

# Code Composer Studio v5 Users Guide



Return to the [Sitara Linux Software Developer's Guide](#)

## Overview

Code Composer Studio v5.1 is currently provided with the Sitara Software Development Kit. It uses the Eclipse backend and includes the Remote System Explorer plug-in that provides tools to provide access to the remote target board.

## Locating the CCSv5 Installer


### Using the SD Card Provided with the EVM

When the SD card provided in the box with the EVM is inserted into an SD card reader attached to a Linux system three partitions will be mounted. The third partition, labeled START\_HERE, will contain the CCS installer along with the Sitara Linux SDK installer. The CCS installer is located inside of the CCS directory and there is a helper script called `ccs_install.sh` available to help call the installer.

### Downloading from the Web

The CCS installer is available for download as a compressed tarball (`tar.gz`) file on the same page as the Sitara Linux SDK download. The installer can be located by browsing to <http://www.ti.com/tool/linuxezsdk-sitara><sup>[1]</sup> and selecting the device being used. On the individual SDK download page you can find the CCS installer under the **Optional Addons** section. i.e.



AM335xSDK Product Downloads			
Title	Description	Size	
<b>AM335x SDK Essentials</b>			
<a href="#">ti-sdk-am335x-evm-05.03.03.00-Linux-x86-Install</a>	AM335x EVM SDK	1203352K	
<b>AM335x SDK Optional Addons</b>			
 <a href="#">CCS-5.1.0.08031-Sitara-ARM.tar.gz</a>	Code Composer Studio for Sitara ARM	1076748K	
<a href="#">README.ccs</a>	Code Composer Studio for Sitara ARM README	4K	
<b>AM335x SDK Individual Components</b>			
<a href="#">am335x-evm-qsg.pdf</a>	AM335x EVM Quick Start Guide	2316K	
<a href="#">beaglebone-qsg.pdf</a>	BeagleBone Quick Start Guide	176K	
<a href="#">sitara-linuxsdk-sdg-05.03.03.00.pdf</a>	Software Developers Guide	5284K	
<a href="#">Software Manifest</a>	Software Manifest of Components Inside the SDK	632K	
<a href="#">am335x-evm-sdk-src-05.03.03.00.tar.gz</a>	AM335x SDK PSP Source Code	109480K	
<a href="#">am335x-evm-sdk-bin-05.03.03.00.tar.gz</a>	AM335x SDK prebuilt PSP binaries and root filesystem	271412K	
<a href="#">Download Pinmuxtool</a>	Sitara Pin Mux Configuration Utility		
<b>AM335x SDK Checksums</b>			
<a href="#">md5sum.txt</a>	MD5 Checksums	4K	

Clicking this link will prompt you to fill out an export restriction form. After filling out the form you will be given a download button to download the file as well as receiving an e-mail with the download link. Download the tarball and save it to your Linux host development system.

## Starting the CCSv5 Installer

### Using the Sitara Linux SDK Installer

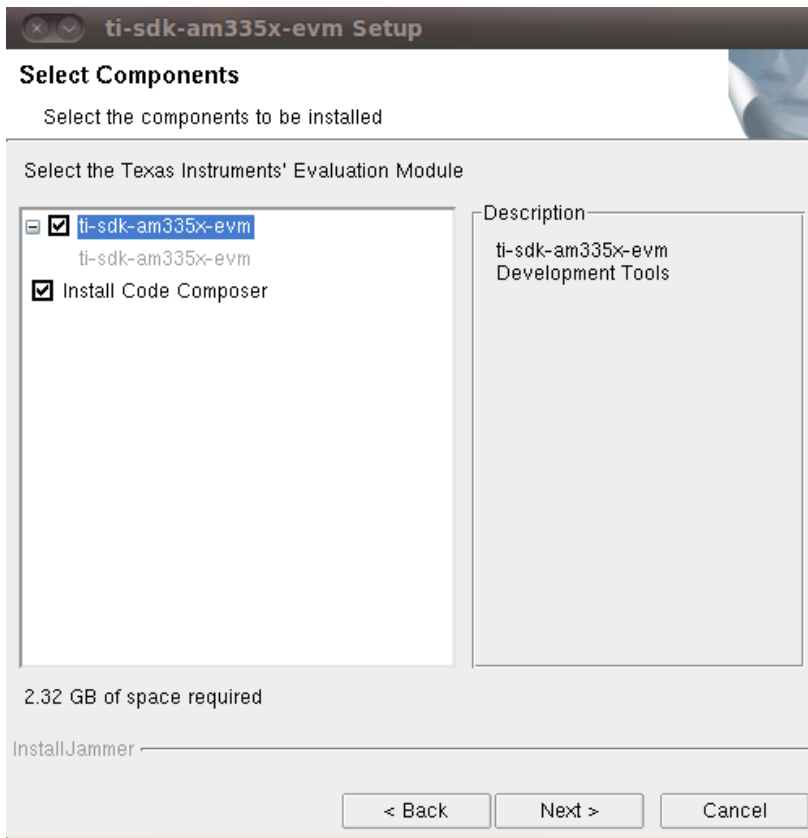
The Sitara Linux SDK installer has the capability of launching the CCSv5 installer during the SDK installation. In order for the installer to launch the CCSv5 installer the *CCS* directory and *ccs\_install.sh* script must be located in the same directory as the Sitara Linux SDK installer. When installing from the SD card found in the EVM box this directory and script are already located in the same directory as the Sitara Linux SDK installer. However, if you downloaded the CCS installer tarball from the ti.com website as mentioned above, then you will need to:

1. Place the CCS tarball (the .tar.gz file) in the same directory as the Sitara Linux SDK installer
2. Extract the CCS tarball using a command like:

```
tar xzf CCS_<version>_Sitara_ARM.tar.gz
```

Where <version> is the version string of the CCS installer

After the CCS installer files are located in the same directory as the Sitara Linux SDK installer you can execute the SDK installer to begin SDK installation. During the SDK installation you will see a screen similar to the one below. The option to **Install Code Composer** is enabled by default.



**NOTE:** If the **Install Code Composer** option is selected and the CCS install files are not located in the same directory as the Sitara Linux SDK installer you will be given a message that the installer could not be located and the SDK installation will continue as normal. To install CCS later you can follow the steps in the next section to bypass the Sitara Linux SDK installer.

## From Linux Command Line

If you want to install CCSv5 apart from the Sitara Linux SDK installer, or if you decided not to install it as part of the SDK install and want to install it now, you can install CCS using the following commands:

1. Open a Linux terminal and change directory to the location where the CCS files are located. This may be the START\_HERE partition of the SD card, or the location where you downloaded the tarball file from the ti.com website.

2. If the CCS files are still in a compressed tarball extract them using the command

```
tar xzf CCS_<version>_Sitara_ARM.tar.gz
```

Where <version> is the version string of the CCS installer

3. Invoke the CCS installer using the **ccs\_install.sh** script located in the START\_HERE directory (copy the script to your current directory).

```
./ccs_install.sh $PWD
```

**NOTE:** You can also invoke the CCS installer using in the CCS directory using the commands:

```
cd CCS
```

```
./ccs_setup*.bin --setupfile ccs_installini.xml
```

## CCSv5 Installation Steps

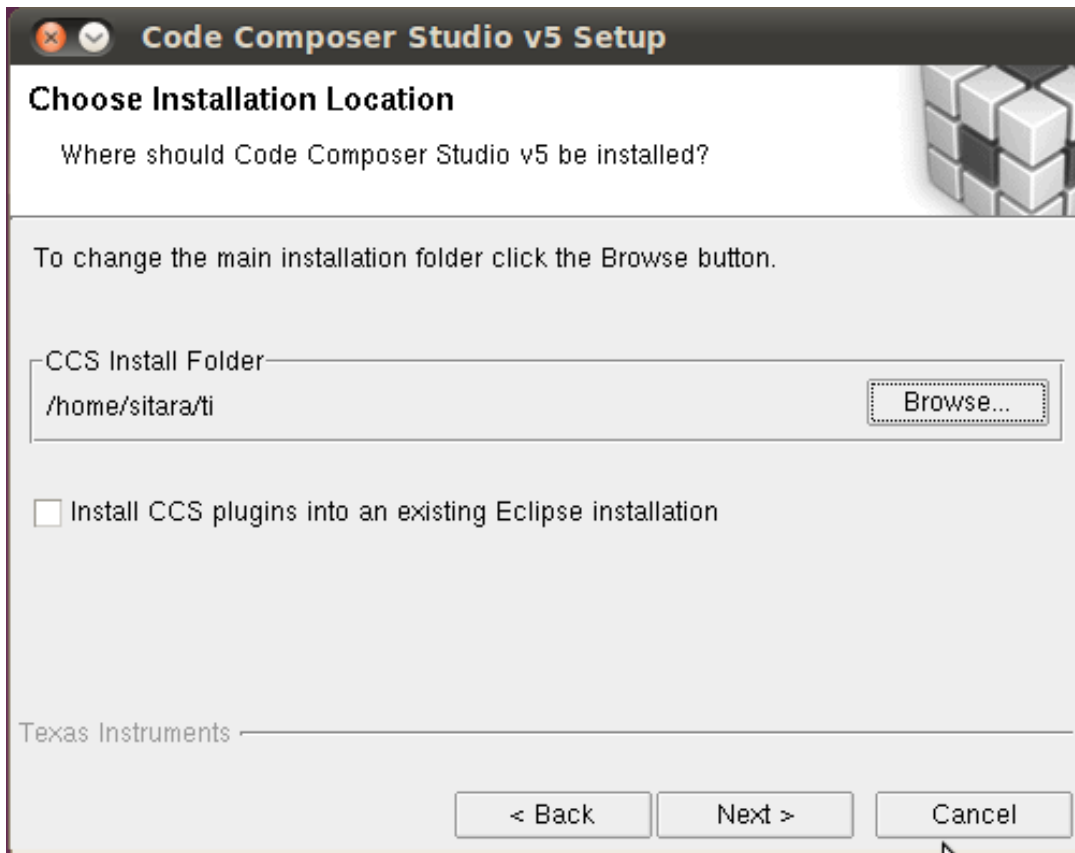
**NOTE:** The 30-day trial version language in the CCS installer license agreement applies only for the case of using high-speed JTAG emulators (does not apply to use of the XDS100v2 JTAG emulator). If a debug configuration is used that requires a high-speed JTAG emulator, you will be prompted to register your software for a fee. All use of CCSv5 (excluding use of high-speed JTAG emulators) is free and has no 30-day time limit.

When the CCSv5.1 installer runs you can greatly reduced the install time and installed disk space usage by taking the defaults as they appear in this CCS installer. The screen captures below show the default installation options and the recommended settings when installing CCSv5.

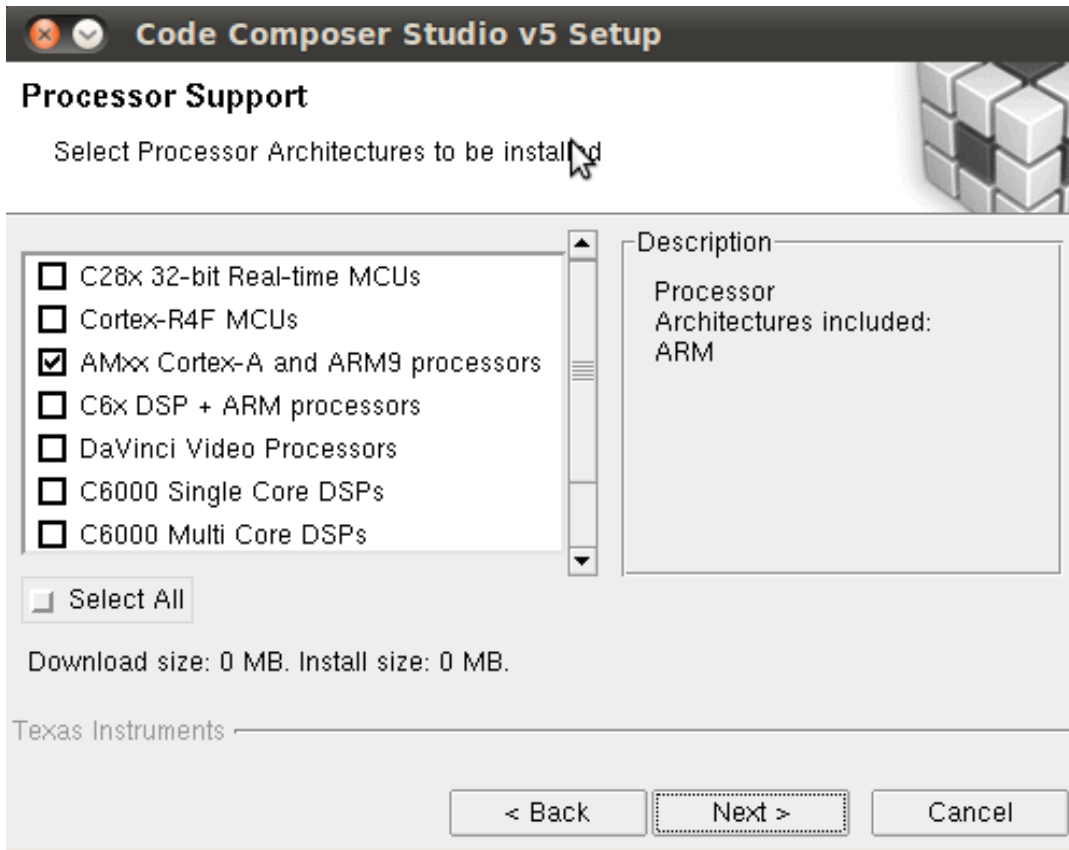
1. The *License Agreement* screen will prompt you to accept the terms of the license agreement. Please read these terms and if you agree select **I accept the terms of the license agreement**. If not then please exit the installation.



