solidThinking Embed Installation Instructions for Texas Instruments Microcontrollers

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Overview:

solidThinking Embed (sTE), formerly known as VisSim Embedded, is a block diagram application for model based development of embedded systems.

The sTE CodeGen feature allows you to easily generate efficient fixed and floating point C code for any block diagram and execute it on a microcontroller.

These Installation Instructions explain how to install and configure sTE to work with three Texas Instrument microcontroller families;

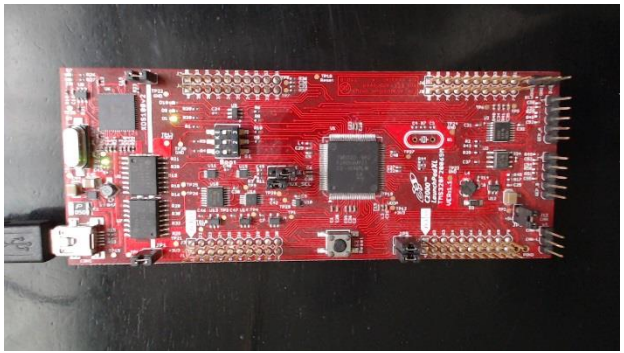
- C2000
- MSP430
- TM4C12x ARM Cortex-M4F

The generated C code may be executed either from RAM or FLASH, both configurations are explained.

Installation Requirements:

Before proceeding with the installation please confirm the following:

1. You have Internet connectivity.
2. Your PC operating system is WIN XP or newer.
3. You have at least 1.5GB free disk space.
4. Any existing copies of the Texas Instruments Code Composer Studio (CCS) are removed from your PC.
5. A Texas Instrument F28069M LaunchPad experimenter board connected via supplied USB to your PC if you want to test your installations.



Installation of the sTE software for Texas Instruments microcontrollers is a three step process that MUST be executed in the following order. NOTE: Step 3 is not required unless you want to execute programs from FLASH.

Step 1: Install Texas Instruments Code Composer Studio (CCS)
Includes the Texas Instruments compiler to translate C Code produced by sTE CodeGen to machine code that will execute on Texas Instruments Microcontrollers.

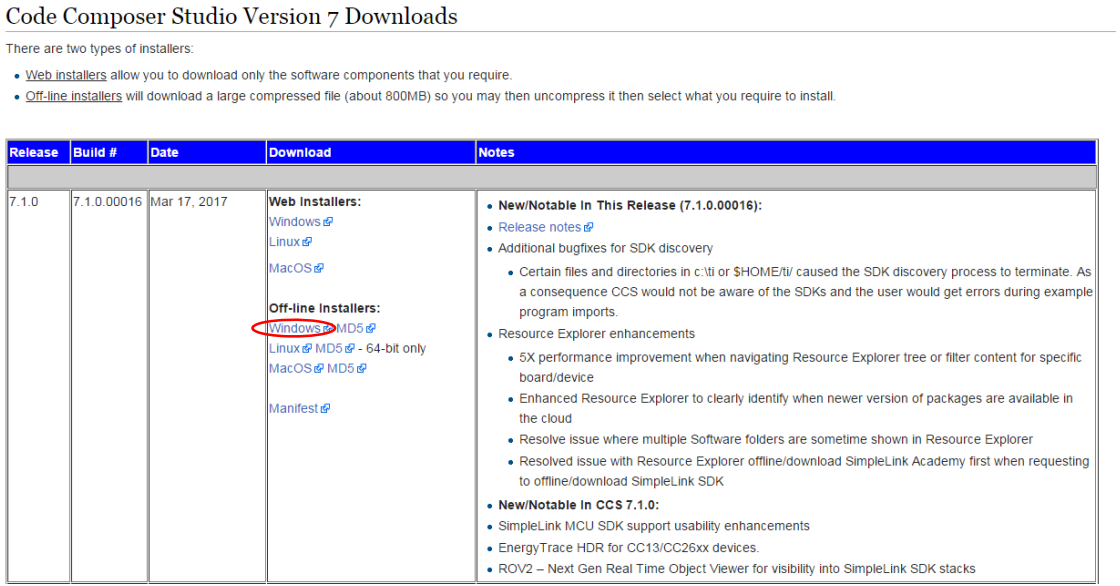
Step 2: Install sTE

Step 3: Install Texas Instruments UniFlash
A standalone application used to program on-chip flash memory on Texas Instruments Microcontrollers

Step 1: CCS Installation (1/11):

1a. Navigate to the following link:
http://processors.wiki.ti.com/index.php/Download_CCS#Code_Composer_Studio_Version_7_Downloads

1b. Under Release 7.1.0, select the most recent “Build #”, then select "Windows" from the "Off-line Installers“.



Code Composer Studio Version 7 Downloads

There are two types of installers:

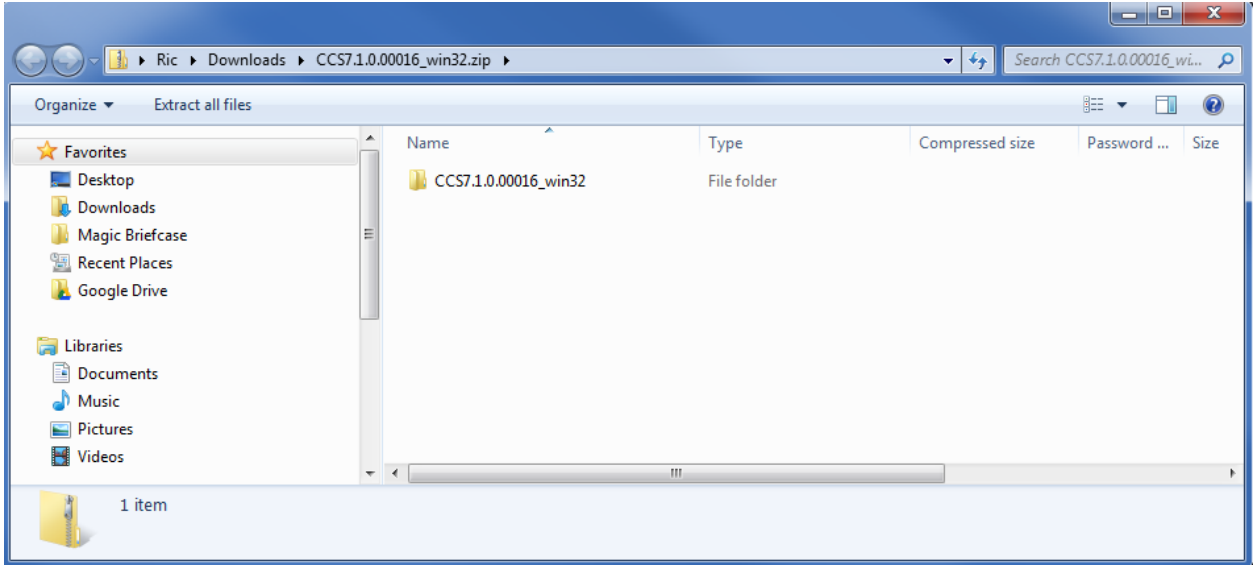
- Web installers allow you to download only the software components that you require.
- Off-line installers will download a large compressed file (about 800MB) so you may then uncompress it then select what you require to install.

