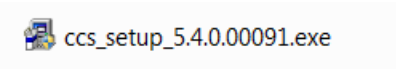
Figure 2. Downloaded Executable for Code Composer Studio Installation

Follow the installation process listed below:

1. Run the installer by double-Clicking *cs_setup_5.4.0.00091.exe*. Read through and accept the license agreement to proceed with the installation.

Figure 3. CCS License Agreement

2. Choose a destination directory. Using the default (*c:\ti*) will remove a step in the SDK installation procedure.
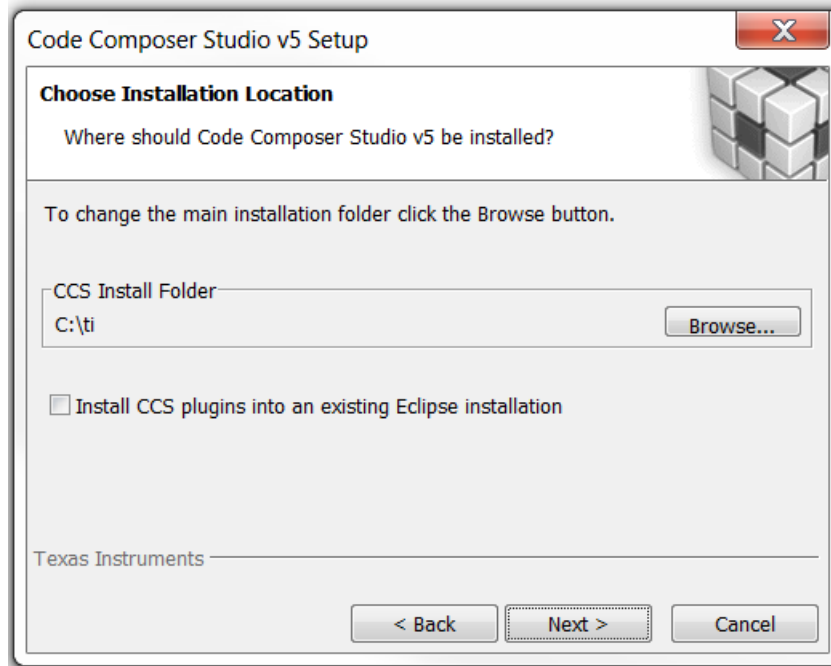
Figure 4. Default Installation Location for CCS

3. Choose the processor architectures to install.

For the DRV9x, the MSP430 package is the only needed processor.
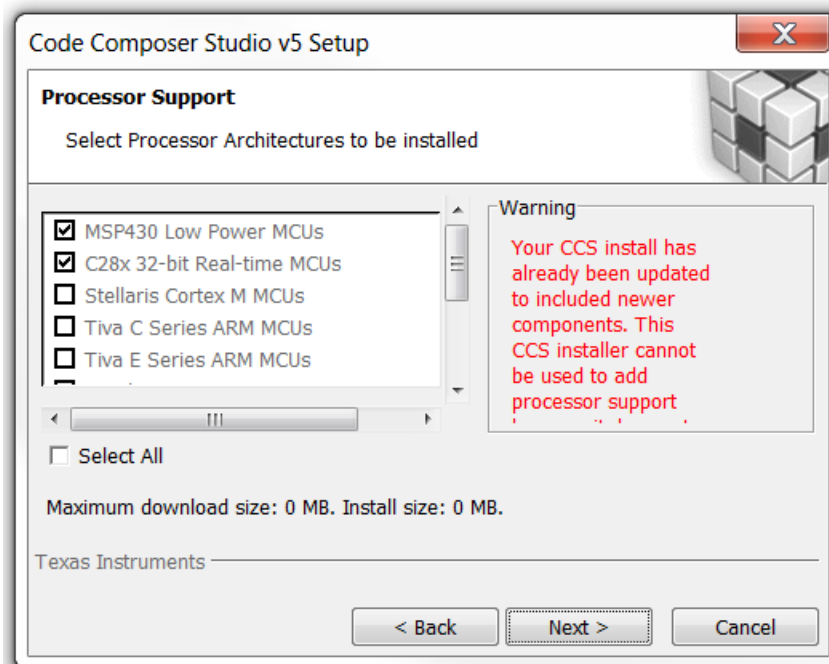
Figure 5. Processors Supported by CCS