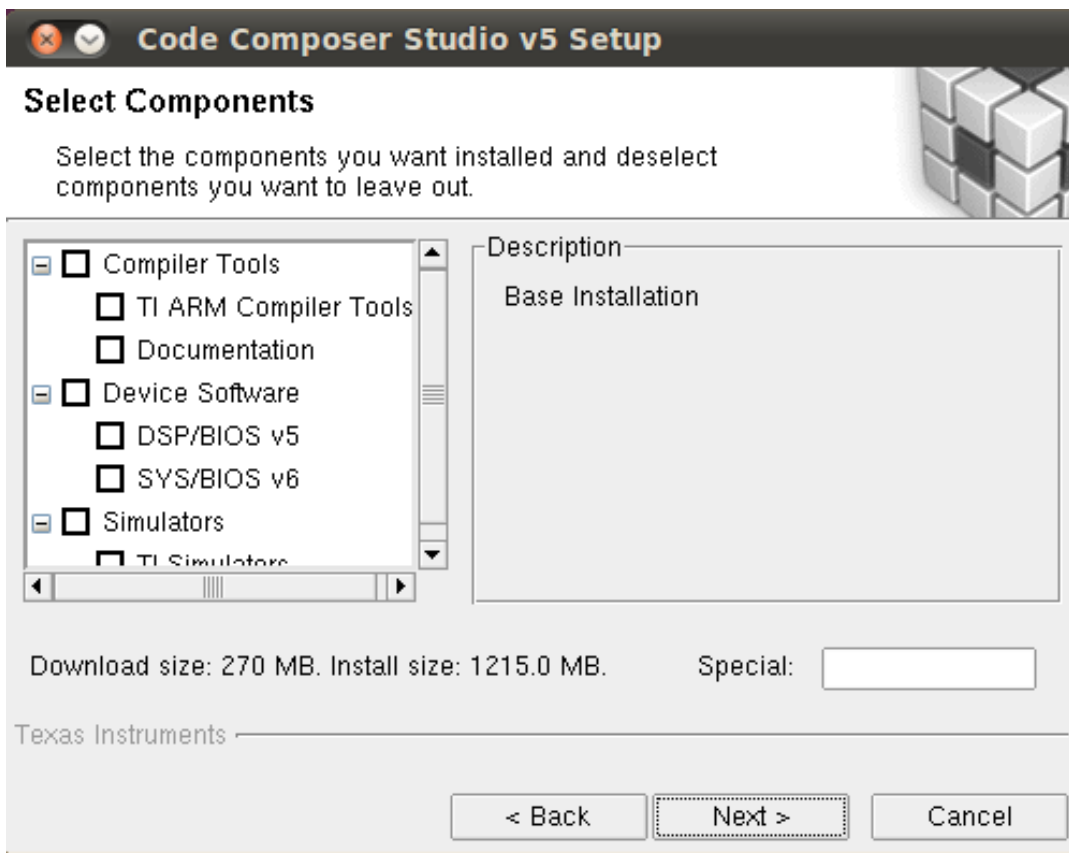
2. At the *Choose Installation Location* screen do **NOT** check **Add TI plug-ins into an existing Eclipse install**



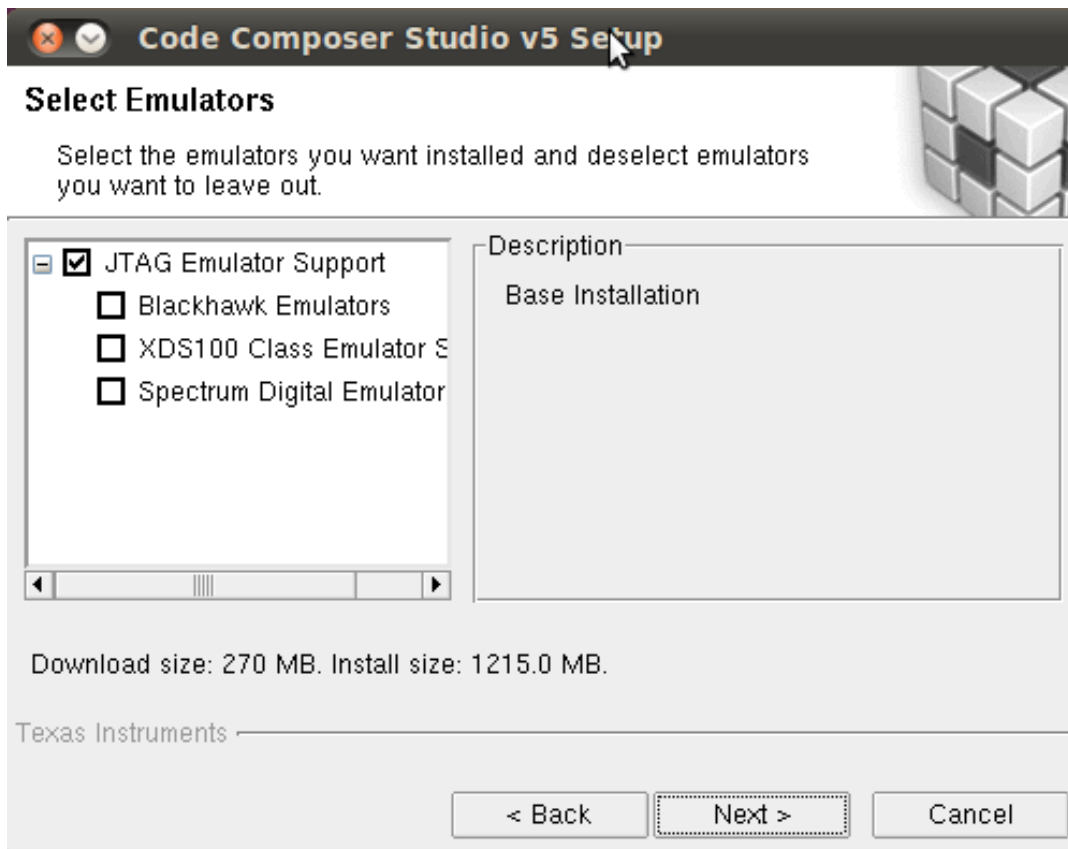
3. At the *Processor Support* screen make sure to select the **AMxx Cortex-A and ARM9 processors** option



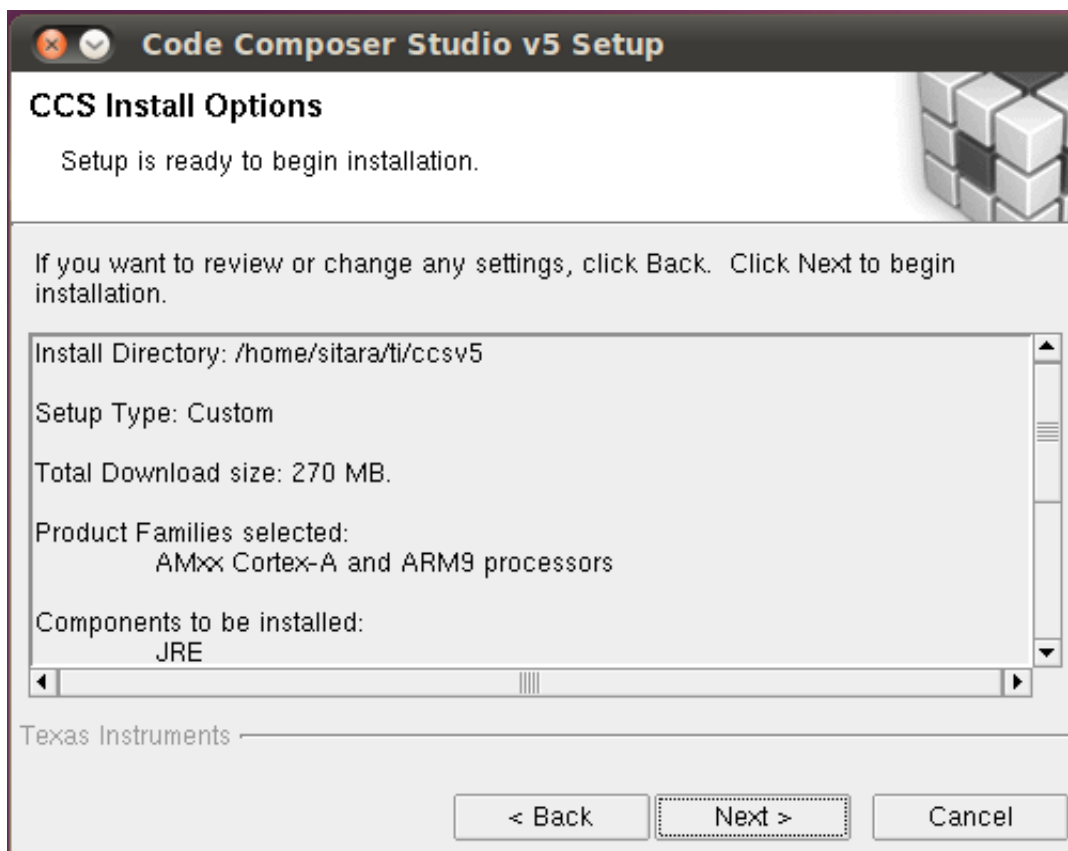
- 4. At the *Select Components* screen do **NOT** select **TI ARM Compiler Tools**. These tools are the TI compiler tools for ARM devices, whereas for Linux the Sitara Linux SDK uses the open source GCC compiler.



- 5. At the *Select Emulators* screen make sure that **JTAG Emulator Support** is enabled but you do not need to select individual emulators unless you require support for that model of JTAG. To install those drivers later see the *Installing Emulator Support* section below.



6. At the *CCS Install Options* screen verify that the options look correct and then select **Next** to begin installation.



7. After the installation has completed click **Finish**

## Installing Emulator Support

If during the CCSv5 installation, you selected to install drivers for the Blackhawk or Spectrum Digital JTAG emulators a script must be run with administrator privileges

to allow the Linux Host PC to recognize the JTAG emulator. The script must be run as "sudo" with the following command:

```
sudo <CCSv5_INSTALL_PATH>/ccsv5/install_scripts/install_drivers.sh
```

where <CCSv5\_INSTALL\_PATH> is the path that was chosen when the CCSv5.1 installer was run.

## Launching CCS

After the CCS installer has finished executing you should have an icon on your desktop call **Code Composer Studio v5** like:

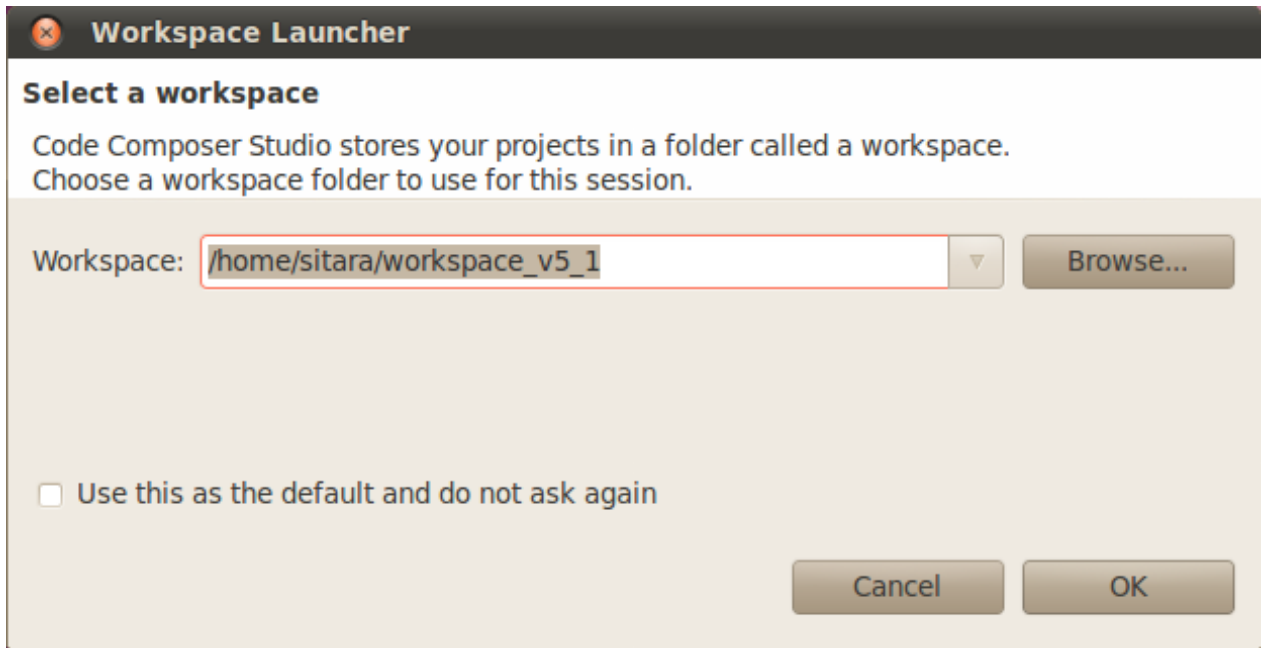


To launch CCS you should:

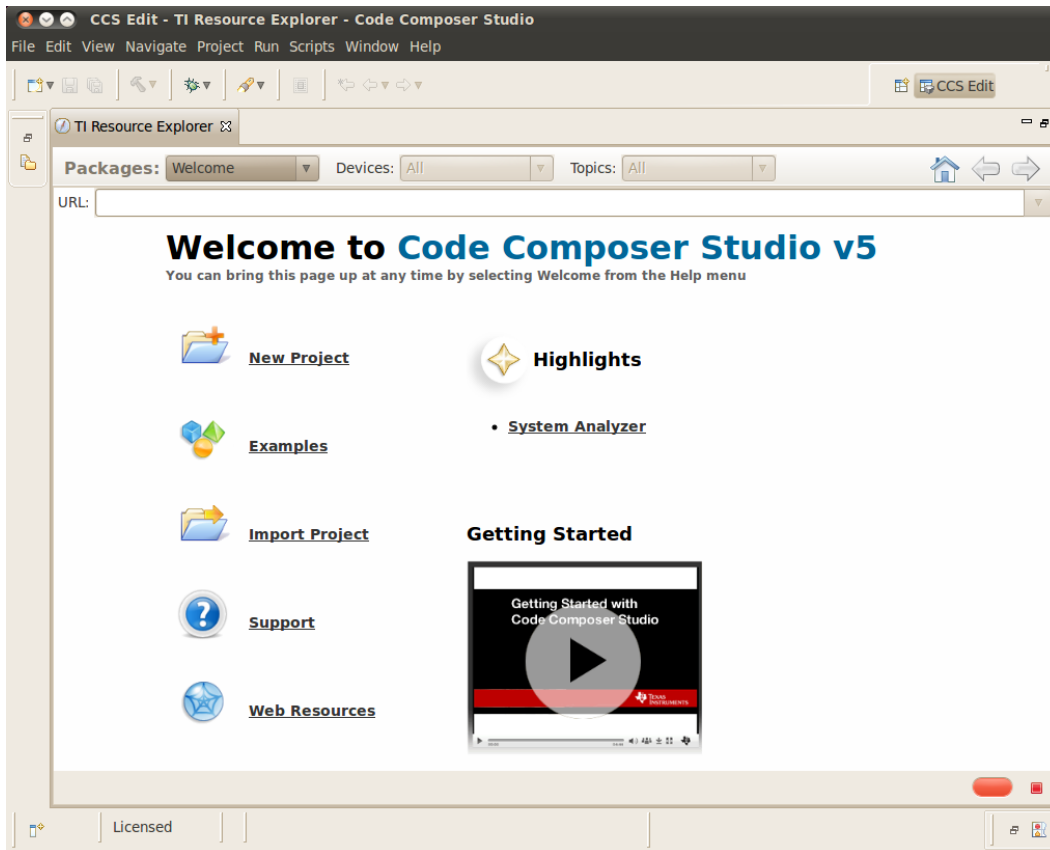
1. **Double-Click** the CCS icon on the desktop. You will see the CCSv5 splash screen appear while CCS loads



2. The next window will be the **Workspace Launcher** window which will ask you where you want to locate your CCSv5 workspace. You can take the default here or choose a custom directory.