Release	Build #	Date	Download	Notes

7.1.0	7.1.0.00016	Mar 17, 2017	**Web Installers:**
			Windows
			Linux
			MacOS
			
			Off-line Installers:
			Windows MD5
			Linux MD5 - 64-bit only
			MacOS MD5
			
			Manifest
				• **New/Notable In This Release (7.1.0.00016):**
				• Release notes
				• Additional bugfixes for SDK discovery
				  • Certain files and directories in c:\ti or $HOME/ti/ caused the SDK discovery process to terminate. As a consequence CCS would not be aware of the SDKs and the user would get errors during example program imports.
				• Resource Explorer enhancements
				  • 5X performance improvement when navigating Resource Explorer tree or filter content for specific board/device
				  • Enhanced Resource Explorer to clearly identify when newer version of packages are available in the cloud
				  • Resolve issue where multiple Software folders are sometime shown in Resource Explorer
				  • Resolved issue with Resource Explorer offline/download SimpleLink Academy first when requesting to offline/download SimpleLink SDK
				• **New/Notable In CCS 7.1.0:**
				• SimpleLink MCU SDK support usability enhancements
				• EnergyTrace HDR for CC13/CC26xx devices.
				• ROV2 – Next Gen Real Time Object Viewer for visibility into SimpleLink SDK stacks

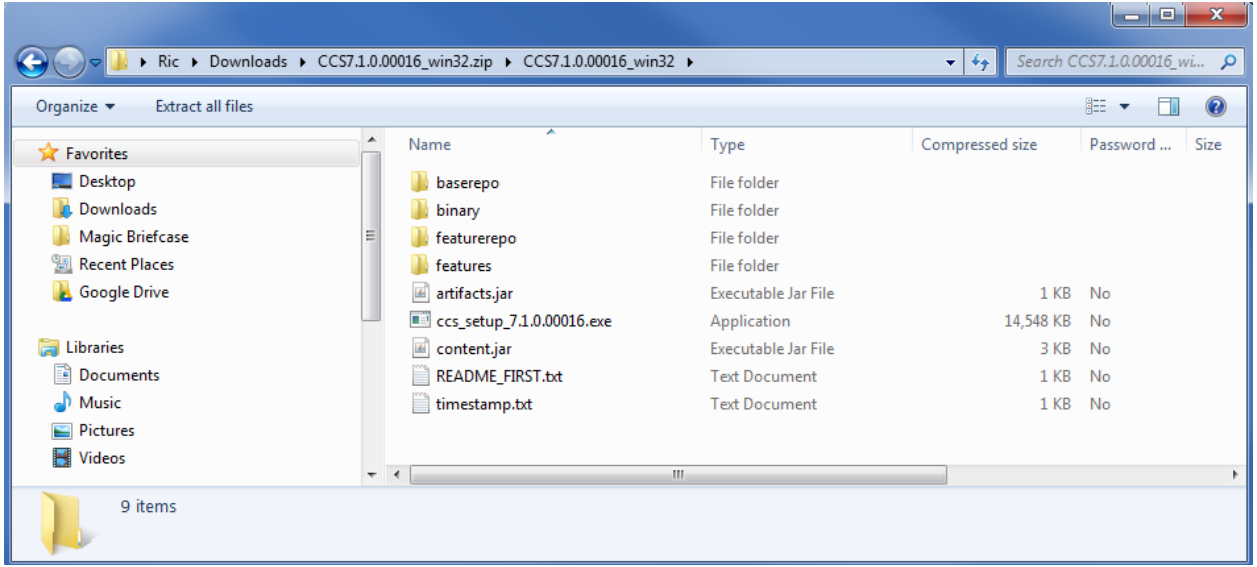
Step 1: CCS Installation (2/11):

After the download completes navigate into the “CCS7.1.0.00016_win32” folder;



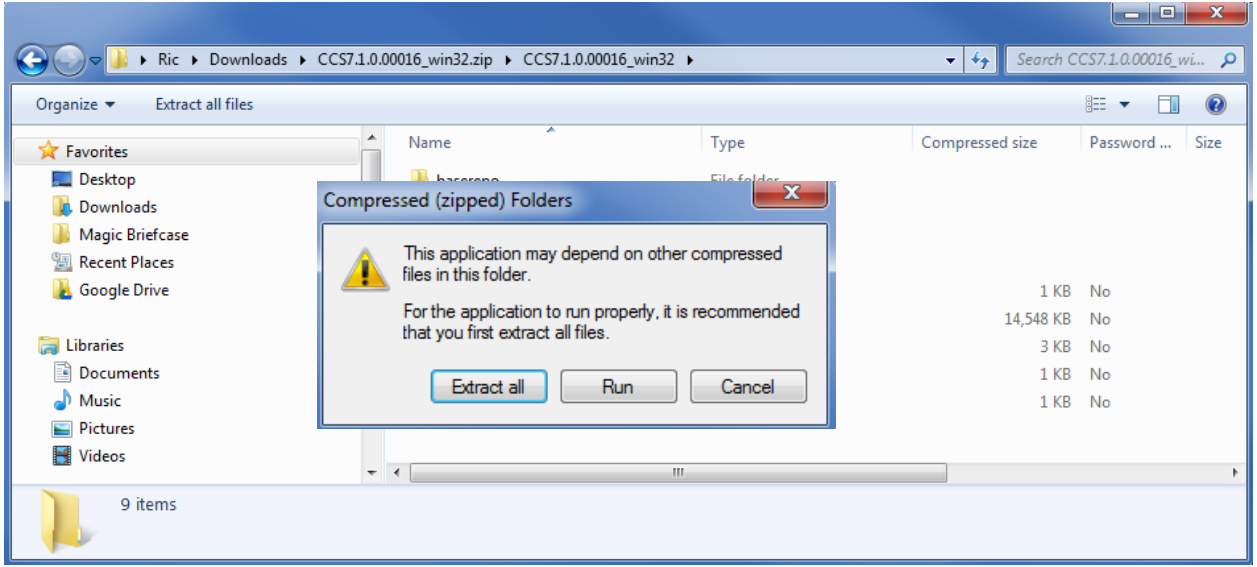
Step 1: CCS Installation (3/11):

Unzip the installation files by clicking “ccs_setup_7.1.0.00016.exe”