4. Select the components you wish to install.

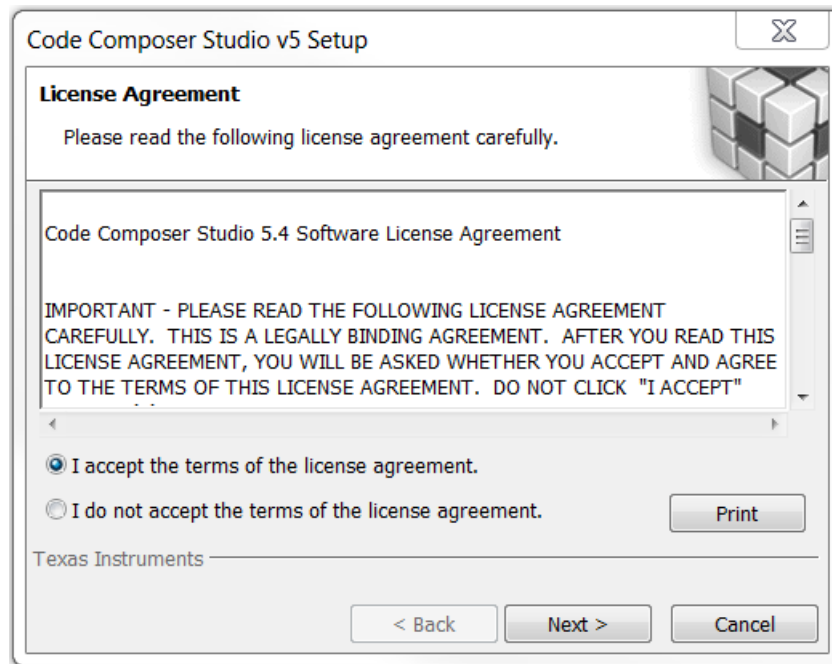The compiler tools are needed, ensure TI MSP430 Compiler Tools and Documentation are both selected. The device software MSP430ware, Grace, and SYS/BIOS v6 are optional.
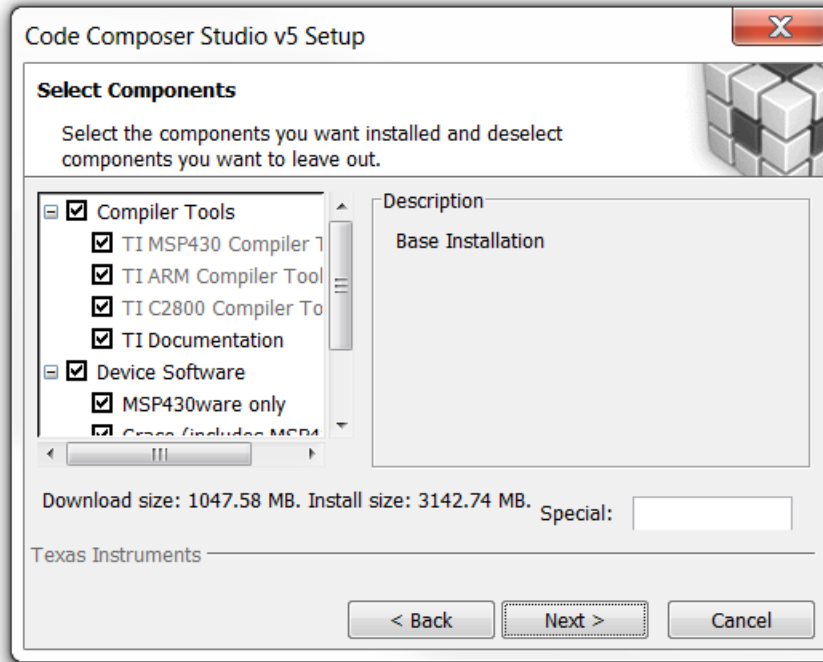
Figure 6. Components Available for Installation