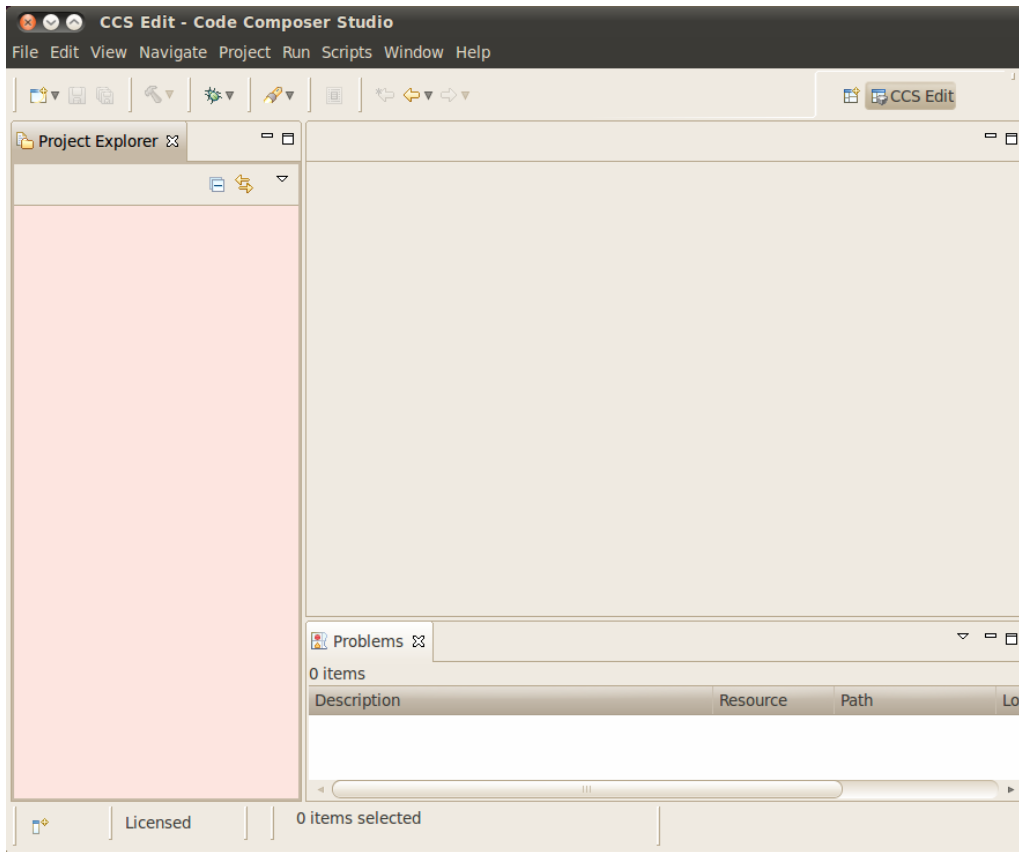


3. CCS will load the workspace and then launch to the default **TI Resource Explorer** screen



4. Close the **TI Resource Explorer** screen. This screen is useful when making TI CCS projects which use TI tools. The Sitara Linux SDK uses open source tools with the standard Eclipse features and therefore does not use the TI Resource Explorer. You will be left in the Project Explorer default view.



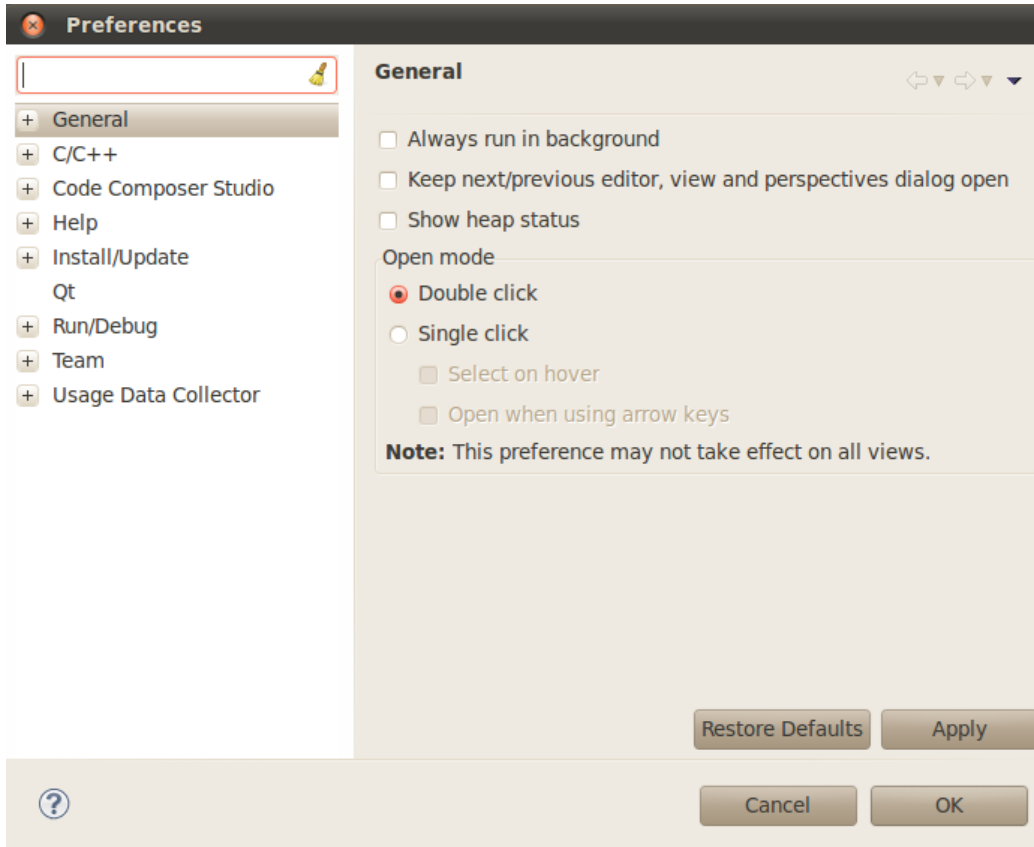


## Enabling CCS Capabilities

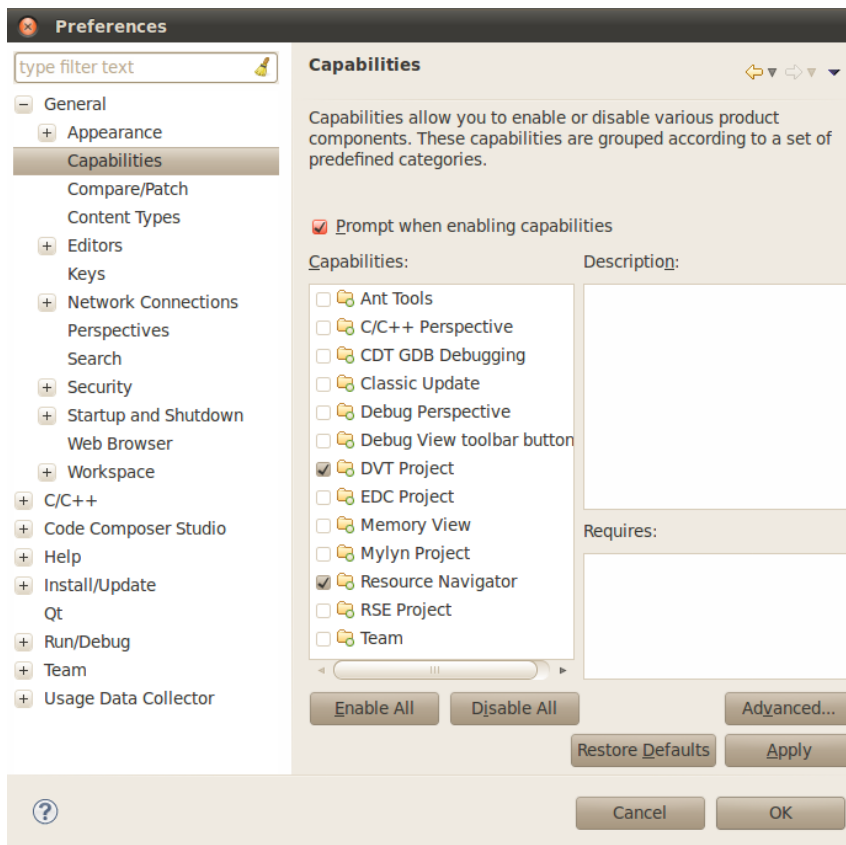
Each time CCSv5.1 is started using a new workspace, additional capabilities need to be enabled so that perspectives for those capabilities will be selectable in the **Window -> Open Perspectives** list.

After opening CCSv5.1 with a new workspace:

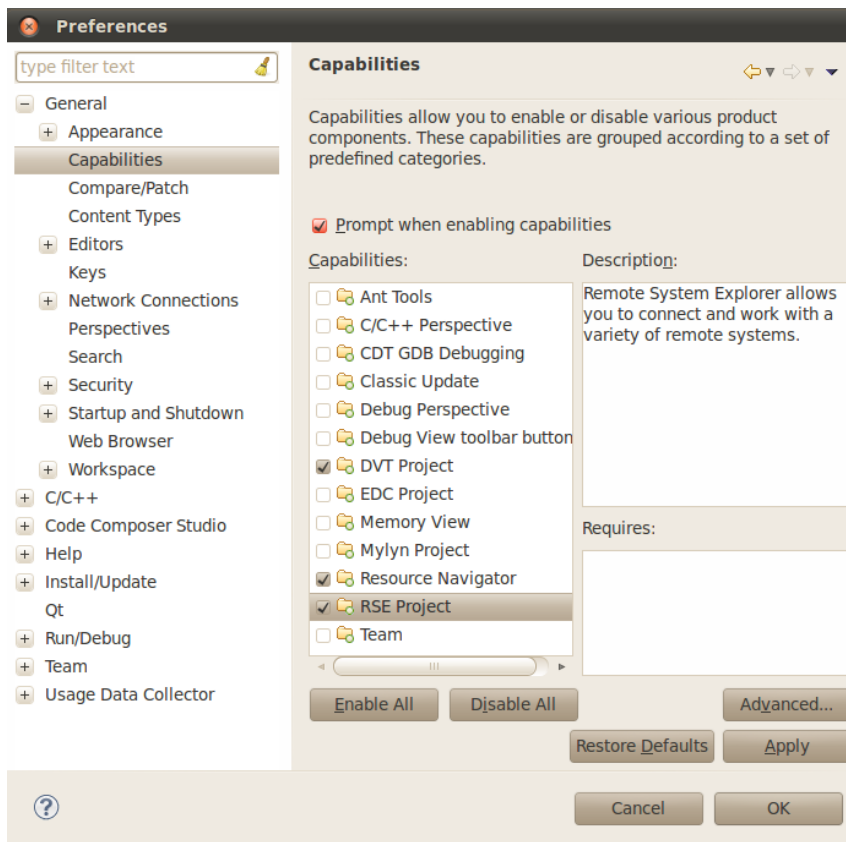
1. Open the **Window -> Preferences** menu



2. Go to the **General -> Capabilities** menu



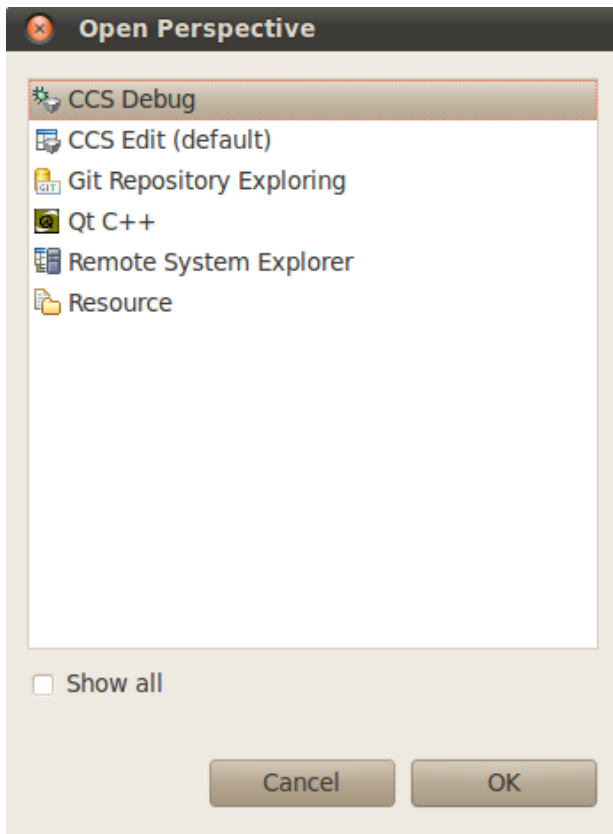
### 3. Select the **RSE Project** Capability



### 4. Click **Apply** and then **OK**

This enables the perspectives in the **Window -> Open Perspective -> Other** menu as shown below and is needed to make the Remote System Explorer plug-ins selectable.

