

# How to Create A HALCoGen-Based Project For CCS

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## ABSTRACT

HALCoGen is a GUI-based initialization, configuration and driver code generator for TI's Hercules™ ARM® Safety MCUs. HALCoGen's editing feature provides a strong motivation to be able to regenerate source code and build/debug the source through Code Composer Studio™ (CCS) integrated development environment (IDE) in the same working folder.

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## 1 Motivation

HALCoGen is able to maintain edits that you make to the generated source code, as long as these edits appear between comments *USER CODE BEGIN* and *USER CODE END*.

For example, by default HALCoGen generates the empty main() function (in file 'sys\_main.c') as shown in [Example 1](#).

### Example 1. The Function main() as Initially Generated by HALCoGen

```

/* USER CODE BEGIN (2) */
/* USER CODE END */

void main(void)
{
/* USER CODE BEGIN (3) */
/* USER CODE END */
}

```

Any code that you add to main() between the comments *USER CODE BEGIN (x)* and *USER CODE END* will be maintained even if you make another pass through HALCoGen and regenerate code after having changed various settings.

You can edit sys\_main.c through the Code Composer Studio IDE, and add functionality.

**Example 2. User Additions to main()**

```

/* USER CODE BEGIN (2) */
#include <stdio.h>           /* Correct */
#include <gio.h>             /* Correct */
/* USER CODE END */
#include <het.h>             /* Incorrect */

void main(void)
{
    hetInit();              /* Incorrect */
/* USER CODE BEGIN (3) */
    gioInit();              /* Correct */
/* USER CODE END */
}
    
```

Suppose you build the code, load it into a Hercules TMS570 or RM4 device, start a debugging session, and then decide that you need to change one of the PLL settings in HALCoGen.

You can go back to the HALCoGen GUI, make changes to the PLL settings, and regenerate the code. Any code additions that you made in the areas marked for user additions will be preserved through the regeneration process. As [Example 3](#) illustrates, as long as you place the code in the correct location (between *USER CODE BEGIN* and *USER CODE END* comments); then the code changes are preserved through a cycle of regeneration.

**Example 3. User Modified Code After Regeneration By HALCoGen**

```

/* USER CODE BEGIN (2) */
#include <stdio.h>           /* Correct */
#include <gio.h>             /* Correct */
/* USER CODE END */

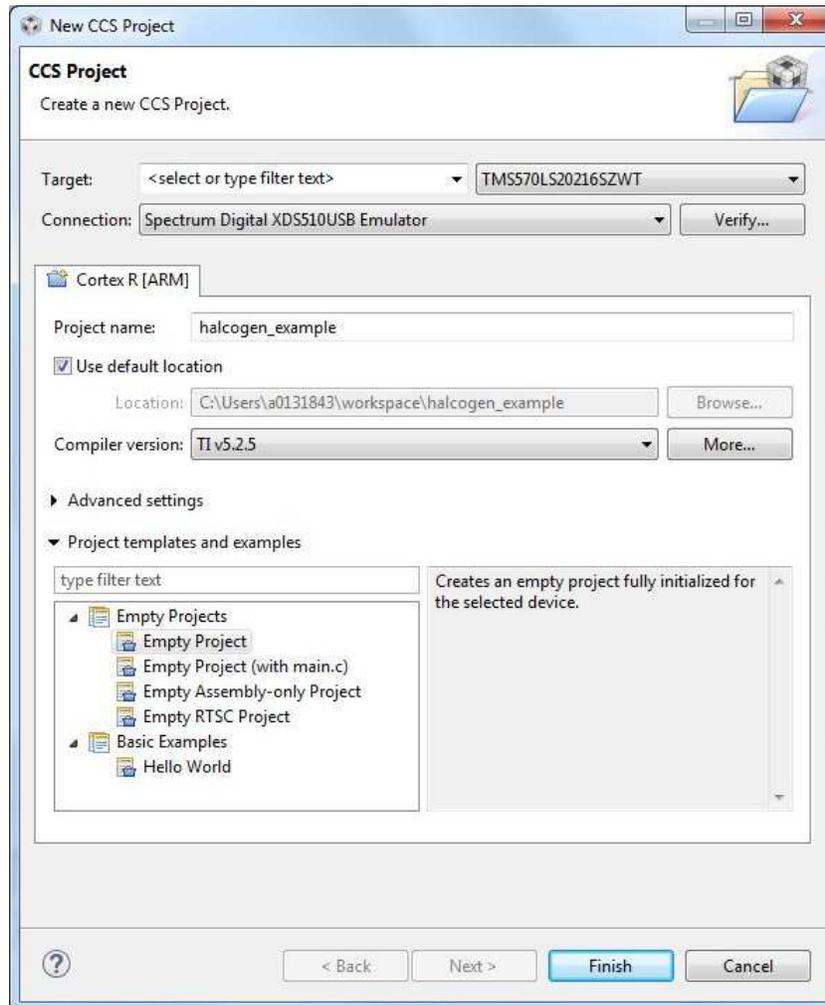
void main(void)
{
/* USER CODE BEGIN (3) */
    gioInit();              /* Correct */
/* USER CODE END */
}
    
```