5. Choose the emulators

For the provided tool, MSP430-FET430UIF, the MSP430 USB FET emulator is needed.
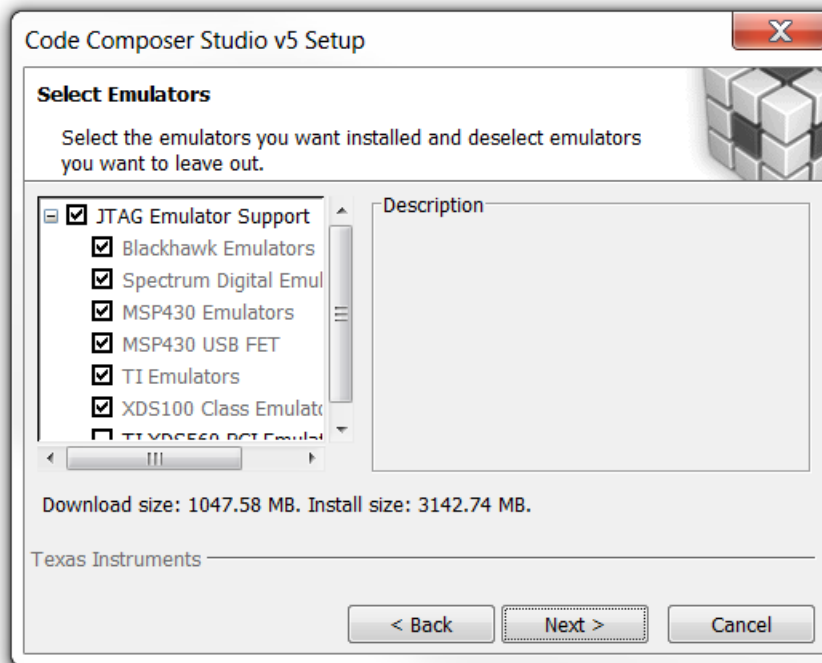
Figure 7. Emulators Available for Installation

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6. Review the installation and finalize.

    The last menu before the installation is underway shows the selected options and requirements. If everything looks correct, click the *Next* button. CCS will begin to install.
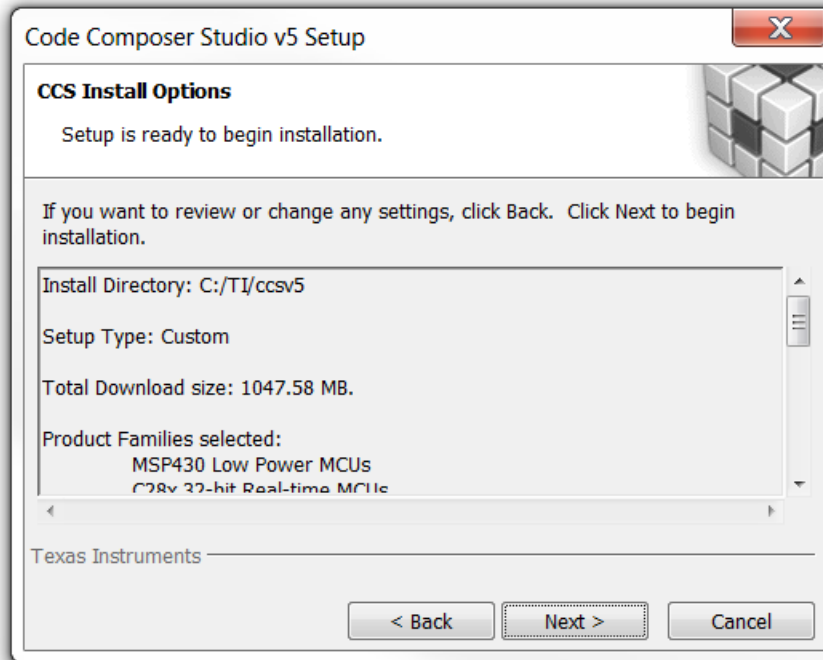
Figure 8. CCS Installation Review