**Note: The Qt C++ Perspective is not compatible with this version of Eclipse. Instead Qt projects are to be built using the Makefiles inside of the project as will be detailed in the later sections of this guide.**

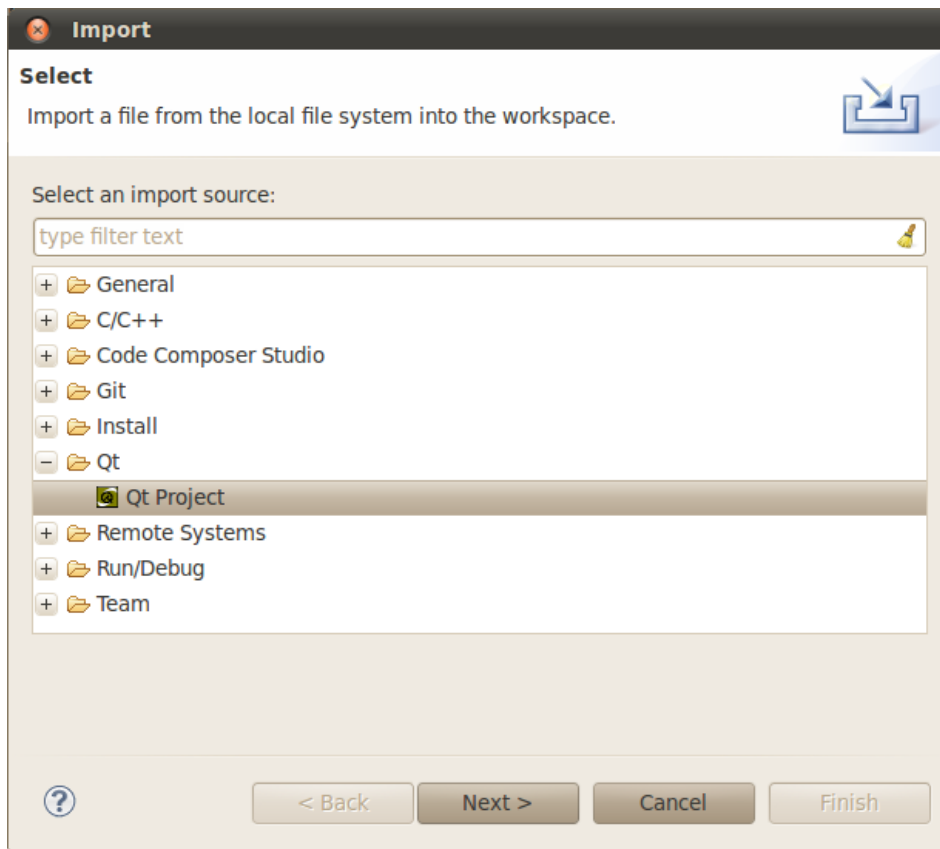


## Importing Qt Projects

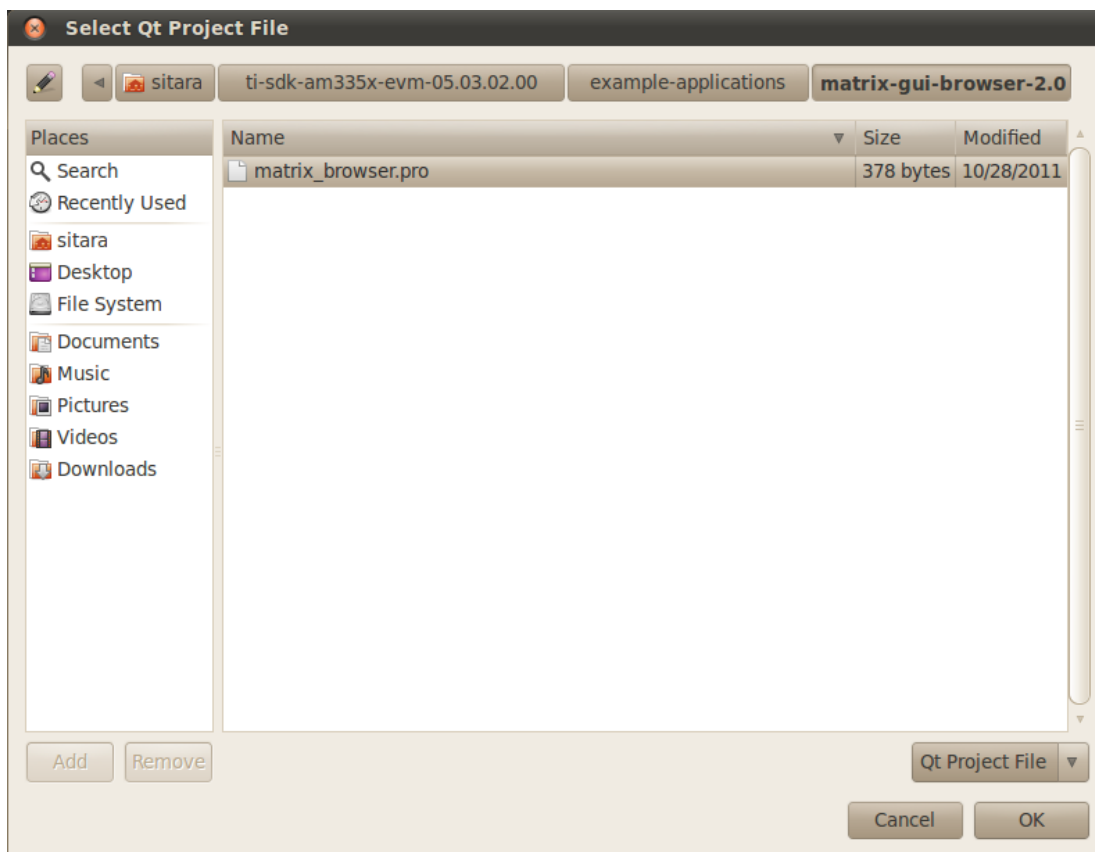
Since the Qt plugin does not work with the latest version of Qt the example projects have been modified to use a Makefile to handle the build step. You can use projects like the **matrix-gui-browser** project as a reference for how to configure a Qt project to build using a Makefile. The following steps detail the changes that should be made for an existing Qt project to use a Makefile to build.

### Importing matrix browser project

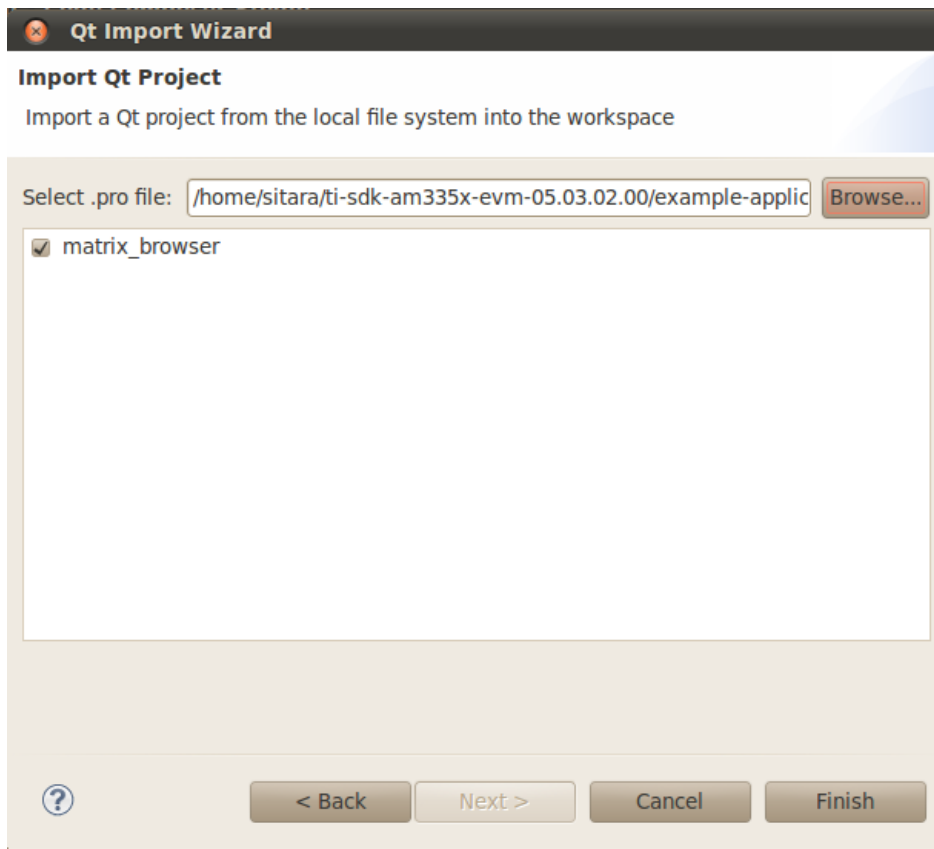
1. First import the Qt project using the **File -> Import...** menu
2. Select the **Qt -> Qt Project** option



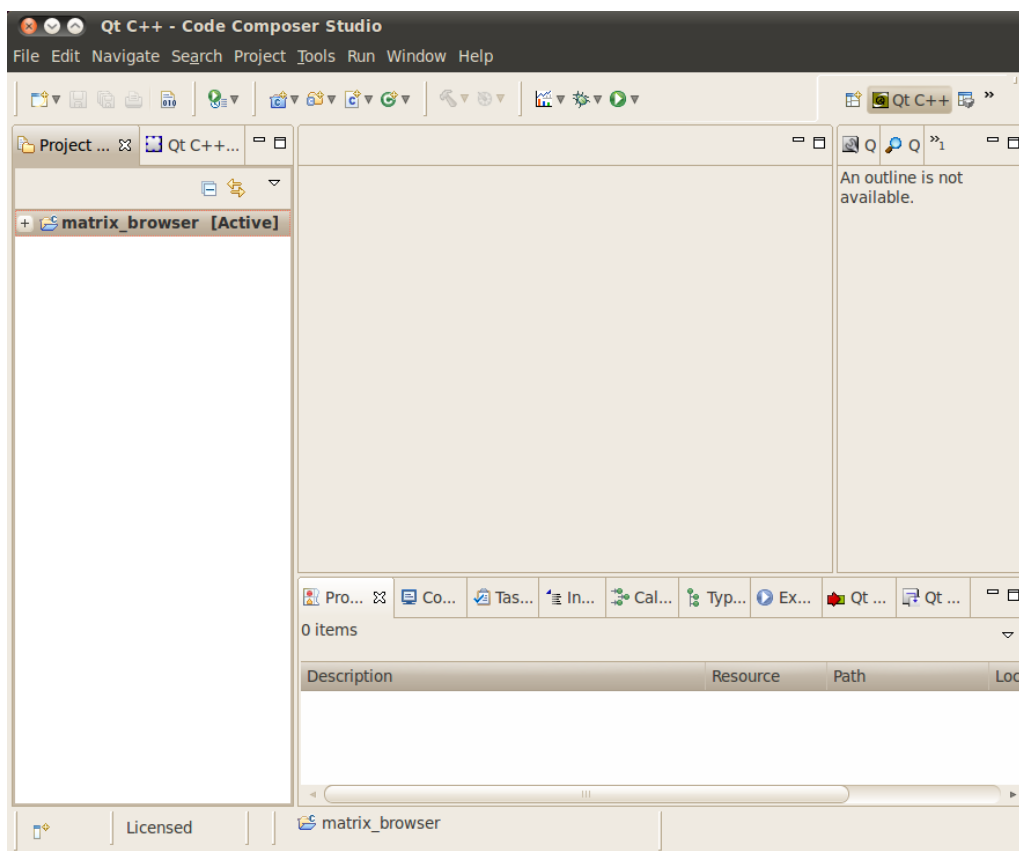
3. Press the **Next >** button
4. On the **Import Qt Project** screen click the **Browse...** button and locate the *matrix\_browser.pro* file within the `<SDK INSTALL DIR>/example-applications/matrix-gui-browser-x.x` directory



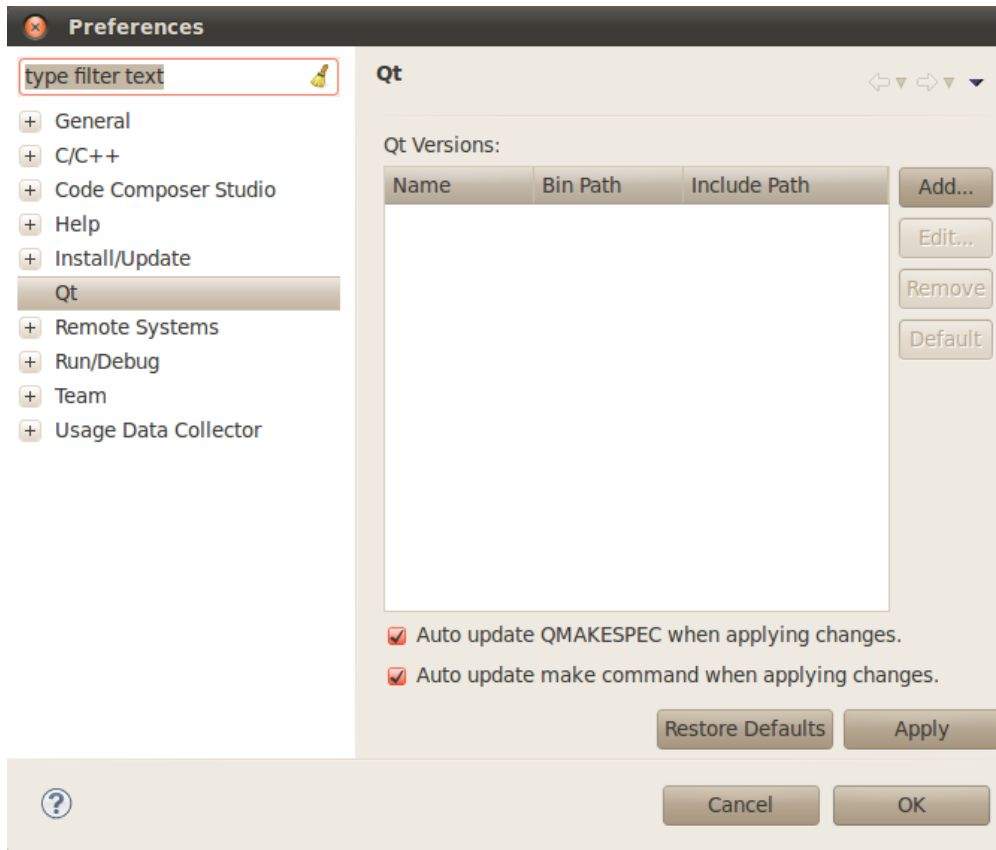
5. Click **OK**
6. You should now see the *matrix\_browser* project listed as being selected for import into CCS



7. Click **Finish** to import the matrix-gui-browser project
8. You should now see the matrix\_browser project in the **Project** view



9. Now you will need to add the Qt version found in the SDK to CCS. This can be done using **Window -> Preferences** and selecting the *Qt* menu item



10. Select the **Add...** button
11. In the **Add new Qt version** dialog fill in:
  - Version Name: AMSDK Qt
  - Bin Path: <SDK INSTALL DIR>/linux-devkit/bin
  - Include Path: <SDK INSTALL DIR>/linux-devkit/arm-arago-linux-gnueabi/usr/include/qtoria