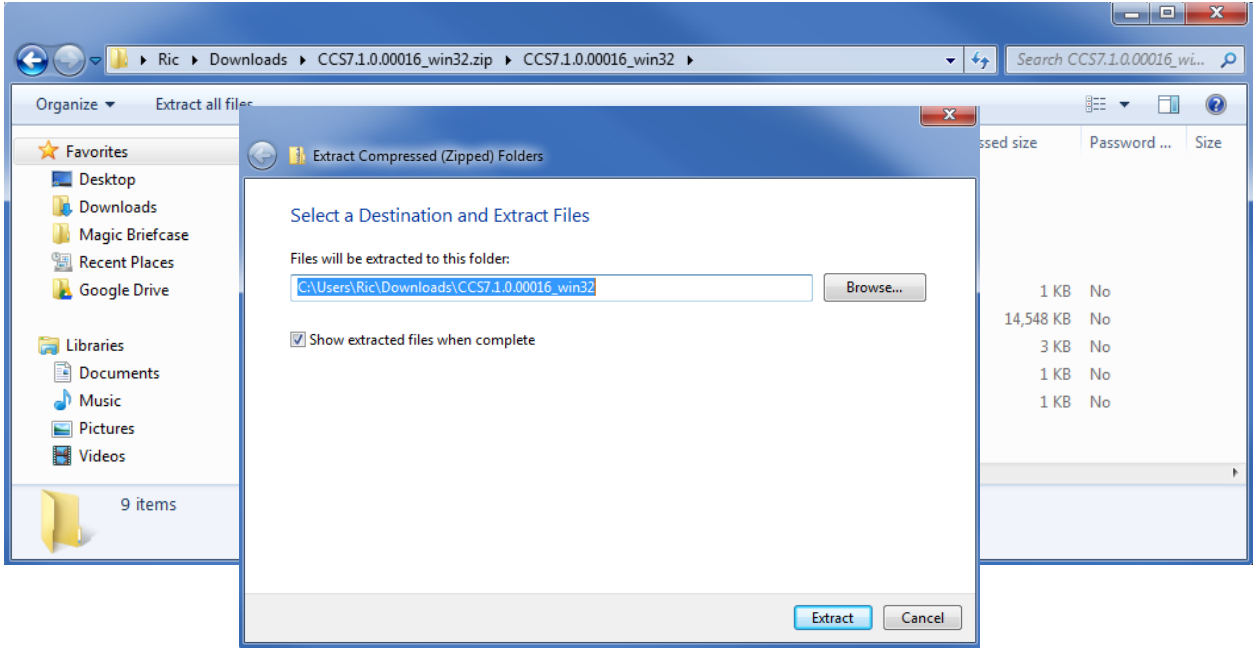
Step 1: CCS Installation (4/11):

Select “Extract all”



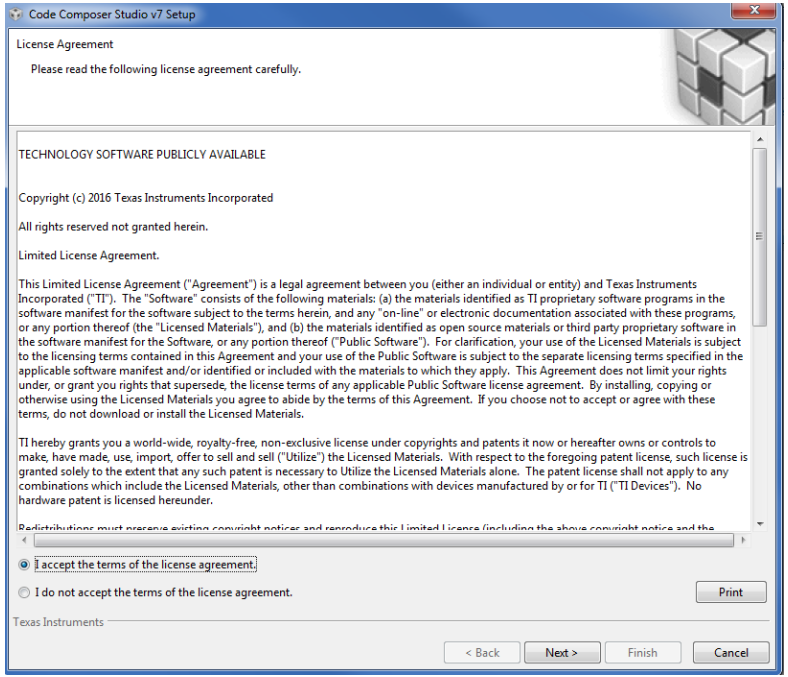
Step 1: CCS Installation (5/11):

Extraction folder (default is recommended):



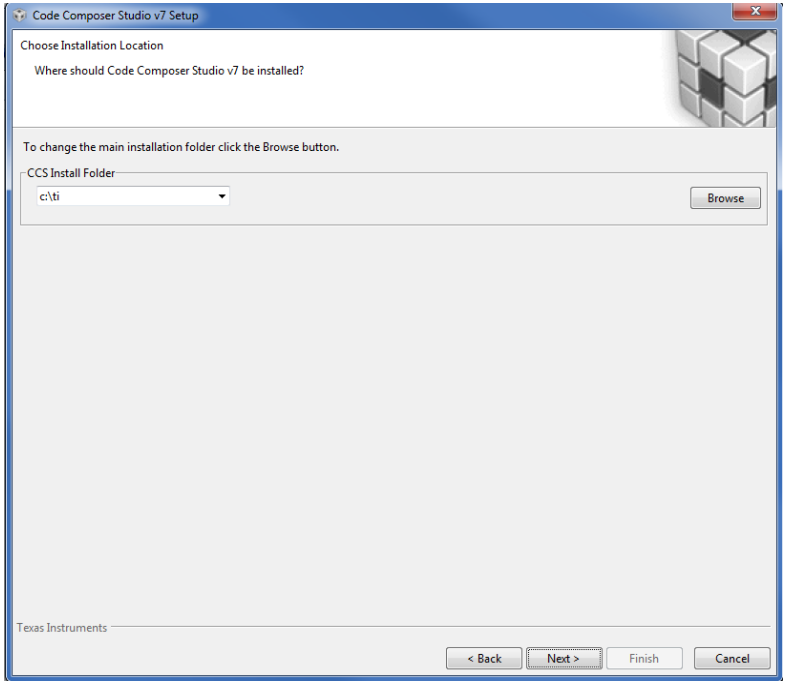
Step 1: CCS Installation (6/11):

Navigate to and execute “ccs_setup_7.1.0.00016.exe” to begin the installation, agree to the license:



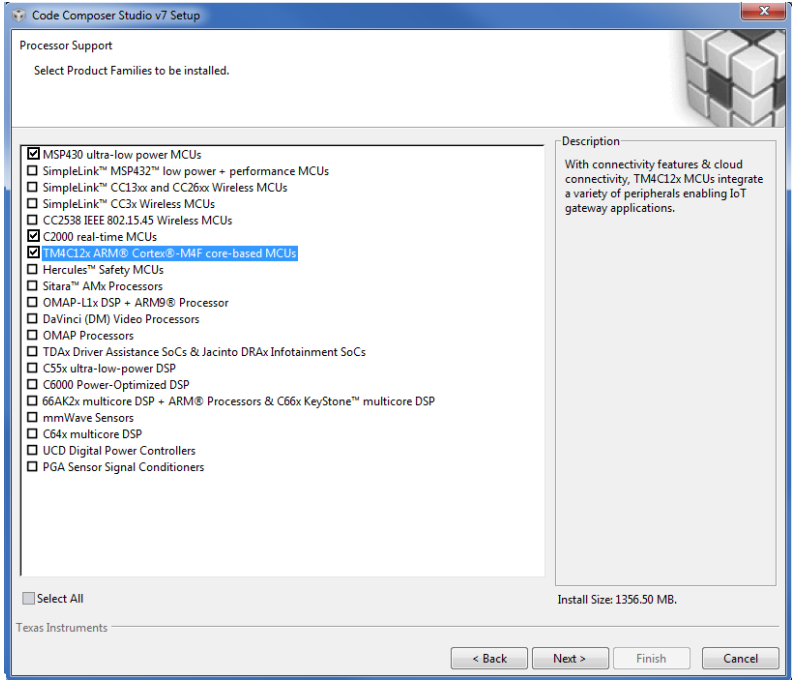
Step 1: CCS Installation (7/11):

Select the installation folder (default is recommended):



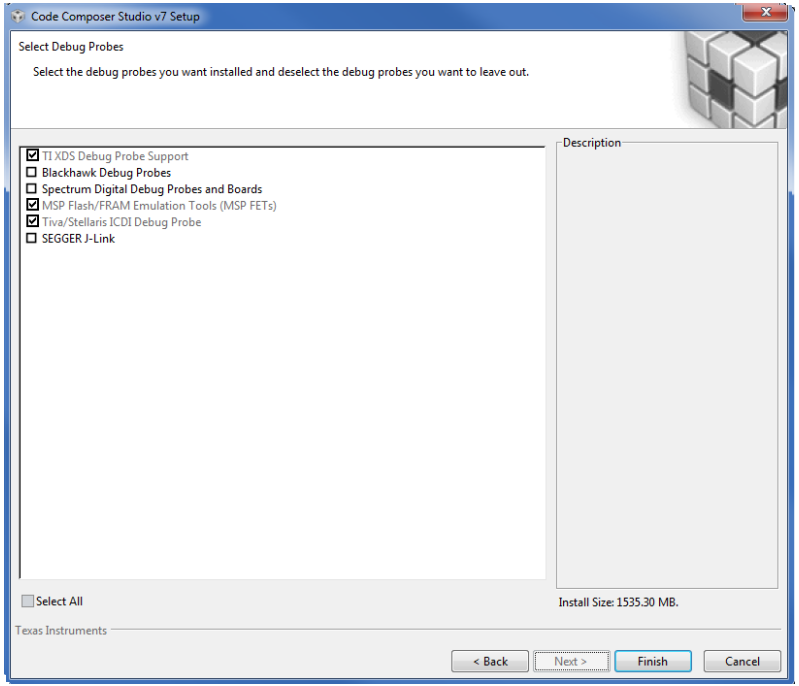
Step 1: CCS Installation (8/11):

Select the Product Families (sTE supports the three product families checked):



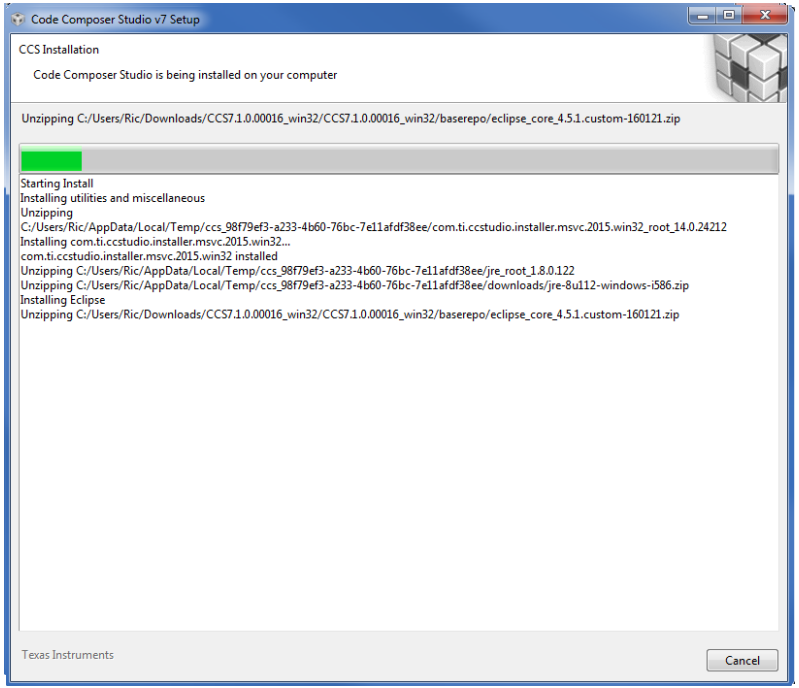
Step 1: CCS Installation (9/11):

Select the Debug Probes (default probes are shown in grey, select additional probes if they are being used):



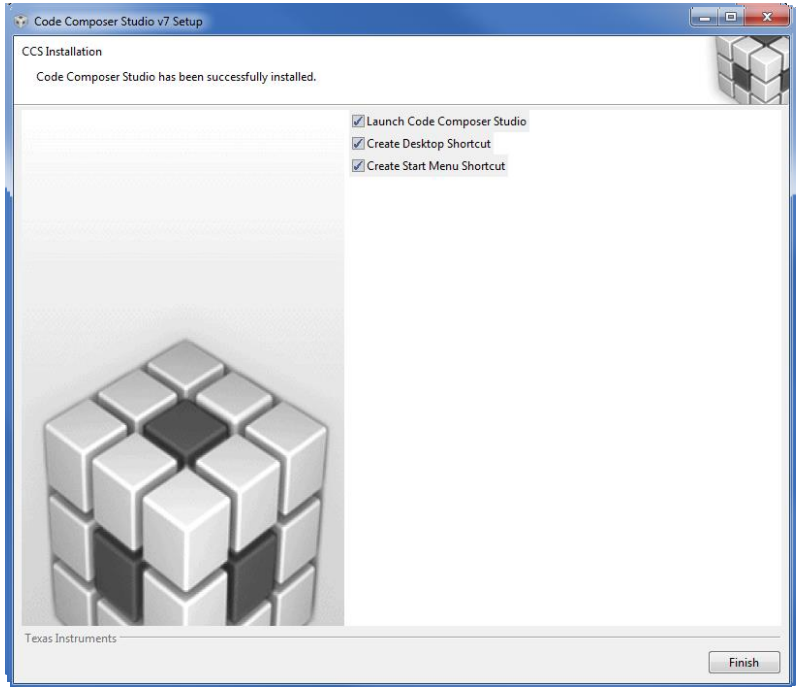
Step 1: CCS Installation (10/11):

Installing Files:



Step 1: CCS Installation (11/11):

CCS Installation is completed successfully!