When reporting a problem, it's important to be able to capture details about the particular setup. In CCS you can view specific software details, under the *Help* menu select *About Code Composer Studio*. Next click the *Installation Details* button. This menu describes different aspects and details of the installation including history, configurations, tools and compiler version. The *Configuration* tab displays a file containing various pieces of information about the setup, including plug-in versions, preference settings, and the contents of the internal log file. You can copy and save this information and attach the saved file to your problem report.
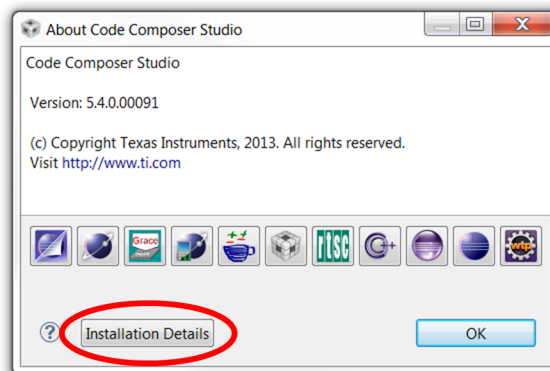
Figure 9. About CCS Software Installation Details

2   Installing DRV9x Software Development Kit

There are files needed to program the DRV9x with CCS. All of these files are included in the installation package of the SDK which can be downloaded from TI's secure software download site. To get access to this download please contact the DRV9x applications team or the respective field sales engineer. Please note the following steps are for the DRV91680; however, the procedure is the same for different DRV9x devices.

1. To begin, double click the SDK executable after downloading it from the TI website.
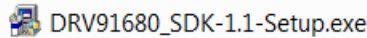
Figure 10. SDK Installation Executable

2. The default setup language is in English, if the user opts for a different language the follow prompt allows the user to change the language.
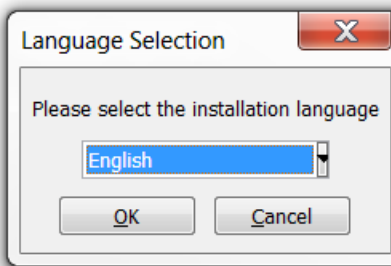
Figure 11. Language Selection for the Driver Installer

3. Read though and accept the license agreement to proceed with the installation.
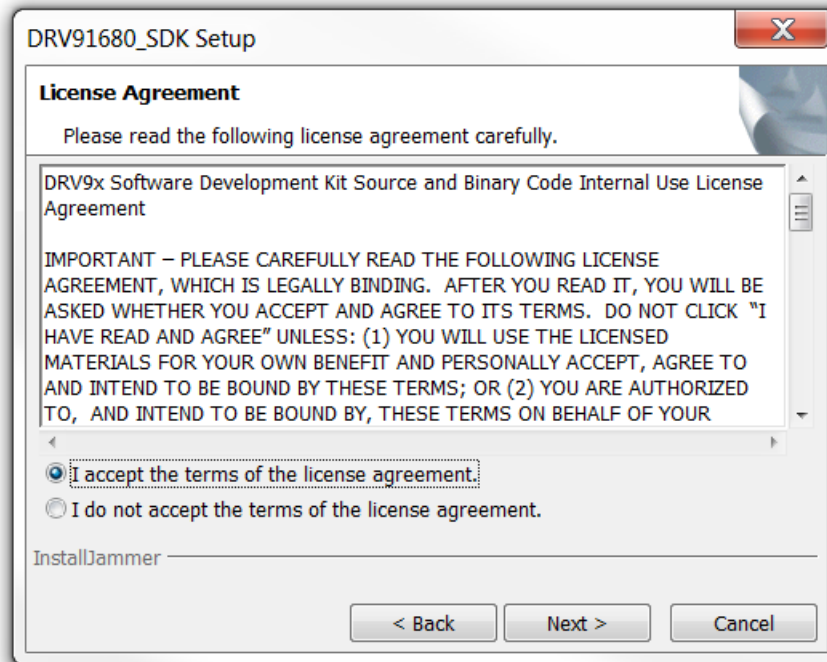
Figure 12. DRV9x SDK License Agreement