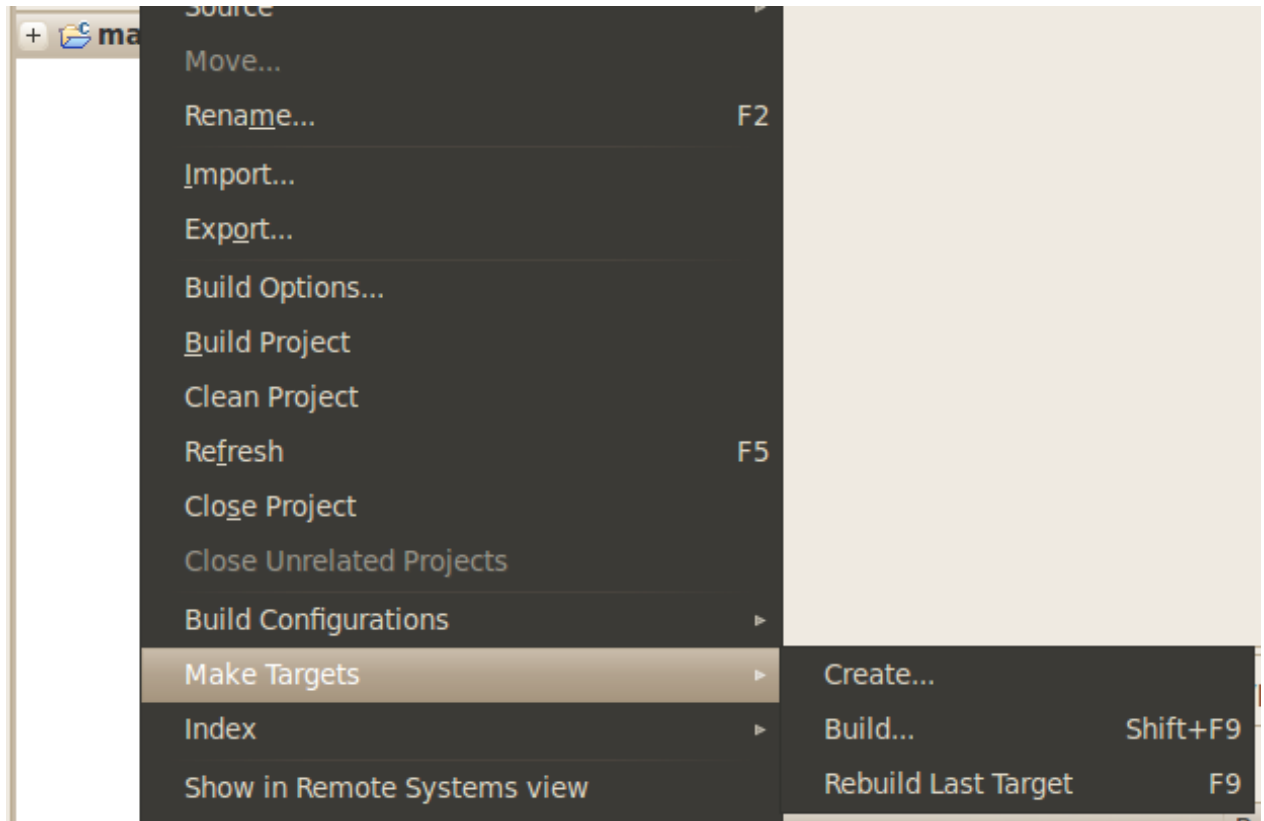
12. Click **Finish**
13. Click **Apply**
14. When prompted that **Qt versions have changed** select **Yes**
15. Click **OK**



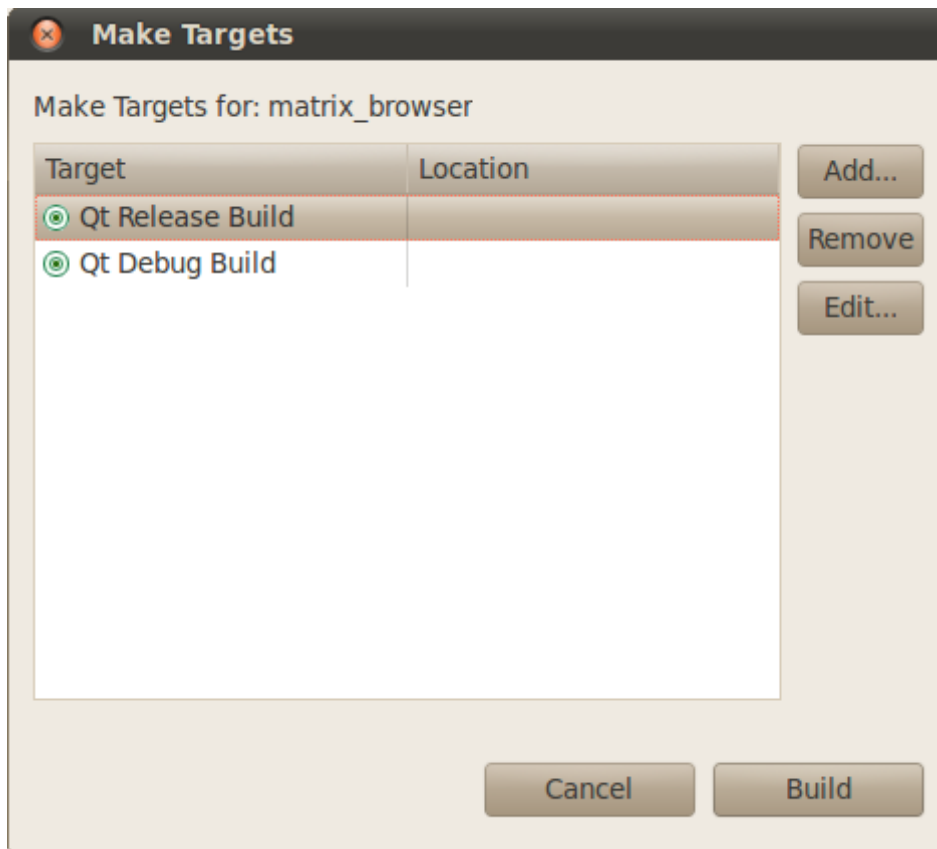
## Changing the Make Target

By default the debug target is compiled when you selected to rebuild the Qt projects due to the Qt version change above. You can build the release version by doing:

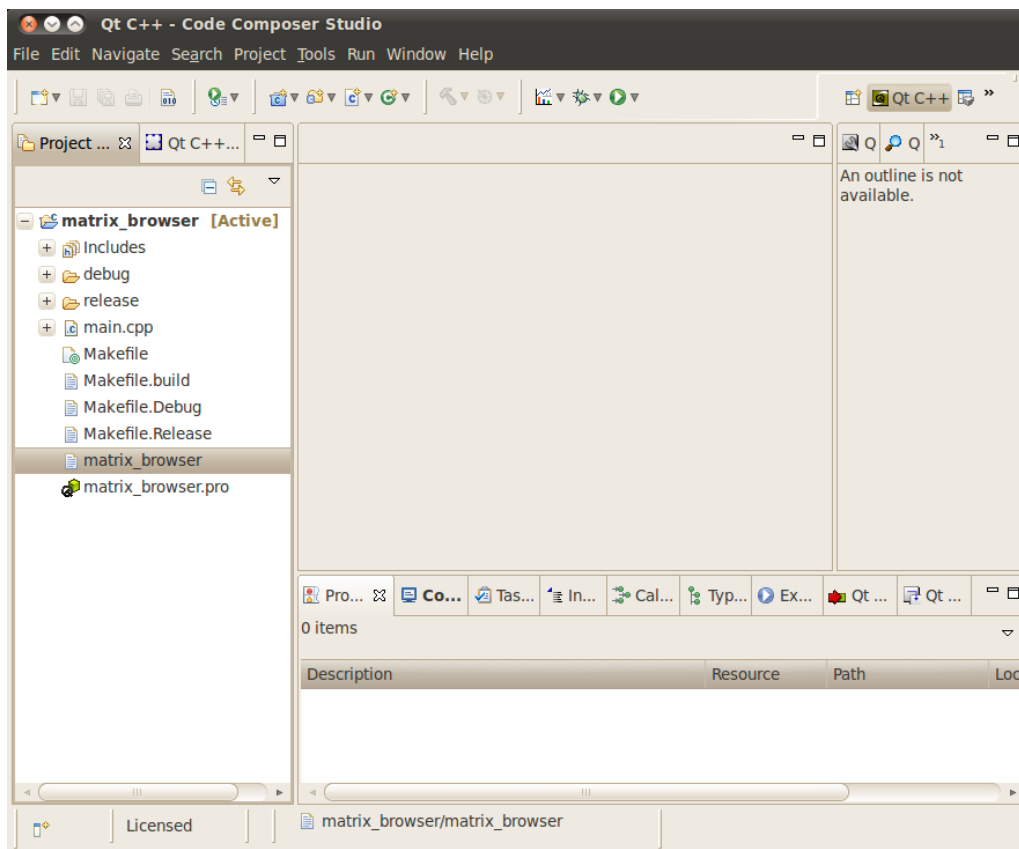
1. Right Click matrix\_browser project
2. Select **Make Targets -> Build...**



3. Highlight **Qt Release Build** and click the **Build** button



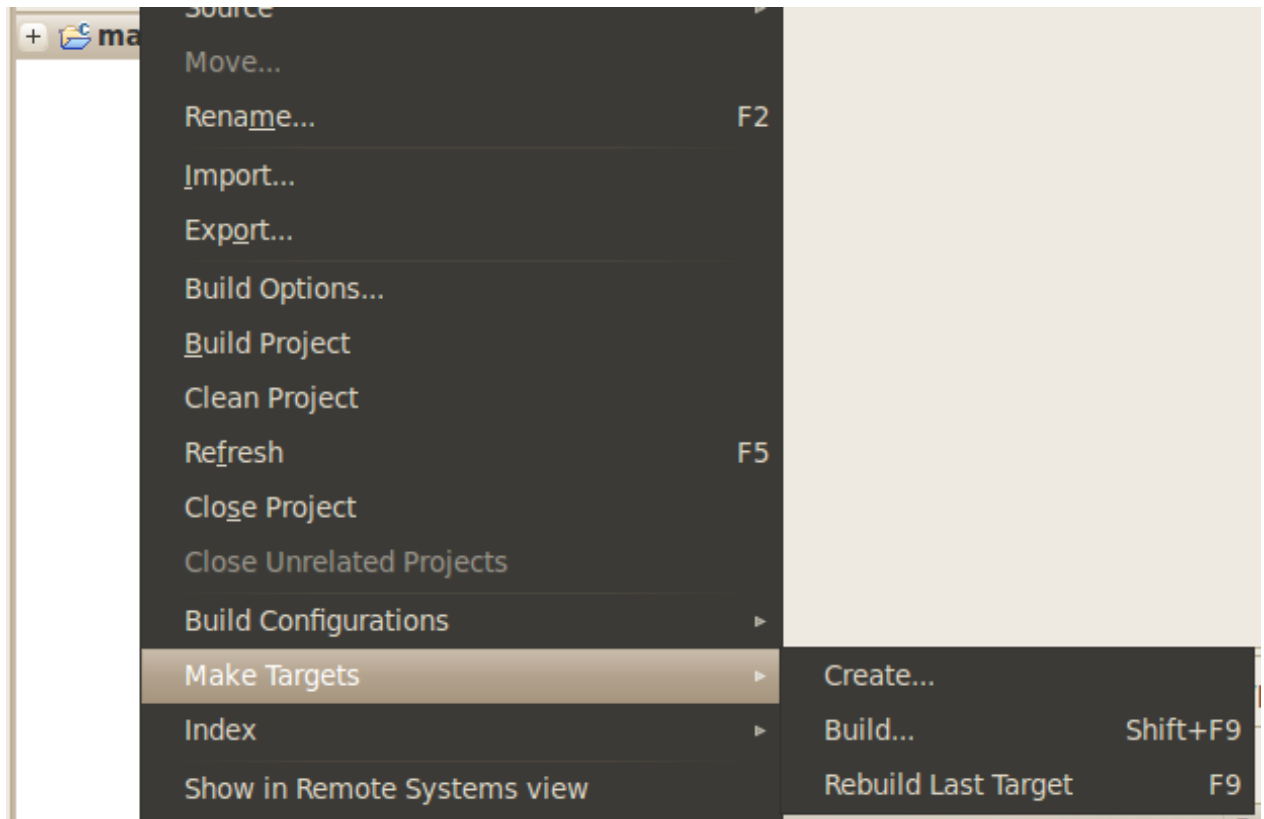
4. You will find the matrix\_browser executable built in the matrix\_browser project.



## Creating a New Make Target

You may want to create additional make targets for steps like the installation step. In this example we will make an install target that installs the release version of the matrix\_browser executable.

1. Right click **matrix\_browser** project and select **Make Targets -> Create...**



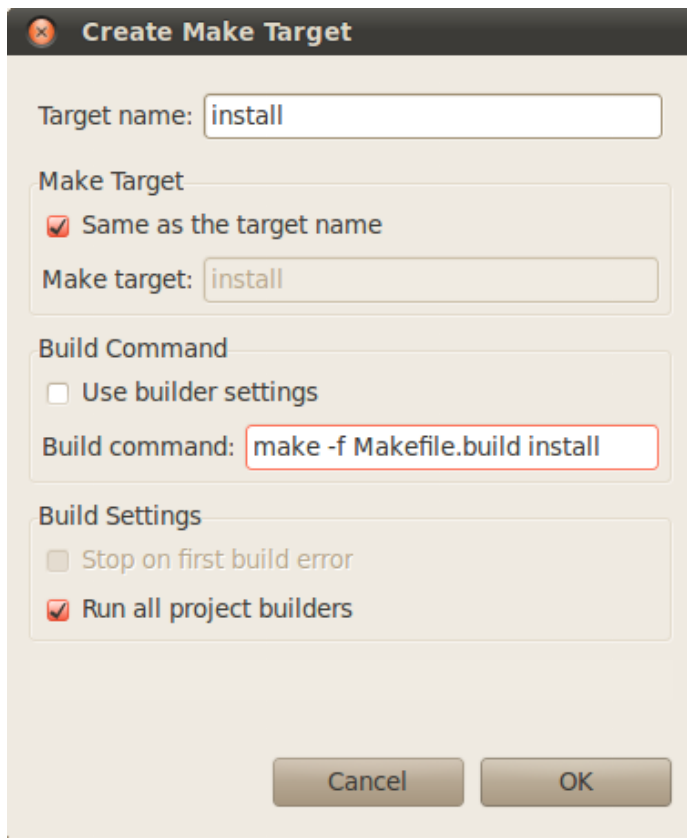
2. In the dialog box set:

Target name: install

Check **Same as the target name** for the **Make Target**

un-check **Use builder settings**

Change **Build command:** to *make -f Makefile.build install*



3. Click **OK**

You can now build the **install** target using the steps in the [Changing the Make Target](#) section above.