[Example 3](#) should provide motivation as to why one would want to have HALCoGen share a project directory with a Code Composer Studio project. Any updates made through HALCoGen would immediately appear in the Code Composer Studio project whenever the code is regenerated. And any edits made to the same files in the Code Composer Studio IDE will be retained through a cycle of HALCoGen regeneration as long as the code is added in areas specified for user code.

## 2 Creating a Code Composer Studio Project

This section explains how to configure both HALCoGen and Code Composer Studio to share the same project folder.

1. Create a project in Code Composer Studio.
2. Select File → New → CCS Project, from the Code Composer Studio menu bar, after starting the Code Composer Studio IDE. A window will open asking you where to create the Code Composer Studio project. In this case, create the project in the existing workspace, and name the project `halcogen_example` as shown in [Figure 1](#).
3. Create the project using the template of the appropriate RM, TMS570 device. In this case, settings for TMS570L20216SZWT are illustrated in [Figure 1](#).
  - (a) Select the Target
  - (b) Select the Emulator (XDS510USB Emulator)
  - (c) Create the project in the existing workspace (use default location), and name the project "halcogen\_example"
  - (d) Select the Compiler version
  - (e) Leave Advanced settings to default. ( Output type - Executable, Output format - eabi)
  - (f) Under Project Templates select "Empty Project"



**Figure 1. Create a New Code Composer Studio Project**

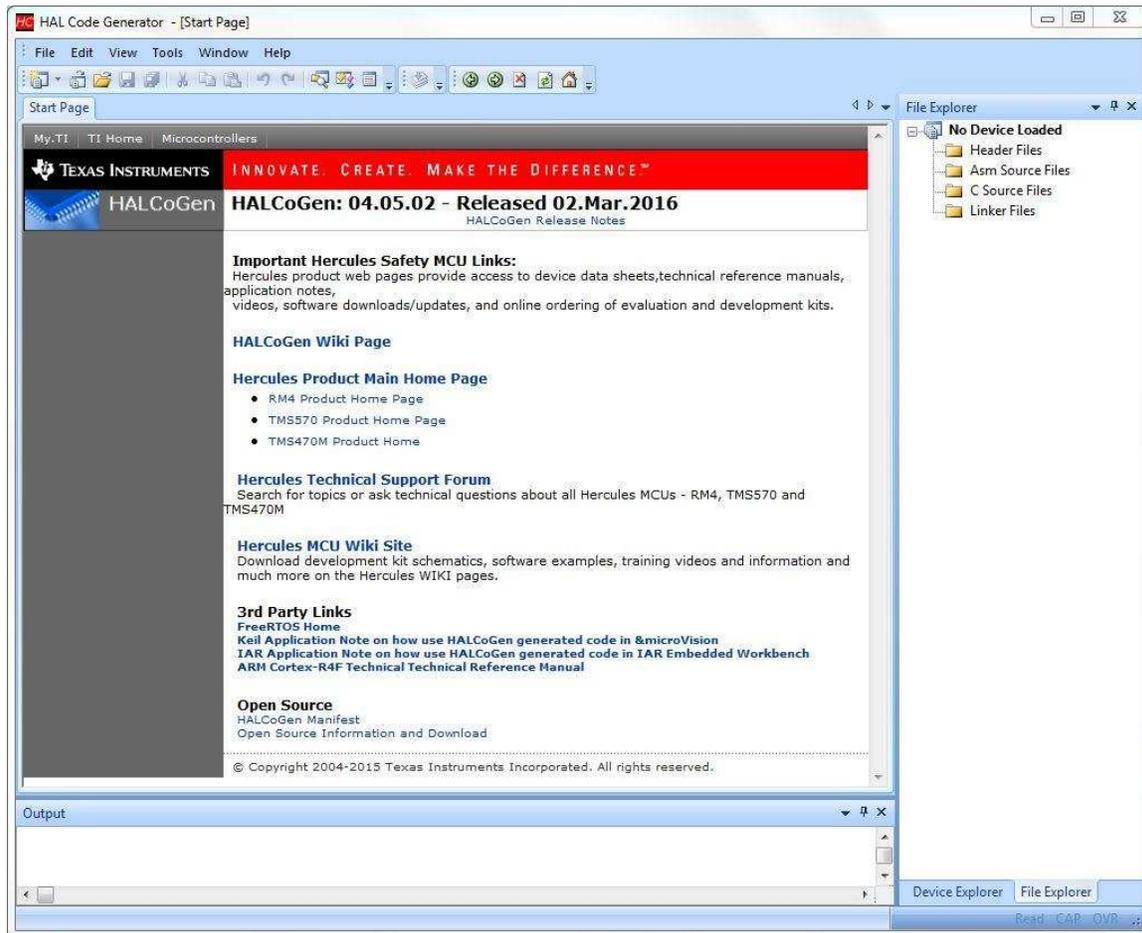
4. Select Finish and a Code Composer Studio project will be created in the folder `.../workspace/halcogen_example`.