4. Ensure all running instances of Code Composer Studio are closed.

Figure 13. Warning Message to Exit CCS Before Installation

5. The default installation folder is specified as the default CCSv6 installation location. If CCv6 was installed in the default directory (C:\ti) then proceed. If CCSv5 was installed or the location of v6 was changed the SDK must be installed in the ccs_base folder. In the previous installation example, the CCS path is *C:\ti*, if that is the case, the SDK should be placed in *C:\ti\ccsv5\ccs_base*.
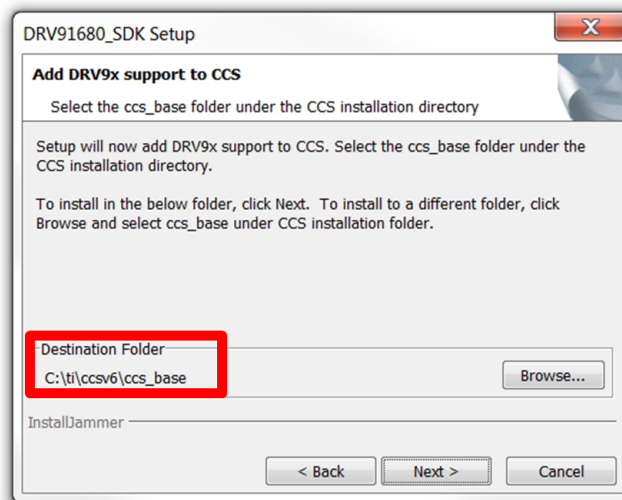
CAUTION this path might need to be modified.

Figure 14. SDK Installation in CCS Base Directory

6. Choose a destination location for the SDK documentation and example CCS projects. This can be set to any location on the PC.
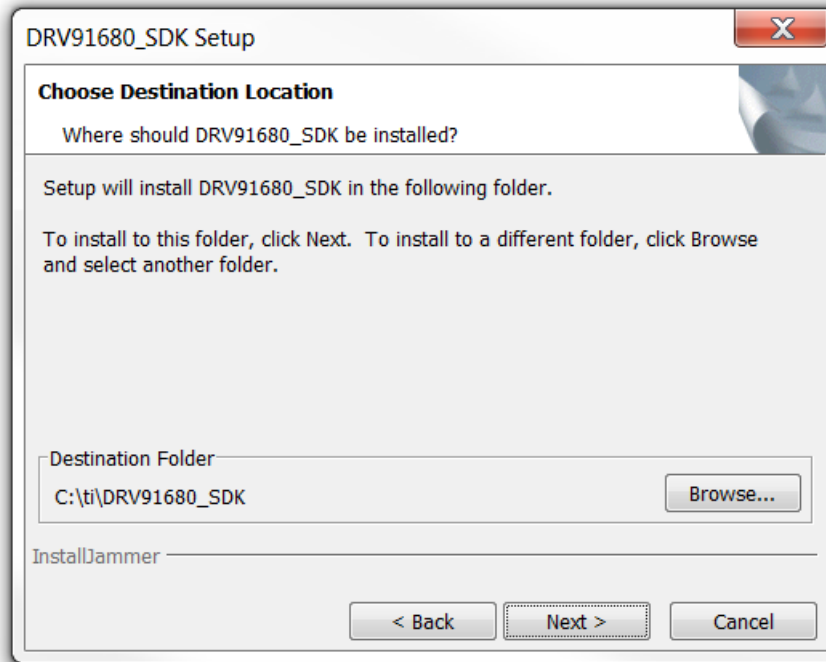
Figure 15. SDK Collateral Destination Folder

7. Continue with the installation process. Select the *Next* button to install after reviewing the settings and click the *Finish* button when procedure is done.