## Using a Makefile

In order for the above steps to work a Makefile.build Makefile was created in the matrix-gui-browser directory. This Makefile.build has some key point that are worth mentioning.

- The Rules.make file is included from the top-level of the Sitara Linux SDK. This is to provide access to variables like *DESTDIR* for installing the built executable.

```
-include ../../Rules.make
```

- There is a variable called *ENV\_SETUP* that points to the **environment-setup** script in the linux-devkit directory. The *qmake* target, which is used by the *release* and *debug* targets will first source the **environment-setup** script to get access to *qmake2* and configure the build to use the Qt version inside of the Sitara Linux SDK

```
qmake : matrix_browser.pro //qmake target depends on
matrix_browser.pro
    @ . ${ENV_SETUP}; \ //source the environment-setup script
using a shell
    qmake2 CONFIG+=debug_and_release
QMAKE_CXXFLAGS_DEBUG+--D${PLATFORM_DEFINE}
QMAKE_CXXFLAGS_RELEASE+--D${PLATFORM_DEFINE} matrix_browser.pro //call
qmake2 to make the project Makefiles
```

## Installing to the Target File System

Depending on your file system type you can use the methods below to install the `matrix_browser` executable. If the file system is NFS you should have first run the **SDK Setup Script**.

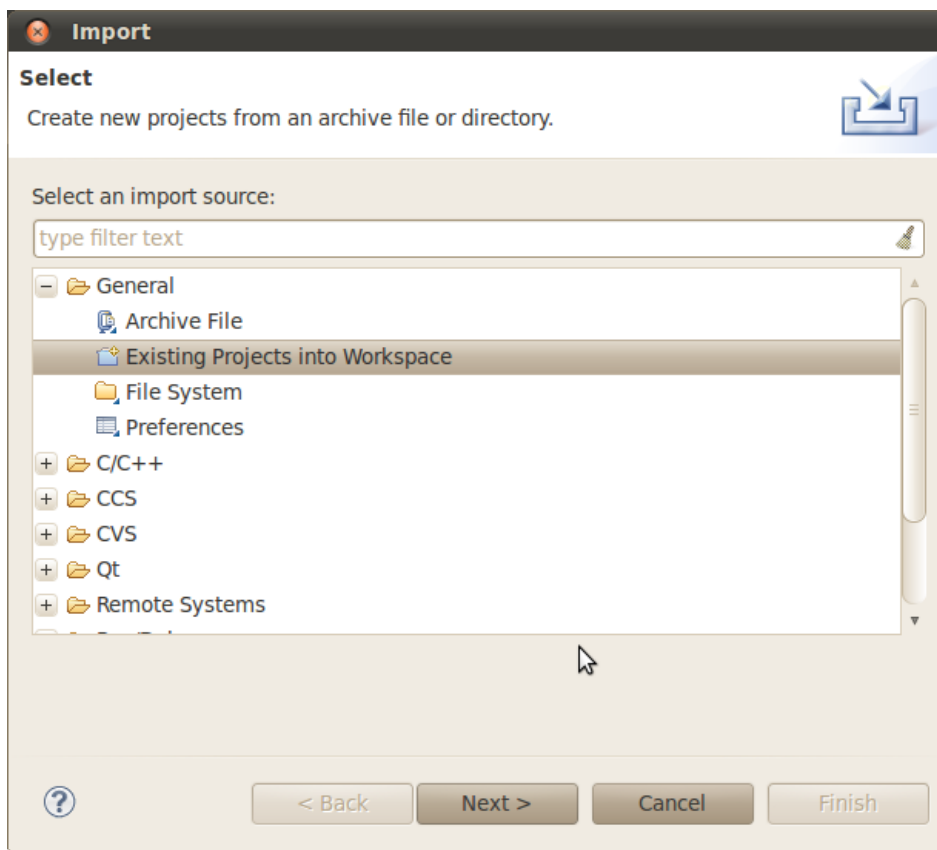
1. Create a Make Target using the steps in the **Creating a New Make Target** section above
2. Browsing to the `<SDK INSTALL DIR>/example-applications/matrix-gui-browser-x.x/` directory in a terminal and typing **`make -f Makefile.build install`**
3. For all file system types you can also transfer the file using the drag-and-drop method of Remote System Explorer. See the **Remote System Explorer** section below for more details

## Importing C/C++ Projects

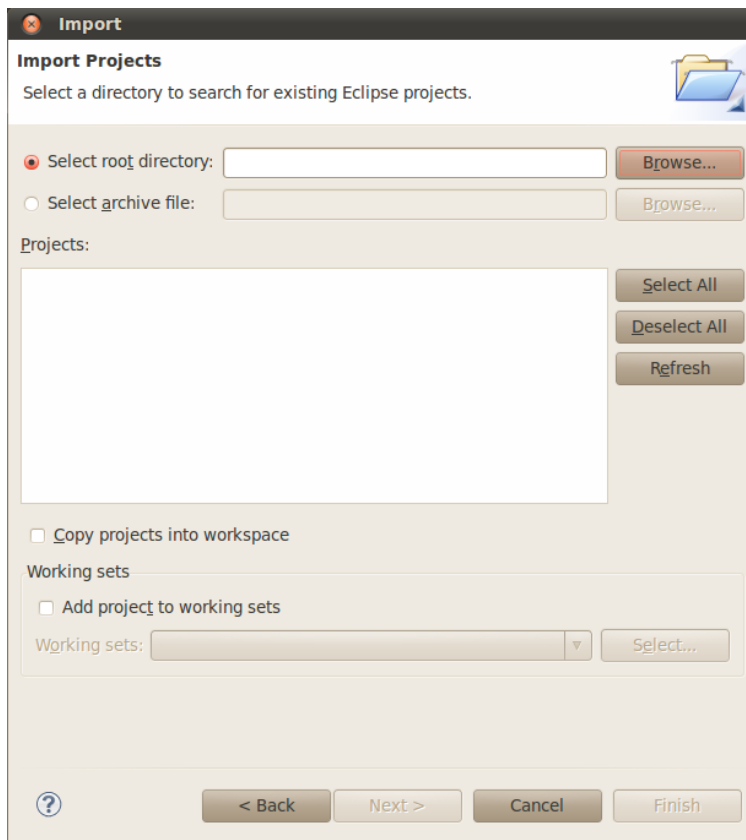
### Importing the Projects

The following instructions will help you to import the example C/C++ application projects into CCSv5. For instructions on importing Qt application see the **Importing Qt Projects** section above.

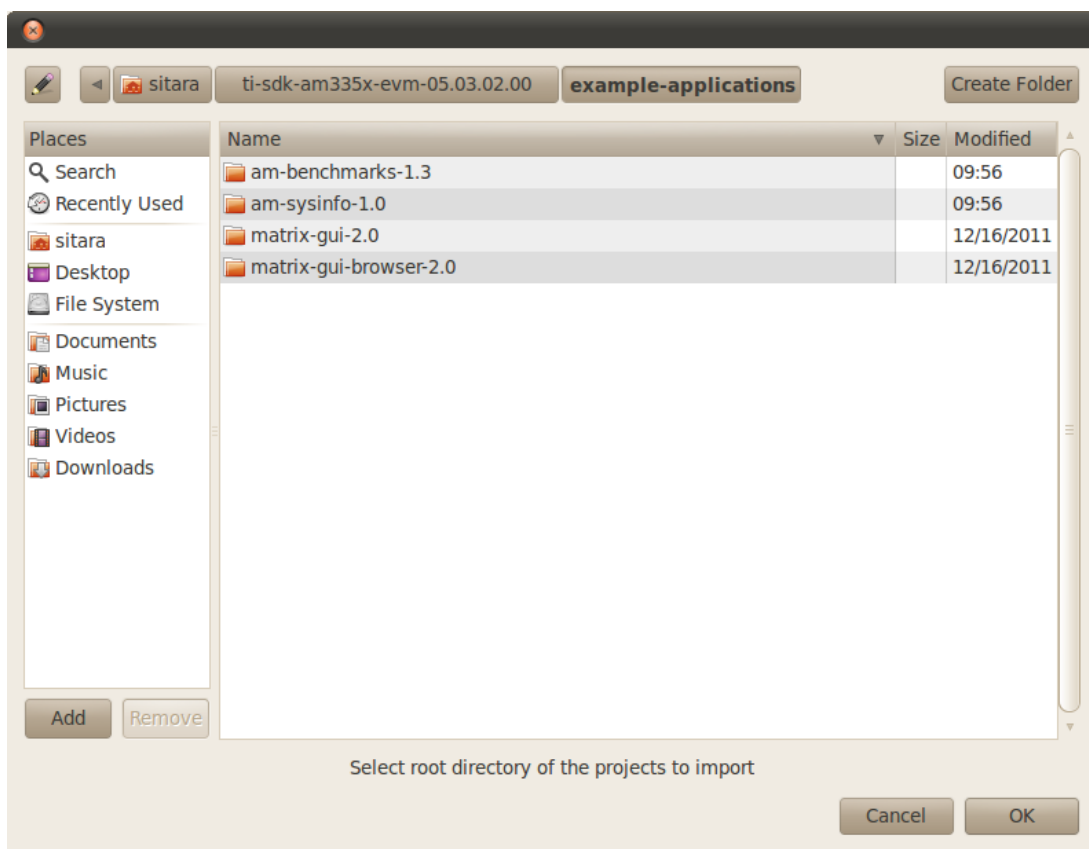
1. From the main CCSv5 window, select **File -> Import...** menu item to open the import dialog
2. Select the **General -> Existing Projects into Workspace** option



3. Click **Next**
4. On the *Import Projects* page click **Browse**

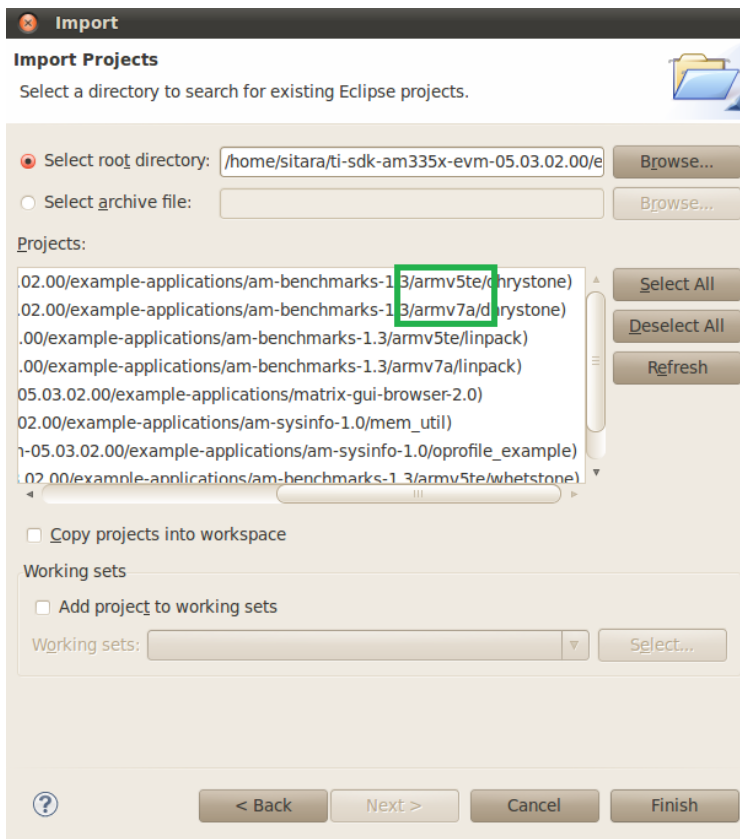


5. In the file browser window that is opened navigate to the `<SDK INSTALL DIR>/example-applications` directory and click **OK**

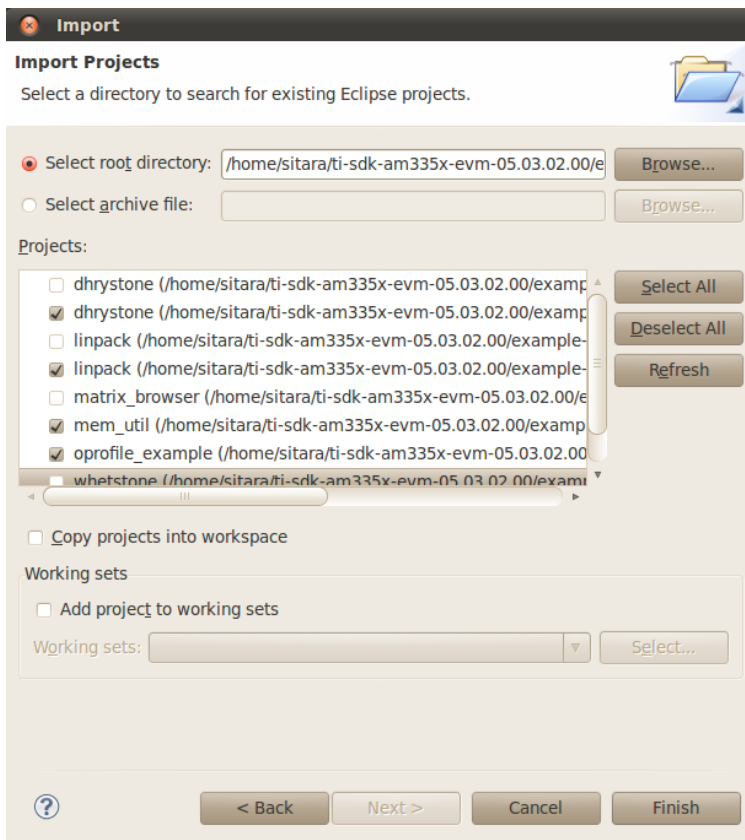


6. The *Projects:* list will now be populated with the projects found.
  - **NOTE:** The `matrix_browser` project should be un-checked since this is a Qt project and should be imported using the steps in the [Importing Qt Projects](#) section above.