Step 2: solidThinking Embed Installation (1/14):

2a. Navigate to the following link:

http://www.solidthinking.com/embed_land.html

2b. Click on “Request a Trial”, fill out the request form and submit it, and a link to your trial license will be emailed to you.

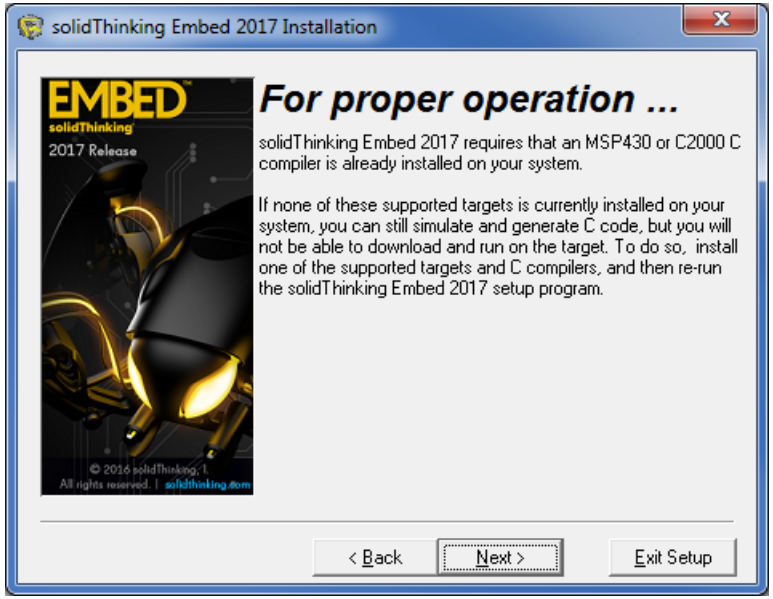
2c. Once you receive the email, click the link to get your trial license file and then click on the Embed Installer Package link.

Step 2: solidThinking Embed Installation (2/14):

Any existing versions of sTE must be closed;

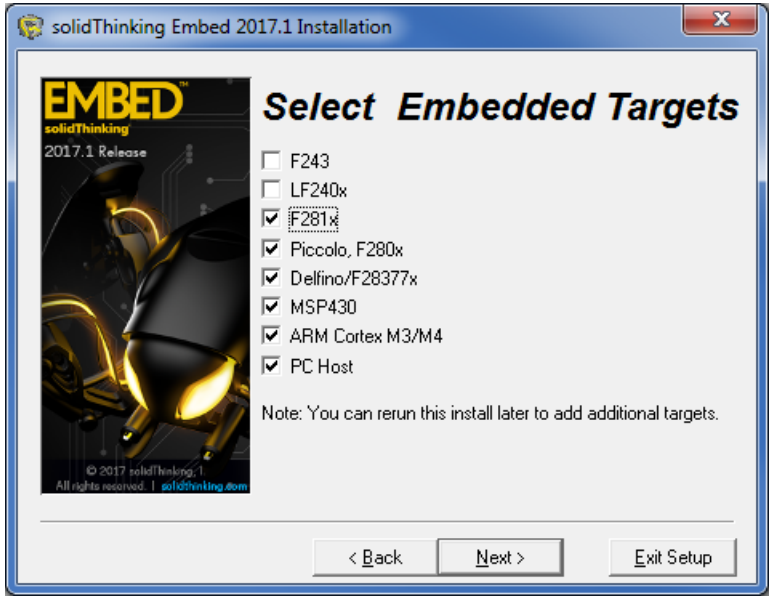
Step 2: solidThinking Embed Installation (3/14):

We have already installed CCS which contains the C compiler for MSP430 and C2000;



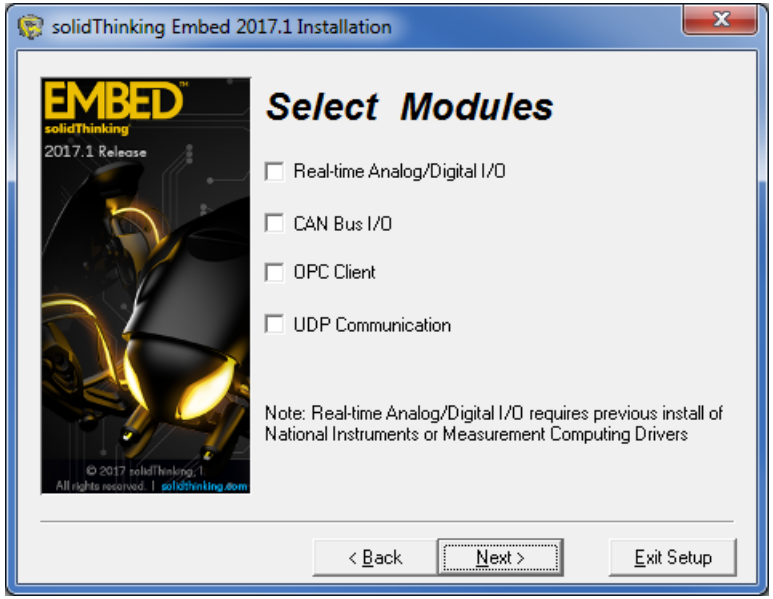
Step 2: solidThinking Embed Installation (4/14):

Select the Embedded Targets you intend to use (check additional selections if needed):



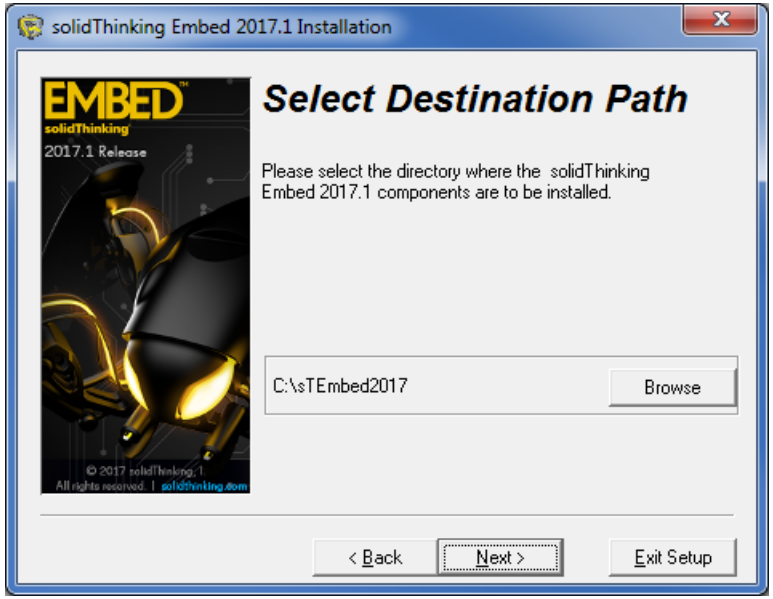
Step 2: solidThinking Embed Installation (5/14):