3 Creating or Importing a Project into CCS

When working with CCS, it will initially ask to select a workspace. A workspace is the structure in which projects are kept and there can be multiple projects in one workspace. To begin with, CCS it is suggested to import the provided project for the specific DRV9x device. After importing an existing project the user can explore the features of CCS and get used to the IDE. Follow these steps for importing the provided project:

1. Double click the CCS ICON to open the application. A CCS icon is placed on the desktop after installation.
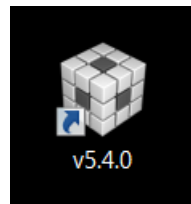
Figure 16. CCS Desktop ICON

2. Select the location and name of the workspace. This selection is up to the user's preference on the location and naming convention.
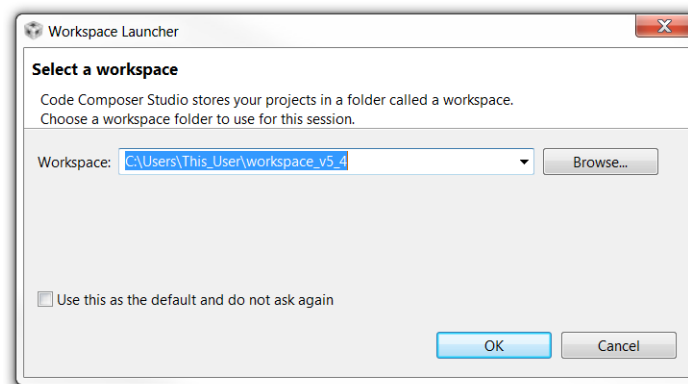
Figure 17. Workspace Launcher Window

Code Composer Studio and Software Development Kit Installation for Texas Instrument's DRV9x Motor Drivers

3. After selecting the workspace, CCS opens showing a welcome menu. From here you can select *Import Project* or go to the *Project* menu and click *Import Existing CCS Eclipse Project*.
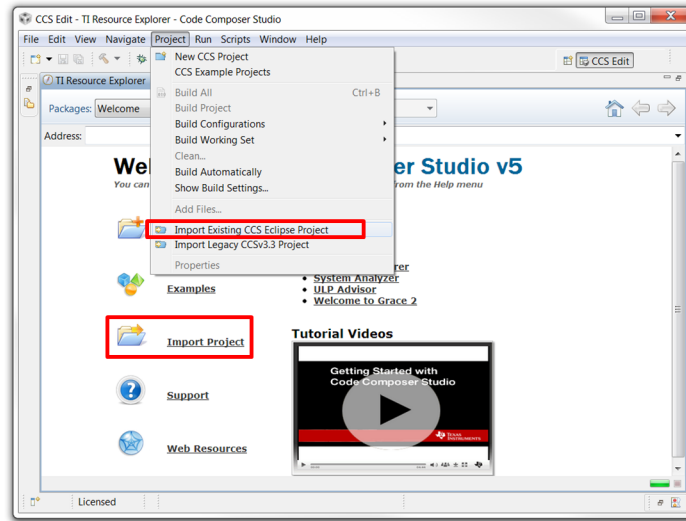
Figure 18. Import Project Options