5. Create a HALCoGen project that will generate source files directly into this folder.

### 3 Creating a HALCoGen Project

Once the Code Composer Studio project has been created, it is time to create a HALCoGen project that generates code directly into the Code Composer Studio Project directory.

1. Start the HALCoGen program, which will bring up a startup screen as illustrated in [Figure 2](#).



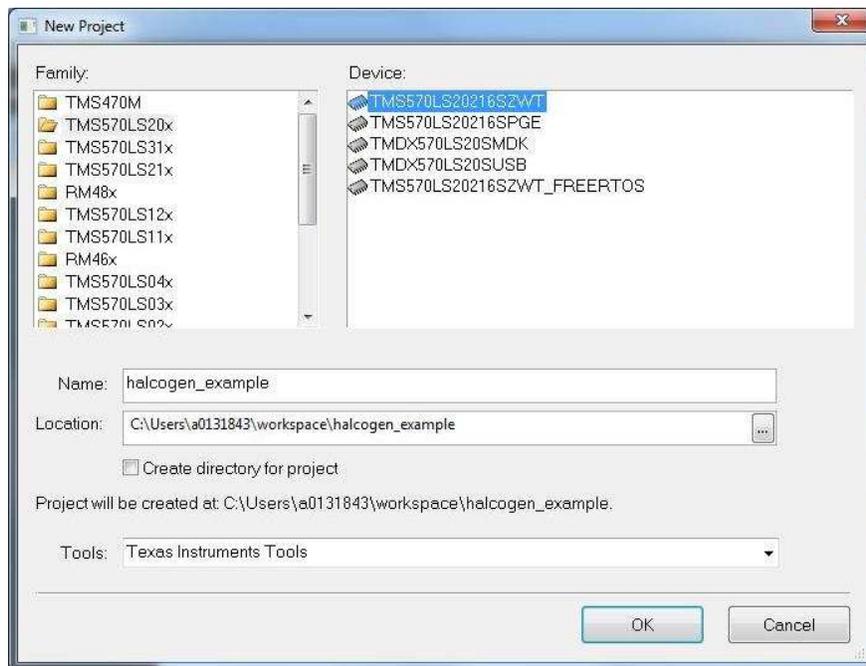
**Figure 2. HALCoGen Startup With No Project**

2. Select File → New → Project from the HALCoGen startup screen. A window appears asking you to select a device type, a working folder, and to select a name for the project.

[Figure 3](#) shows how you would create the new HALCoGen project so that code is generated directly into the Code Composer Studio project directory. In this case, the Code Composer Studio project directory was `.../workspace/halcodegen_example`.

The corresponding HALCoGen project should be created:

- With the same TMS570 device as was selected when creating the Code Composer Studio Project
- With any 'name' – although in this case the HALCoGen project name was chosen to match the Code Composer Studio Project name `halcodegen_example`.
- With location matching the top level Code Composer Studio Project Folder: `.../workspace/halcodegen_example`.
- With *Create directory for project* unchecked



**Figure 3. Creating a HALCoGen Project Sharing the Code Composer Studio Project Folder**

That's it! Now you have a pair of HALCoGen and Code Composer Studio projects that are set up to allow rapid iteration between the environments.