Select the communication modules you expect to use:



Step 2: solidThinking Embed Installation (6/14):

Select the installation folder location:

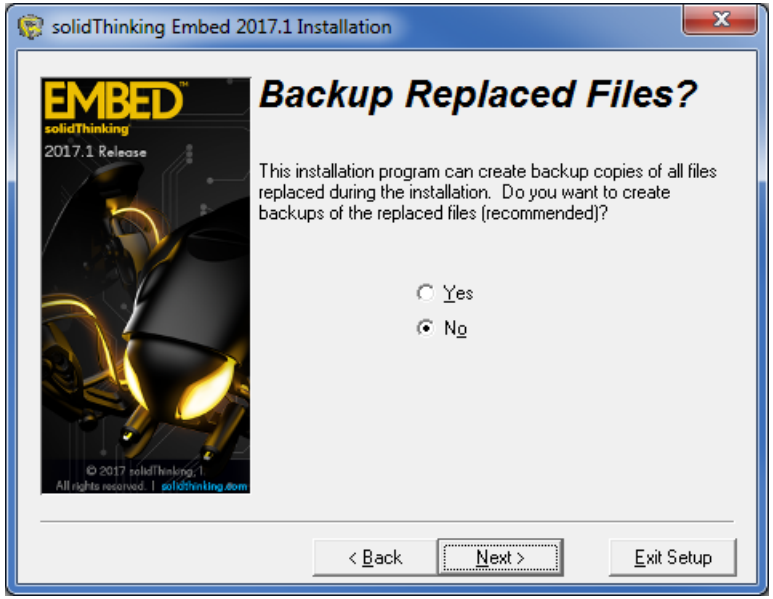


Step 2: solidThinking Embed Installation (7/14):

Accept the license agreement:

Step 2: solidThinking Embed Installation (8/14):

Backup previous installation files is optional:



Step 2: solidThinking Embed Installation (9/14):

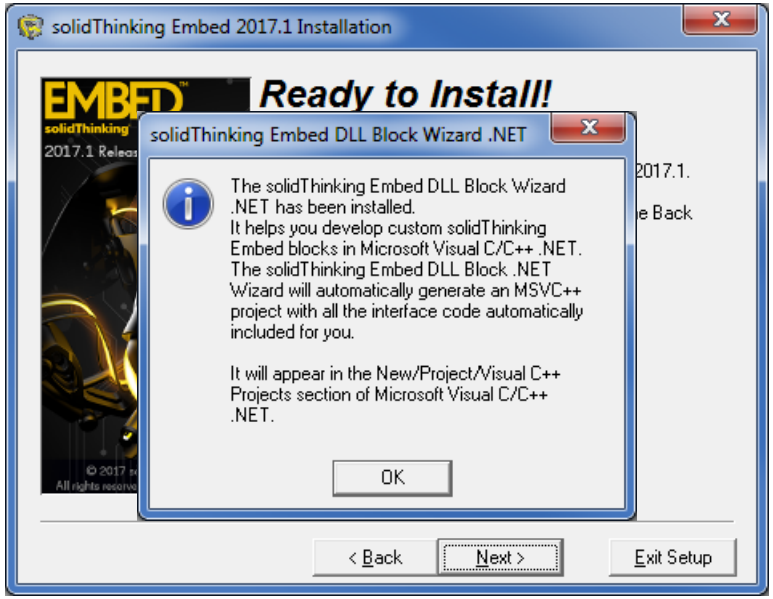
Select Start Menu Name (default is recommended):

Step 2: solidThinking Embed Installation (10/14):

Click “Next” to begin the installation:

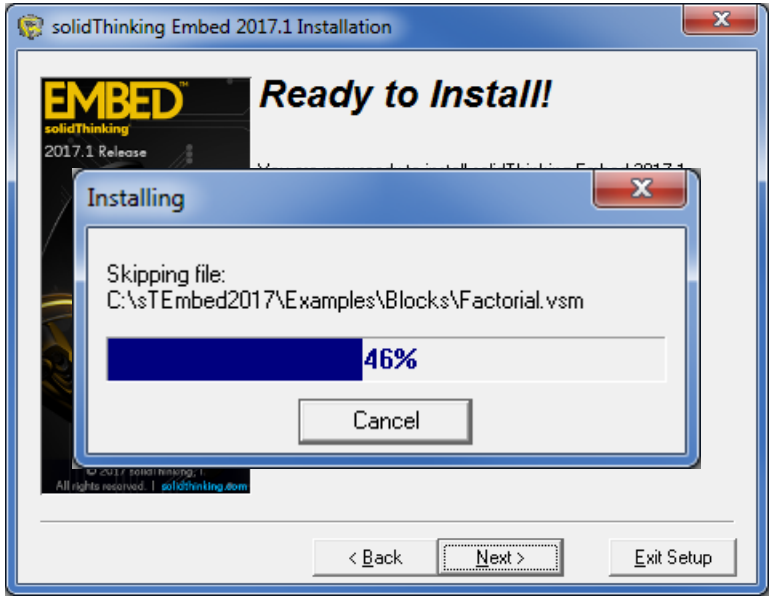
Step 2: solidThinking Embed Installation (11/14):

If Microsoft Visual C++ is installed, the DLL Block Wizard will be installed:



Step 2: solidThinking Embed Installation (12/14):

Installing sTE files;