4. A new window appears showing options for importing the project. Click the browse button and find the provided projects through the folder browser. These projects are located in the SDK installation directory. The above example location is *C:\ti\DRV91680_SDK*. Once selected, the provided project appears under *Discovered Projects*, make sure it is selected and then press the *Finish* button.
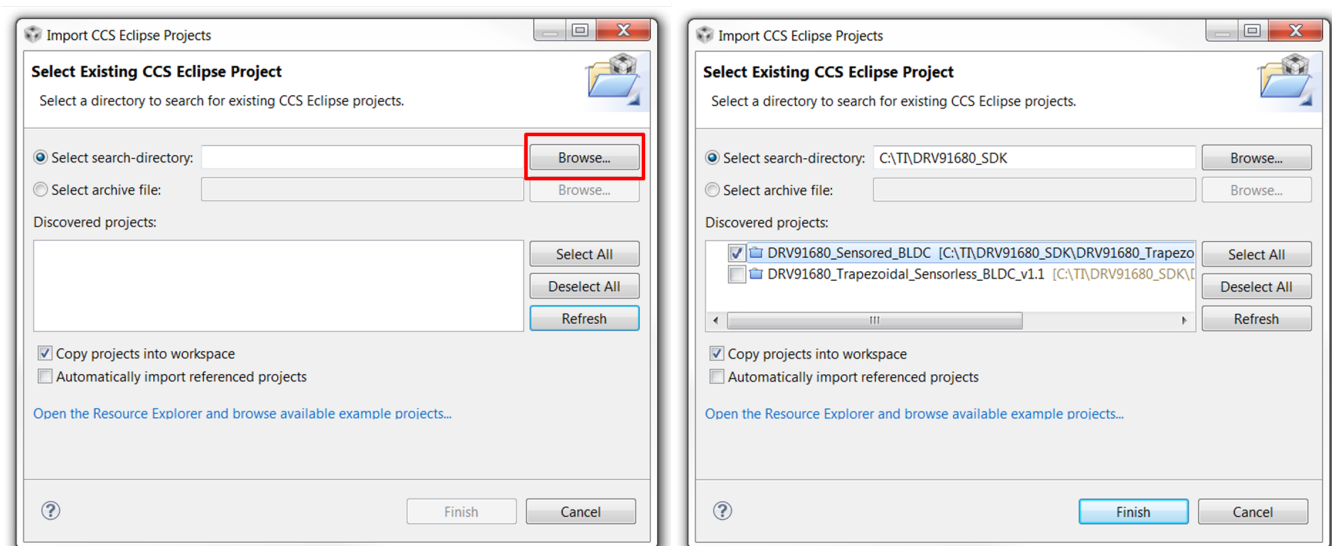
Figure 19. Import Project Menu

5. Now the project should appear in the Project Explorer window. Explore, build, and run the project from here.
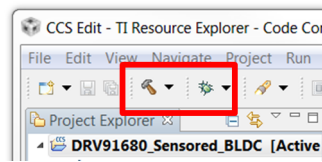
Figure 20. CCS Build and Debug

6. To create a new project, start by clicking on the *File* menu and select *New*, then *CCS Project*. A new window appears:

(a) Fill in *Project Name*

(b) Under the *Family* pull-down menu, select MSP430

(c) Select DRV9XXXX as the *Variant* and the specific device in the adjoining field

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NOTE: If the DRV9xxxx is not showing in the device sub-group, the device drivers need to be reinstalled (see Section 2).
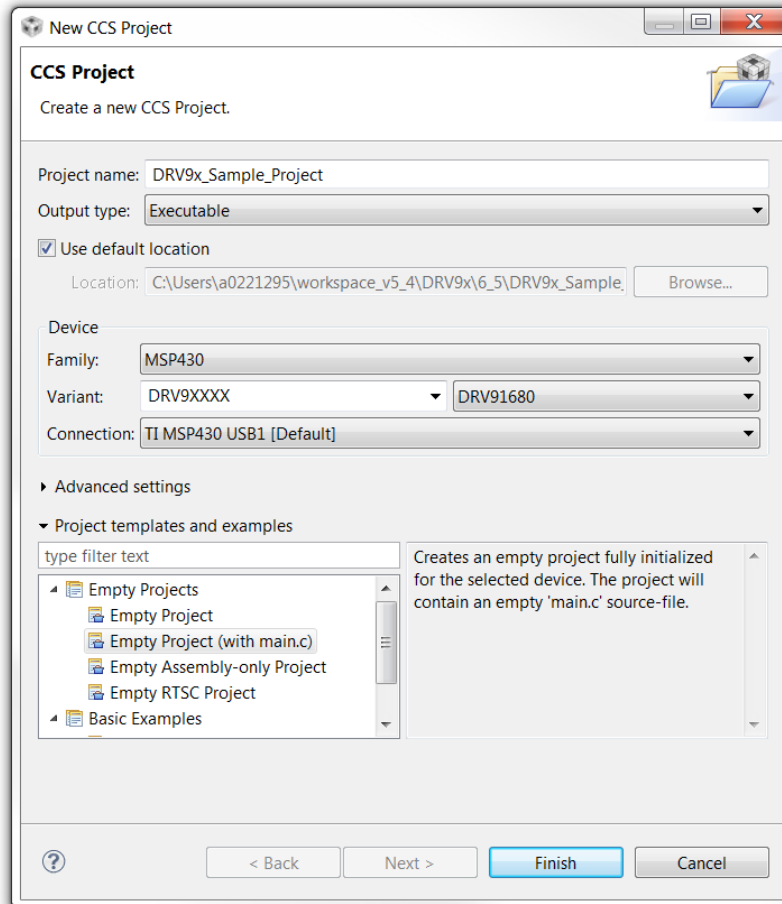
Figure 21. Creating a New Project Menu Items