## 4 Generate the Code – Check the Code Composer Studio Project

At this point, you should be able to generate code from HALCoGen (you can try this immediately after creating the project, without changing any of the default settings.)

If everything is setup correctly, when you look at the corresponding Code Composer Studio project, you will see that all of the source files (Source and Include) generated by HALCoGen have automatically been added to the Code Composer Studio project, as shown in the left hand pane of the Code Composer Studio project view (Figure 4)

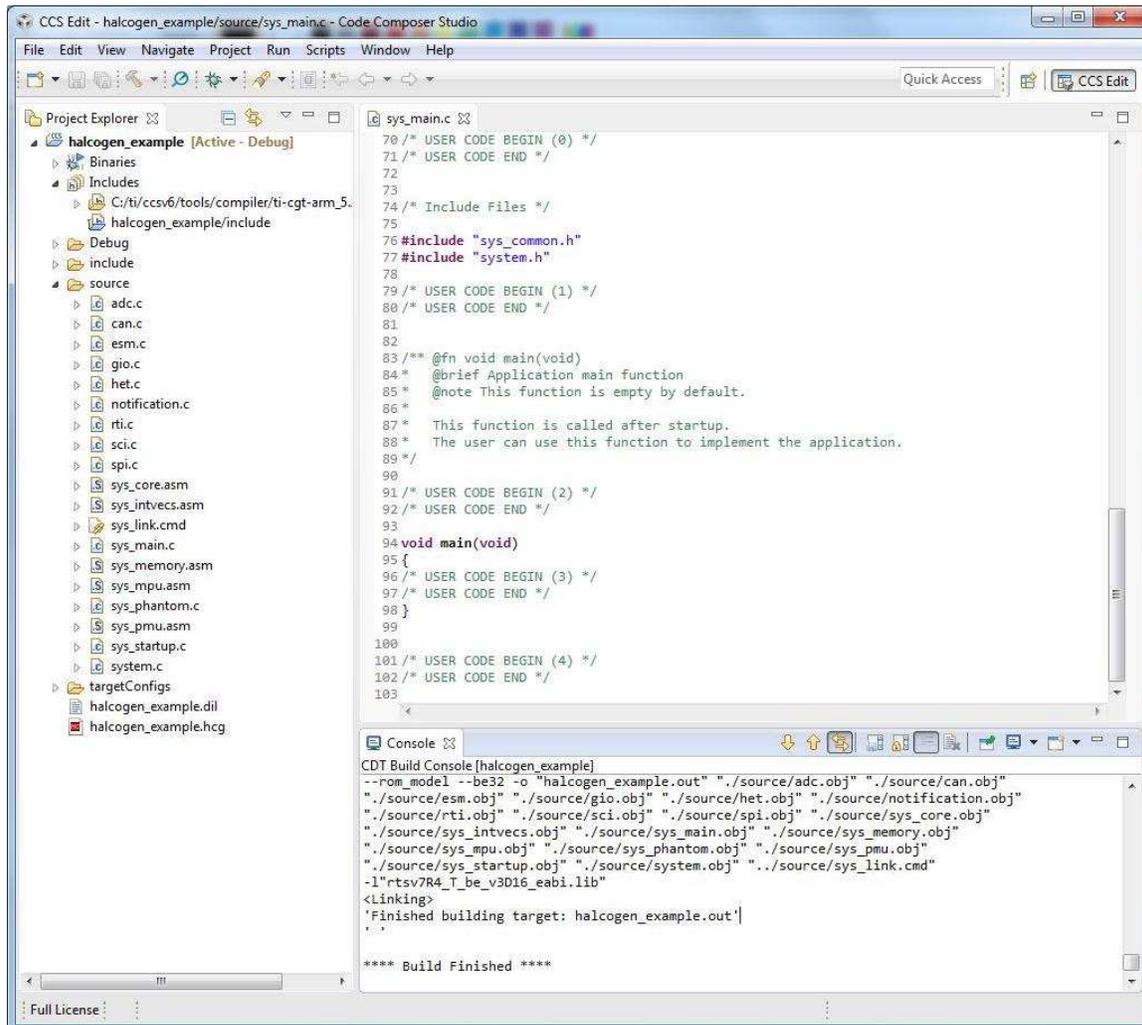
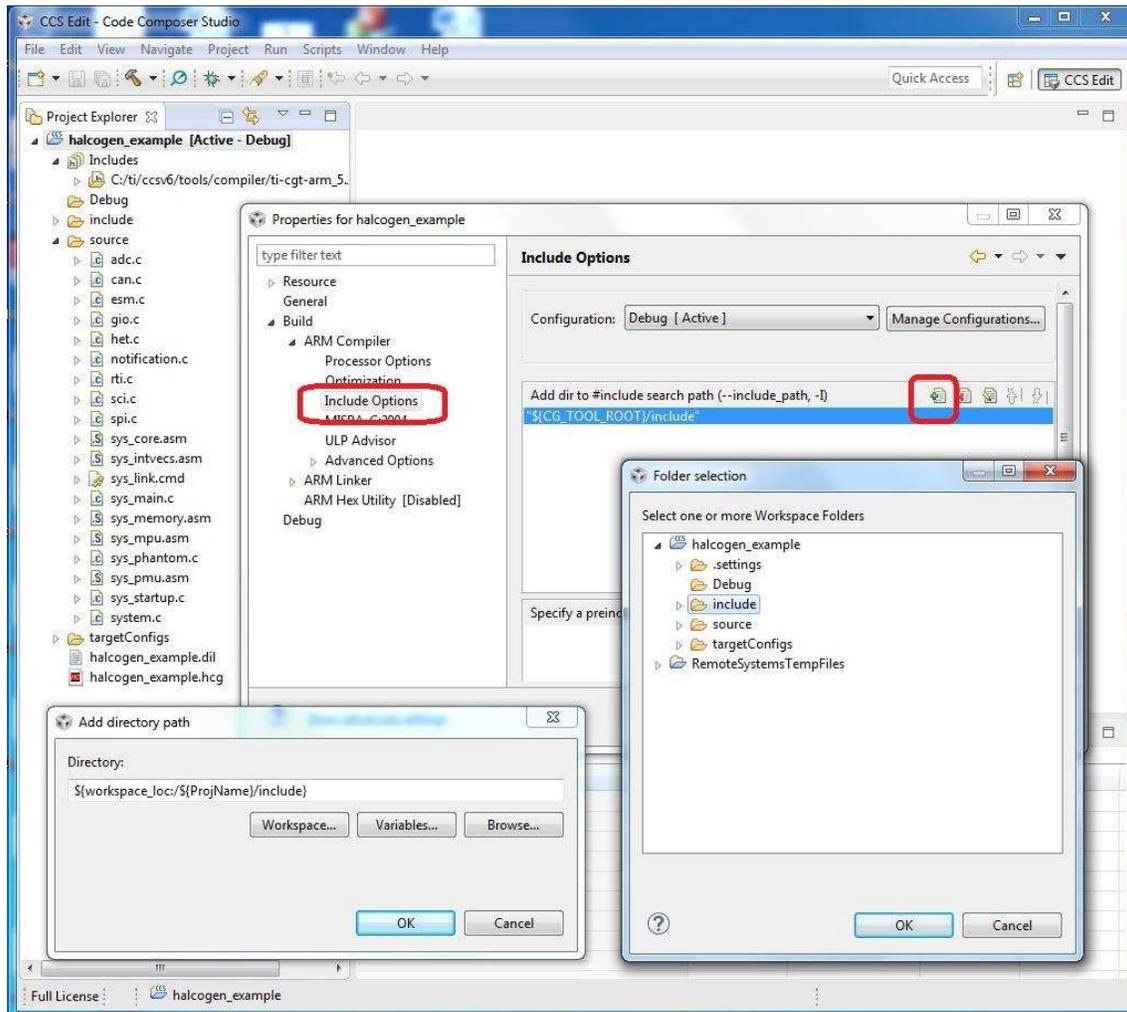


Figure 4. Code Composer Studio View of Shared Project Folder - After HALCoGen Generation Step

Add the HALCoGen generated Include folder to the #include search path under the compiler Include Options as illustrated in the [Figure 5](#).



**Figure 5. Adding HALCoGen Include Folder to #include Search Path**

Now you will be able to make changes to the same project through either the HALCoGen environment or through the Code Composer Studio editor. And you will be able to regenerate code without losing your edits in the Code Composer Studio environment, as long as they are placed in the designated user code areas.

## Revision History

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

<b>Changes from A Revision (September 2011) to B Revision</b>	<b>Page</b>
• Information was updated in <a href="#">Section 2</a> .	3
• Information was updated in <a href="#">Section 3</a> .	4
• Information was updated in <a href="#">Section 4</a> .	6

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