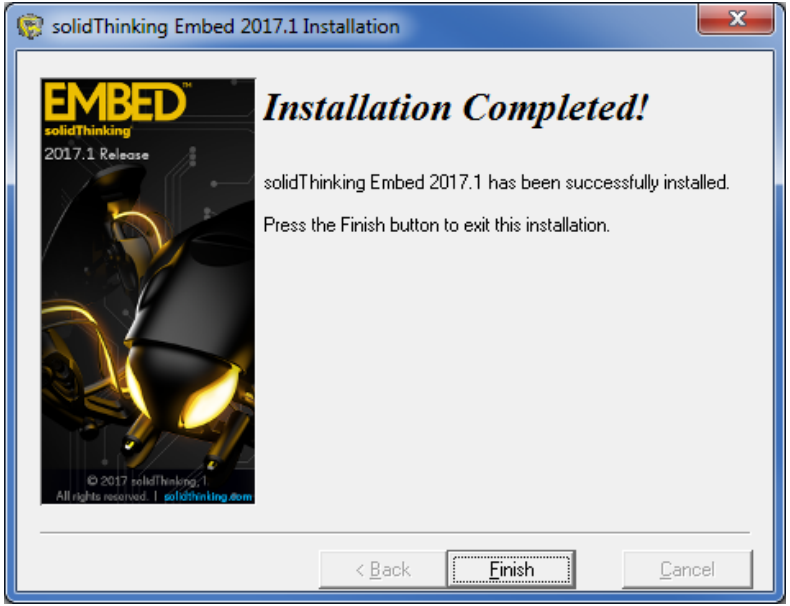


Step 2: solidThinking Embed Installation (13/14):

A desktop icon is recommended:

Step 2: solidThinking Embed Installation (14/14):

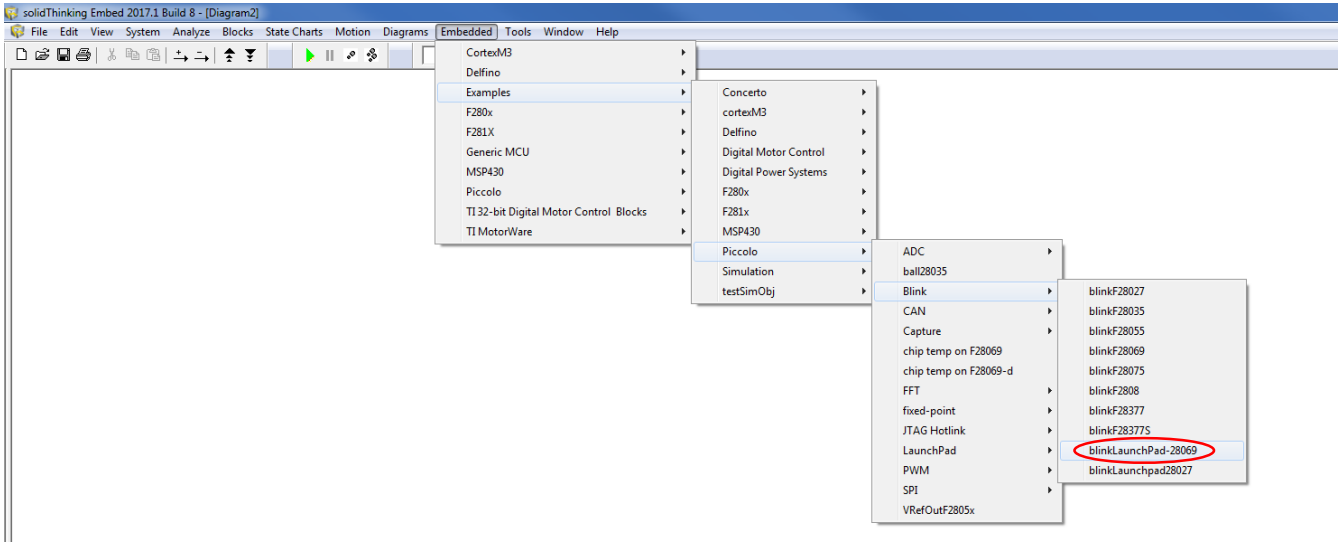
sTE installation is completed successfully!



Test the sTE + CCS Installation (1/4):

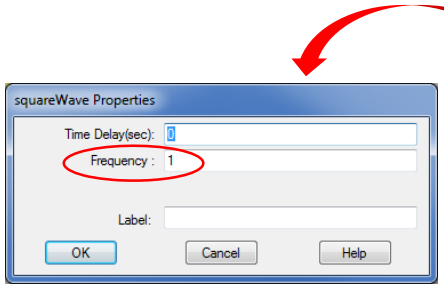
The following procedure may be used to check that CCS operates correctly with solidThinking Embed.

1. Connect the Texas Instruments F28069M Launchpad to your computer using the USB cord (supplied)
2. Launch solidThinking Embed
3. Under “Embedded/Examples/Piccolo/Blink”; Open the file “blinkLaunchPad-28069”



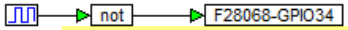
Test the sTE + CCS Installation (2/4):

This model will blink the red LED (GPIO34) at the frequency, (Hz), specified in the “squareWave” block;



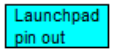
Blink LED

This diagram sends a 1 hz square wave to the LED(s) on the controlCARD/STICK.
(You can change the frequency by right clicking on the square wave)
Be certain the ControlCARD/STICK is plugged in to your computer



right click to set channel, choose whether it is analog or digital, or seek help. GPIO is configured for F28069/F28035/28027 controlCARD/controlSTICK

Right-click above block to select JTAG (use TI XDS100 for TI controlCARD) change target or seek help



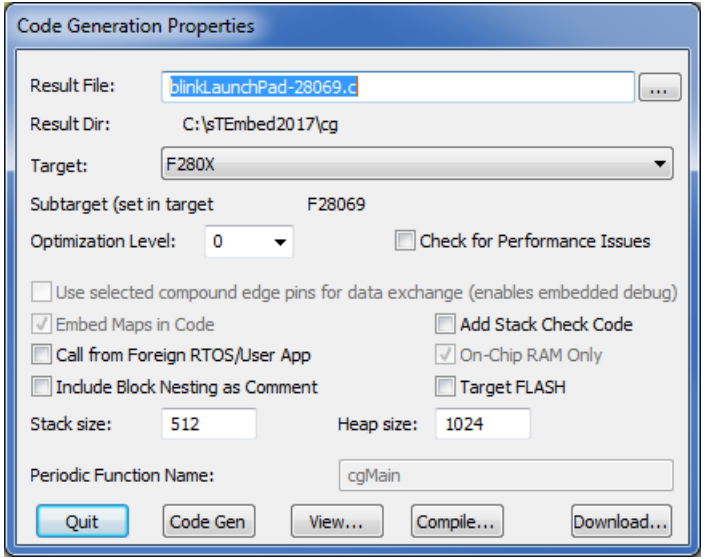
COMPILING
To generate the C Code to for the controlCARD you need to compile and download to RAM.
1) Select Tools|Codegen...
2) Click "Compile"
3) Click "Download"
4) Click "Download" again

INTERACTIVE MODE
If you click the green triangle "Go" button in the tool bar above Embed runs the diagram instead of compiling. If certain IO blocks GPIO, ADC, PWM, quadrature encoder) are present in the diagram, Embed downloads a precompiled .out file to the target that interactively communicates with the PC. While this lets you communicate with on-chip peripherals, all blocks are running on the PC.