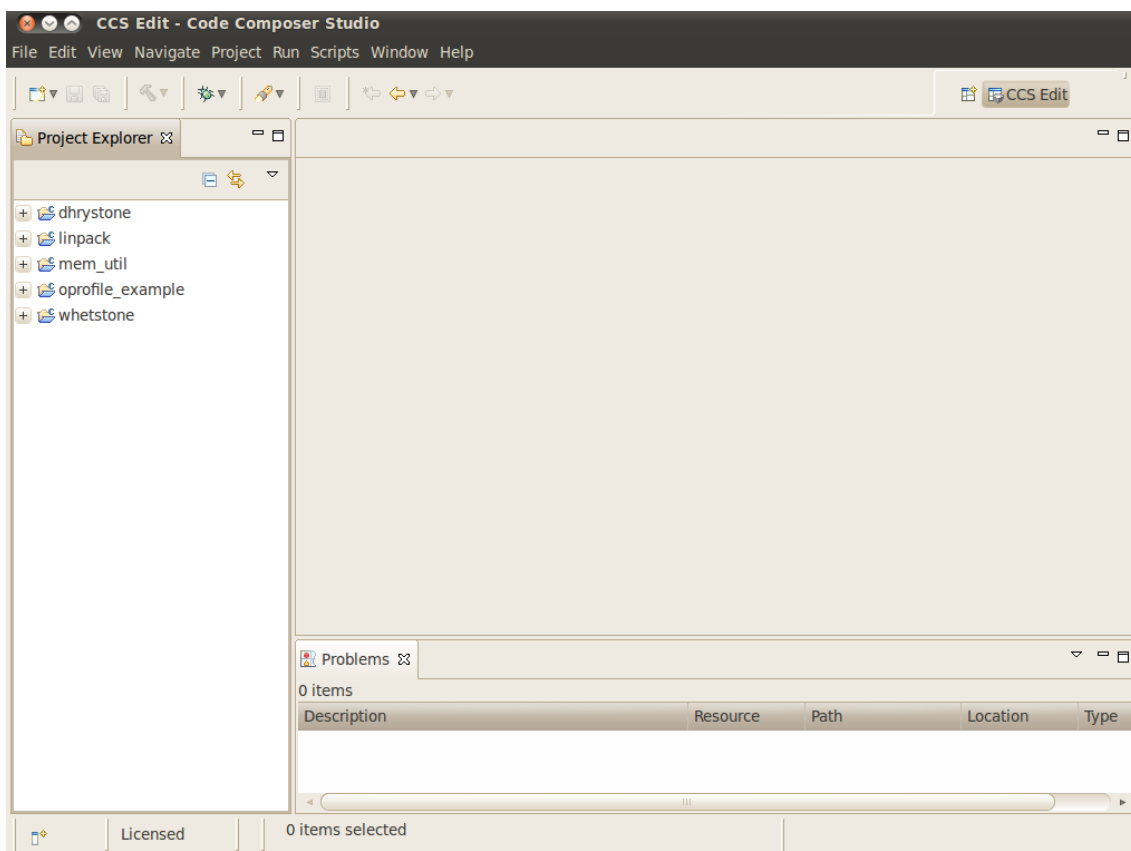
- **NOTE:** Some projects like dhrystone, linpack, and whetstone support multiple architectures. You should only import one architecture of these projects at a time. You can determine the architecture by scrolling to the end of the project name and looking for armv5te or armv7a. armv5te is for ARM9 devices and armv7a is for ARM-Cortex devices.



7. Select the projects you want to import. The following screen capture shows importing all of the example projects for an ARM-Cortex device, excluding the matrix\_browser project.



8. Click **Finish** to import all of the selected projects.
9. You can now see all of the projects listed in the *Project Explorer* tab.





## Building C/C++ Projects

1. Right-Click on the project in the *Project Explorer*
2. Select the build configuration you want to use
  - For Release builds: **Build Configurations -> Set Active -> Release**
  - For Debug builds: **Build Configurations -> Set Active -> Debug**
3. Select **Project -> Build Project** to build the highlighted project
  - **NOTE:** You can use **Project -> Build All** to build all of the projects in the *Project Explorer*

## Installing C/C++ Projects

There are several methods for copying the executable files to the target file system:

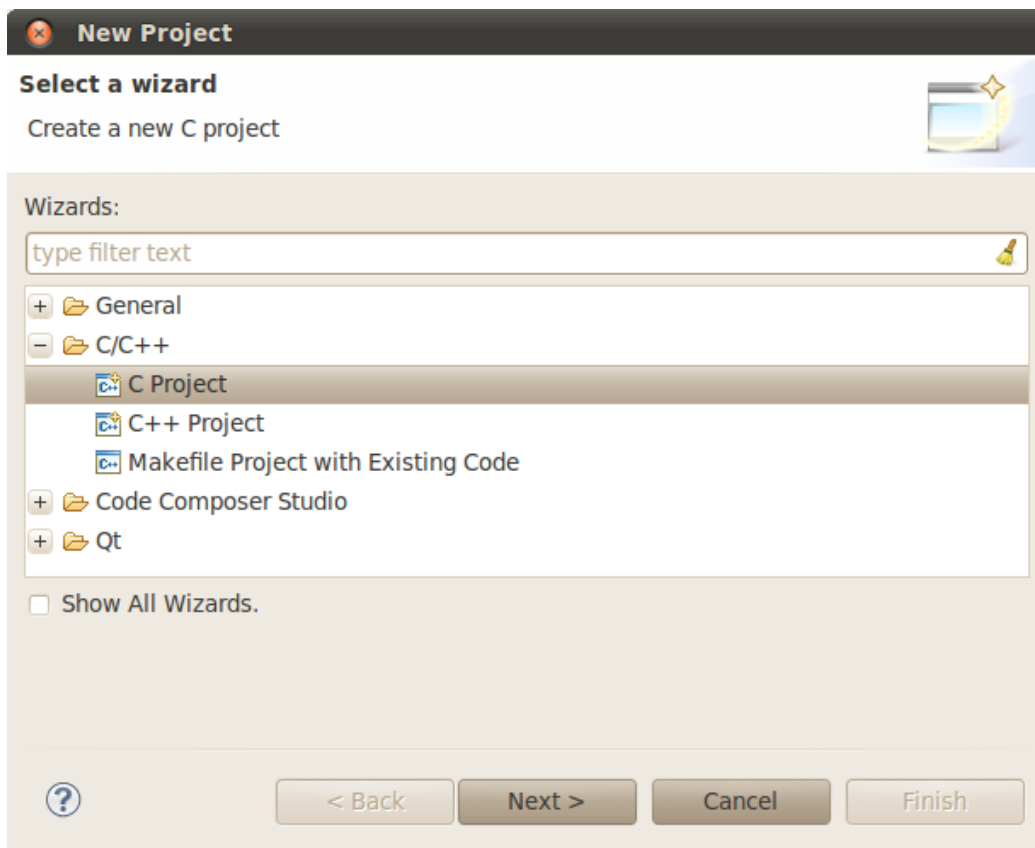
1. Use the top-level Makefile in the SDK install directory. See the **Top-Level Makefile** section for details of using the top-level Makefile to install files to a target file system.
  - **NOTE:** The top-level Makefile uses the install commands in the component Makefiles and can be used as a reference for how to invoke the install commands.
2. For all file system types you can also transfer the file using the drag-and-drop method of Remote System Explorer. See the **Remote System Explorer** section below for more details

## Creating a New Project

This section will cover how to create a new cross-compile project to build a simple *Hello World* application for the target.

## Configuring the Project

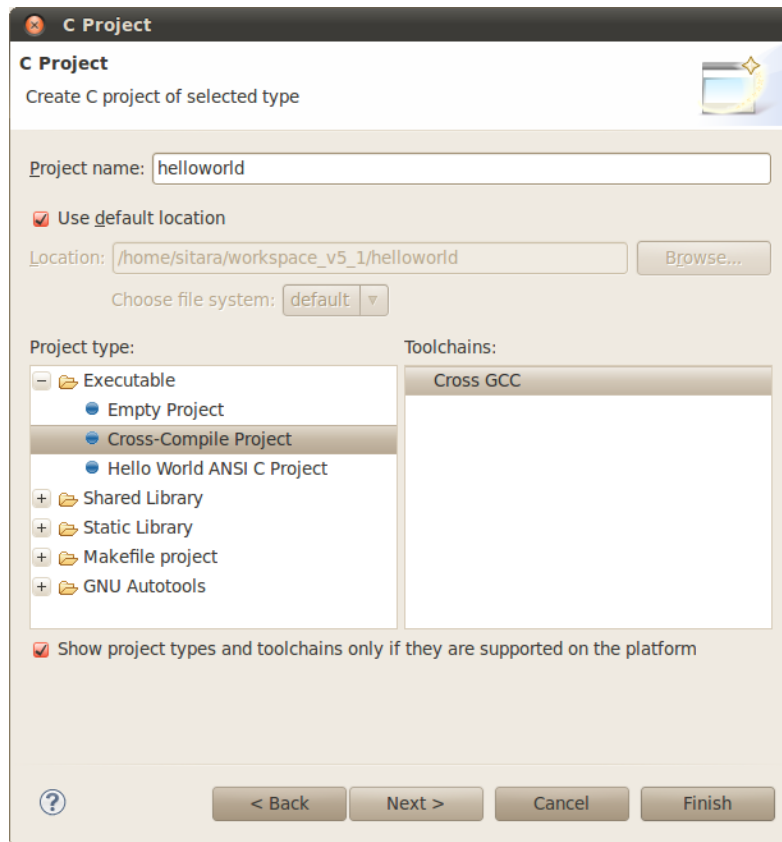
1. From the main CCSv5 window, select **File -> New -> Project...** menu item
2. in the **Select a wizard** window select the **C/C++ -> C Project** wizard



3. Click **Next**
4. In the **C Project** dialog set the following values:

Project Name: **helloworld**

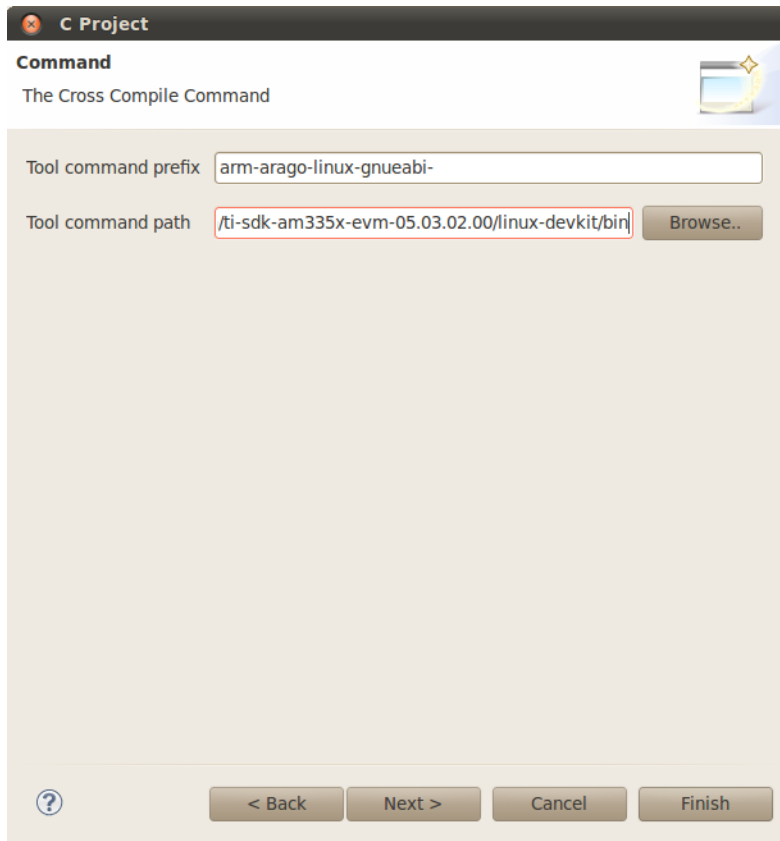
Project type: **Cross-Compile Project**



5. Click **Next**
6. In the **Command** dialog set the following values:

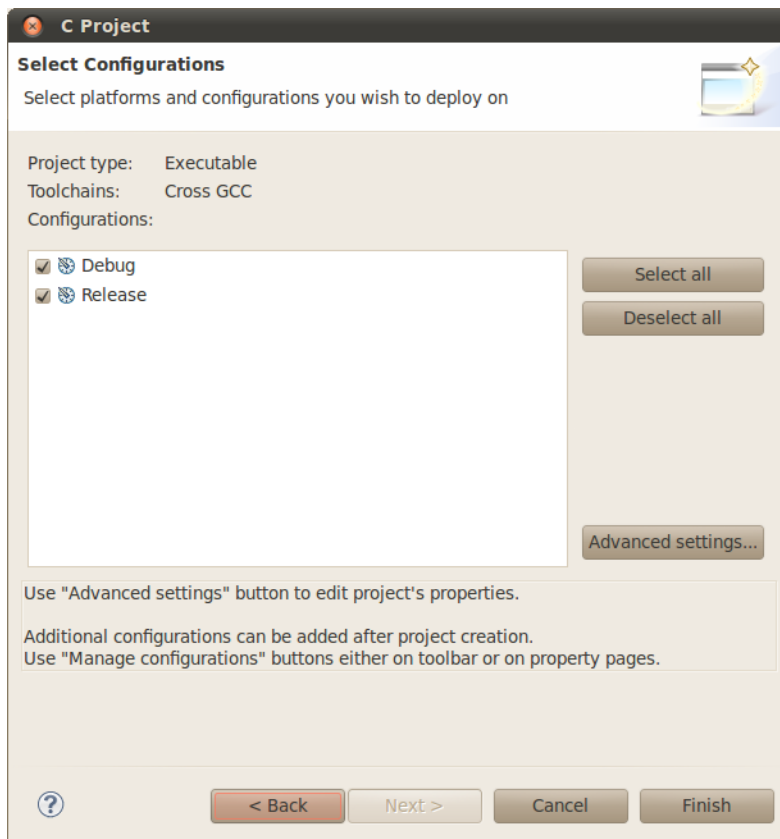
Tool command prefix: **arm-arago-linux-gnueabi-**. Note the the prefix ends with a "-". This is the prefix of the cross-compiler tools as will be seen when setting the *Tool command path*

Tool command path: **<SDK INSTALL DIR>/linux-devkit/bin**. Use the *Browse..* button to browse to the Sitra Linux SDK installation directory and then to the **linux-devkit/bin** directory. You should see a list of tools such as *gcc* with the prefix you entered above.