For older projects:

CCS v4 Projects—CCSv4 projects can be imported and are automatically converted to the newer format. Use *Import Existing CCS Eclipse Project under the Project* menu.

CCS v3.3 Projects—CCSv5 uses the Eclipse concept of projects. To help import existing projects into CCSv5.1, use the project *import wizard*. Under the *Project* menu select *Import Legacy CCSv3.3 Project*. This starts a wizard that guides the user through the conversion process.

If further resources are needed for using CCS, consult the guides and support under the *Help* menu.

4   Updating the MSP-FET43OUIF

After the reference project is imported and selected in CCS, the provided software will build and run on the DRV9x device. The device is programmed by the MSP-FET430UIF. When this device is used, CCS automatically detects the firmware version and notifies of an update. The process takes a few minutes, let the update complete before unplugging the USB cable or closing CCS. See Figure 22 and Figure 23 for images depicting the update process.

Figure 22. Notification of Firmware Update

Figure 23. Update Progress Window

NOTE: To prevent any damage, it is important to wait for the update to finish before unplugging the MSP430UIF tool or closing CCS.

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Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other change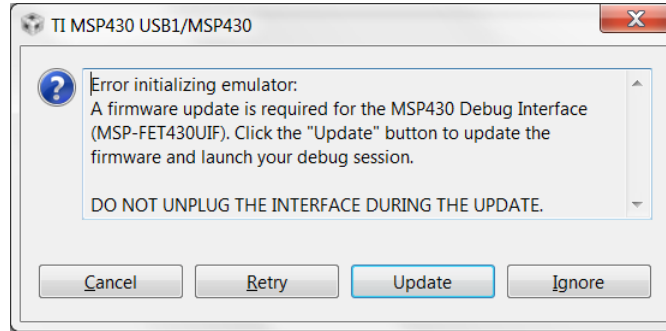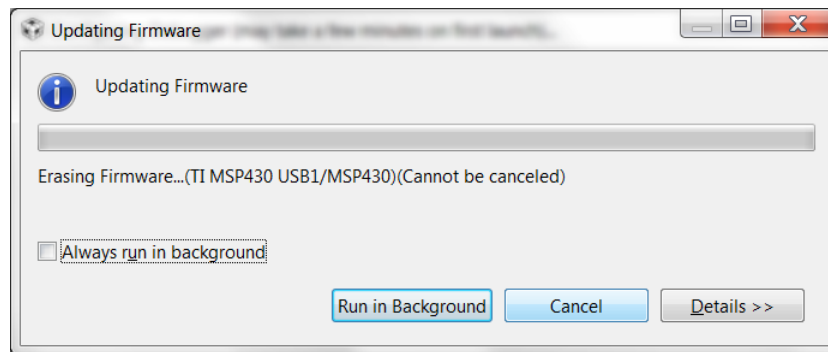s to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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