7. Click **Next**

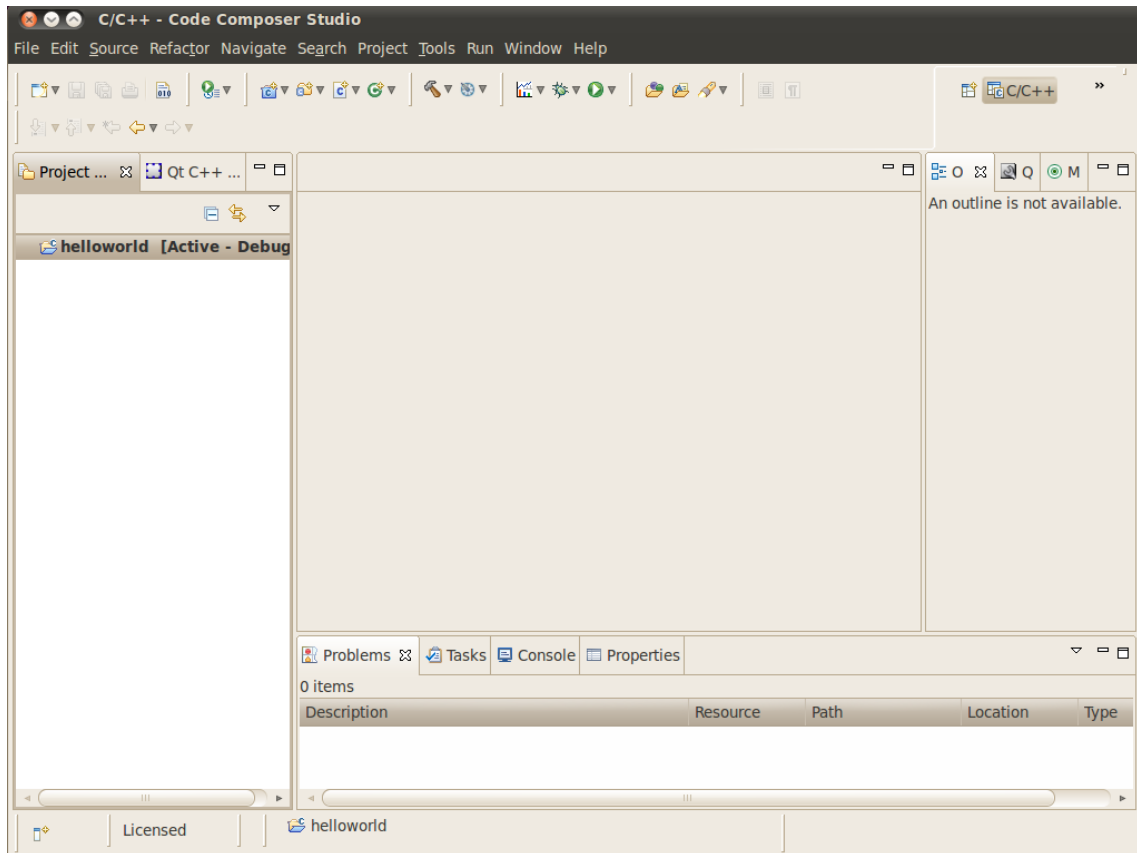
8. In the **Select Configurations** dialog you can take the default *Debug* and *Release* configurations or add/remove more if you want.



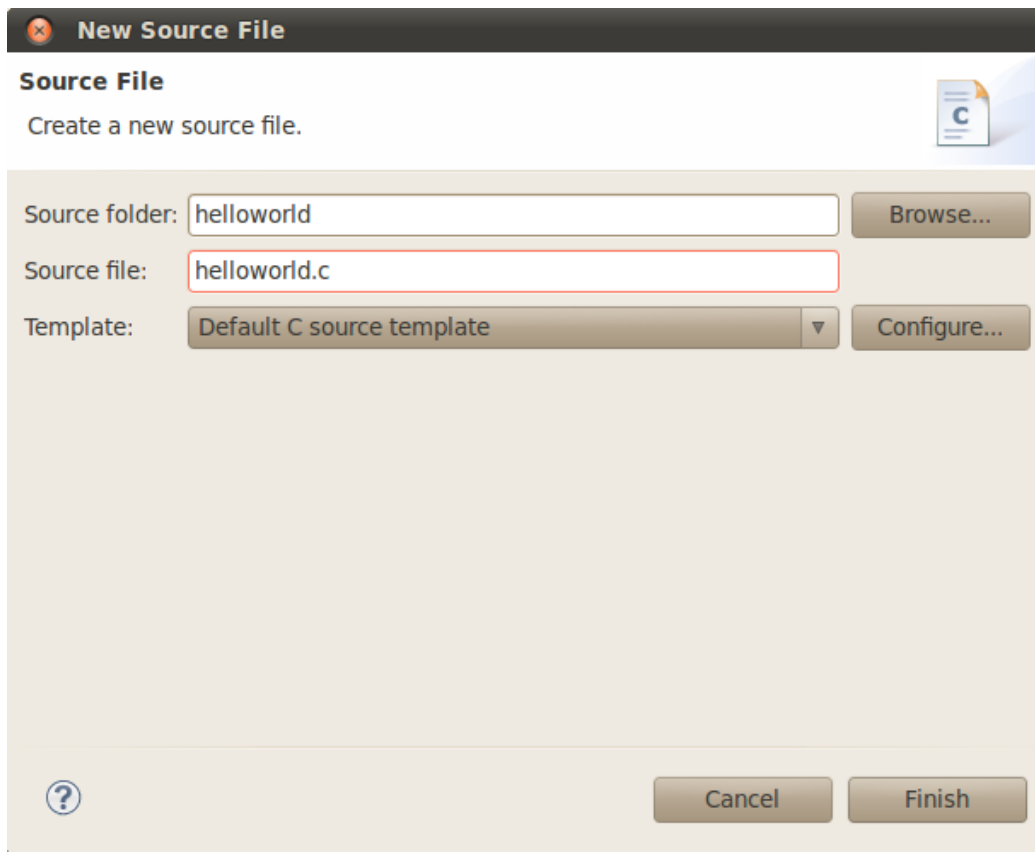
9. Click **Finish**

## Adding Sources to the Project

1. After completing the steps above you should now have a **helloworld** project in your *CCS Project Explorer* window, but the project has no sources.



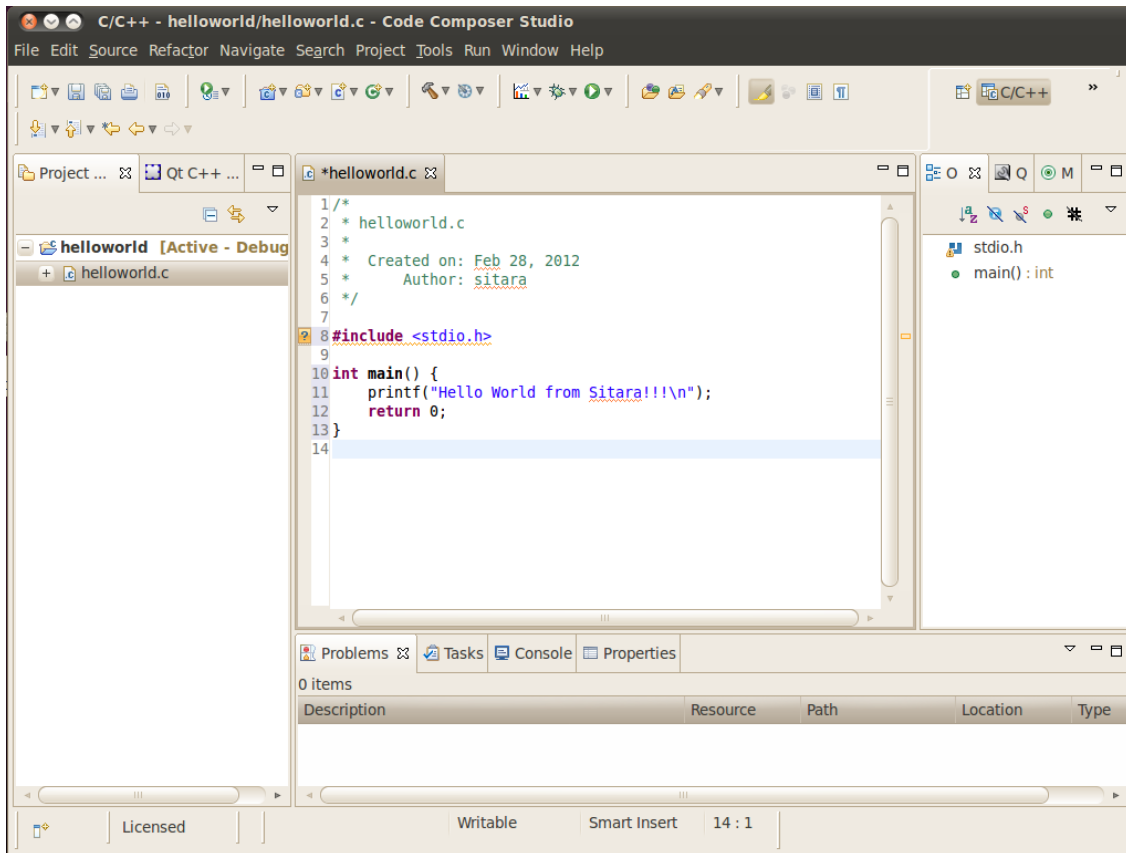
2. From the main CCSv5 window select **File -> New -> Source File** menu item
3. In the **Source File** dialog set the *Source file:* setting to **helloworld.c**



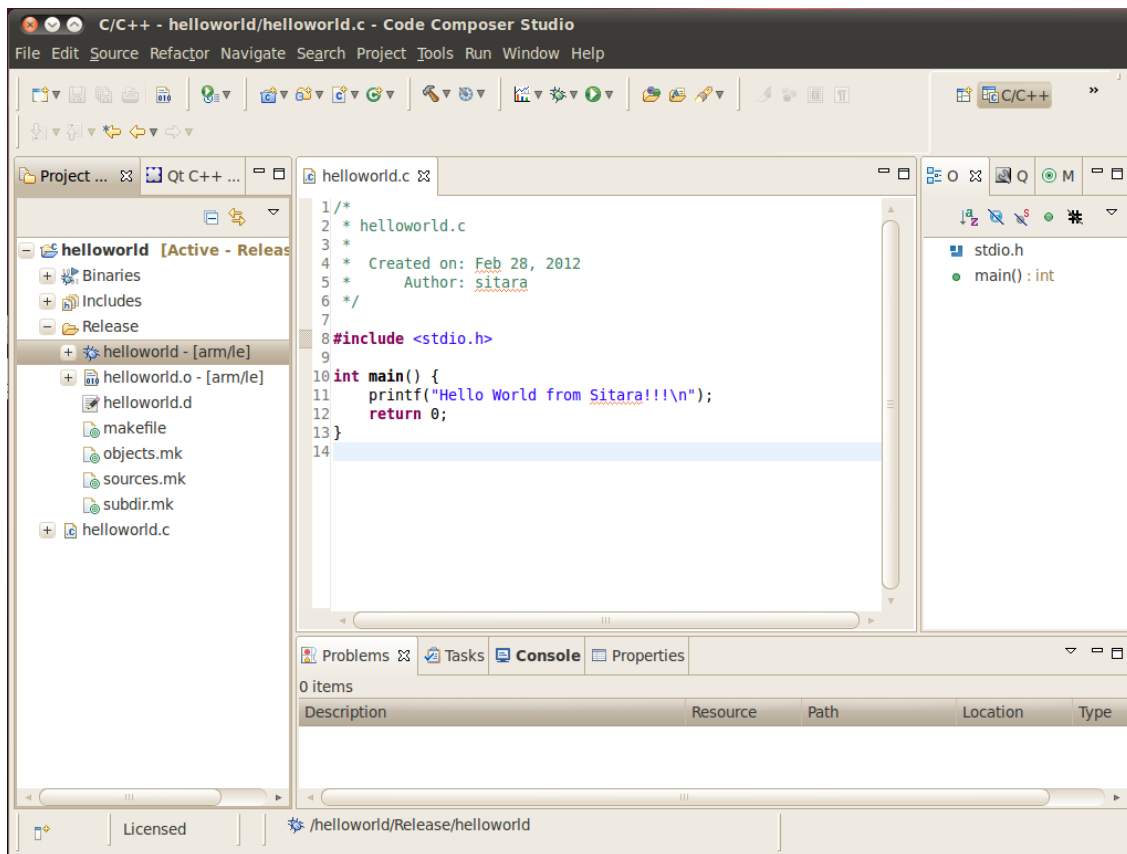
4. Click **Finish**

## Cross-Compiling the Sources

1. After completing the steps above you will have a template **helloworld.c** file. Add your code to this file like the image below:



2. Change the build configuration to **Release** by selecting **Project -> Build Configurations -> Set Active -> Release**
3. Compile the **helloworld** project by selecting **Project -> Build Project**
4. The resulting executable can be found in the *Release* directory



5. You can now install the executable to the target file system using **Remote System Explorer**, NFS, or any other method you want.

## Remote System Explorer

CCSv5 as installed with this SDK includes the Remote System Explorer (RSE) plug-in. RSE provides drag-and-drop access to the target file system as well as remote shell and remote terminal views within CCS. Refer to [How to Setup and Use Remote System Explorer](#) to establish a connection to your target EVM and start using RSE.

## Using GDB Server in CCSv5 for Linux Debugging

In order to debug Linux code using Code Composer Studio v5, you first need to configure the gdbserver on both the host and target (EVM) side.

Please refer to [Running GDB Server on CCSv5](#) for more information.

## Archived versions

- [Sitara SDK 05.03 CCSv5 User Guide \(archived\)](#) <sup>[2]</sup>
- [Sitara SDK 05.02 CCSv5 User Guide \(archived\)](#) <sup>[3]</sup>

## References

[1] <http://www.ti.com/tool/linuxezsdk-sitara>

[2] [http://processors.wiki.ti.com/index.php?title=Code\\_Composer\\_Studio\\_v5\\_Users\\_Guide&oldid=84244](http://processors.wiki.ti.com/index.php?title=Code_Composer_Studio_v5_Users_Guide&oldid=84244)

[3] [http://processors.wiki.ti.com/index.php?title=Code\\_Composer\\_Studio\\_v5\\_Users\\_Guide&oldid=68253](http://processors.wiki.ti.com/index.php?title=Code_Composer_Studio_v5_Users_Guide&oldid=68253)



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