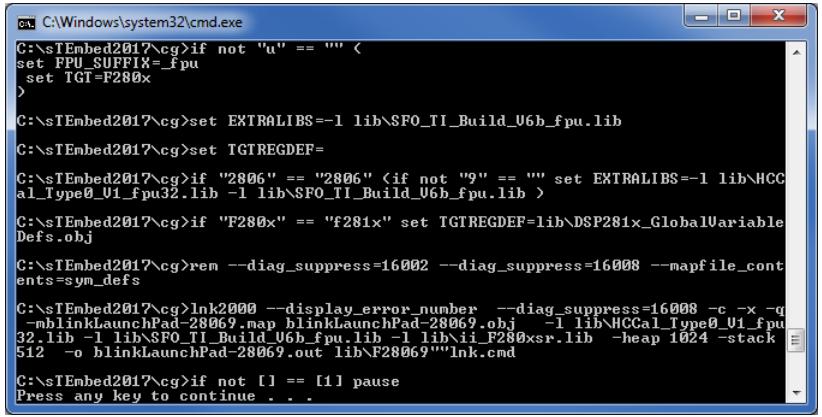
Test the sTE + CCS Installation (3/4):

4. Under “Tools”; select “Code Gen…”. The “Code Generation Properties” window will display the following default settings;

Name of the C code file
Location of the C code file

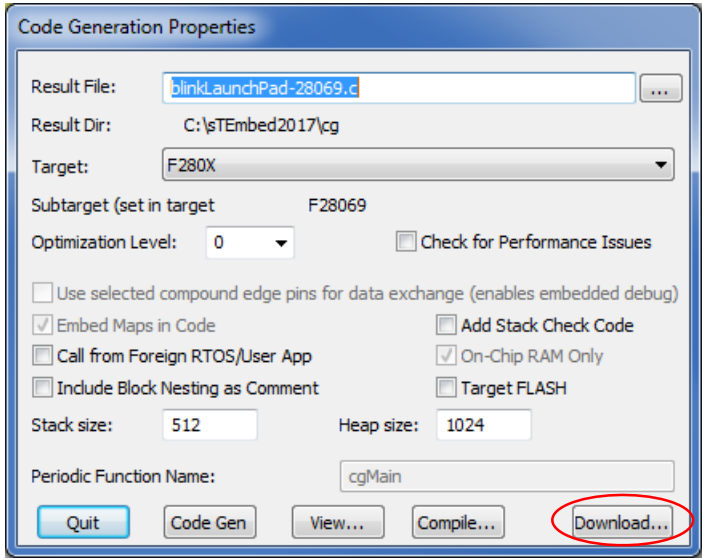


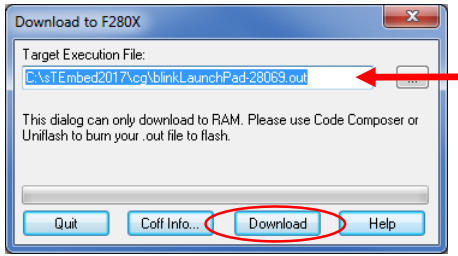
5. Select the “Compile…” option, the following DOS window will appear;



Test the sTE + CCS Installation (4/4):

6. The C code has been compiled. Click “Download” on the “Code Generation Properties” window, the click “Download” on the “Download to F280X” window to load the “.out” file into RAM and commence microcontroller execution.





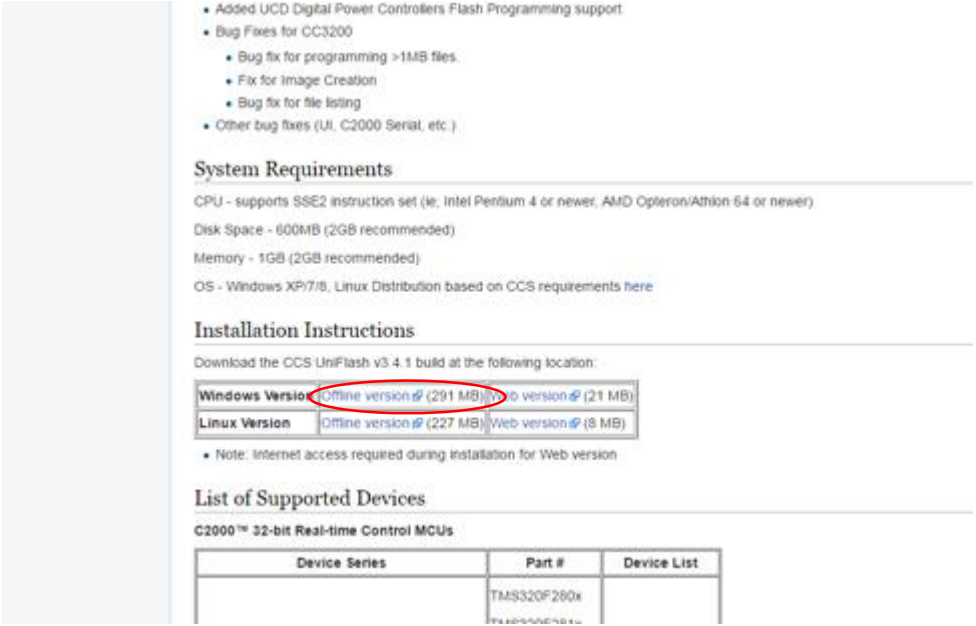
Name of the executable (.out) file

Step 3: UniFlash Installation (1/14):

3a. Navigate to the following link:
http://processors.wiki.ti.com/index.php/CCS_UniFlash_v3.4.1_Release_Notes

3b. Under “Installation Instructions”, select CCS UniFlash v3.4.1 for Windows "Off-line version“ (Note: You will be temporarily directed to the Texas Instruments website to complete a free registration before the download begins).

NOTE: solidThinking Embed has been tested with UniFlash versions 3.x, you are requested to only use these versions for FLASH downloads.



- Added UCD Digital Power Controllers Flash Programming support
- Bug Fixes for CC3200
  - Bug fix for programming >1MB files.
  - Fix for Image Creation
  - Bug fix for file listing
- Other bug fixes (UI, C2000 Serial, etc.)

System Requirements

CPU - supports SSE2 instruction set (ie: Intel Pentium 4 or newer, AMD Opteron/Athlon 64 or newer)

Disk Space - 600MB (2GB recommended)

Memory - 1GB (2GB recommended)

OS - Windows XP/7/8, Linux Distribution based on CCS requirements here

Installation Instructions

Download the CCS UniFlash v3.4.1 build at the following location:

Windows Version	Offline version (291 MB)	Web version (21 MB)
Linux Version	Offline version (227 MB)	Web version (8 MB)

- Note: Internet access required during installation for Web version

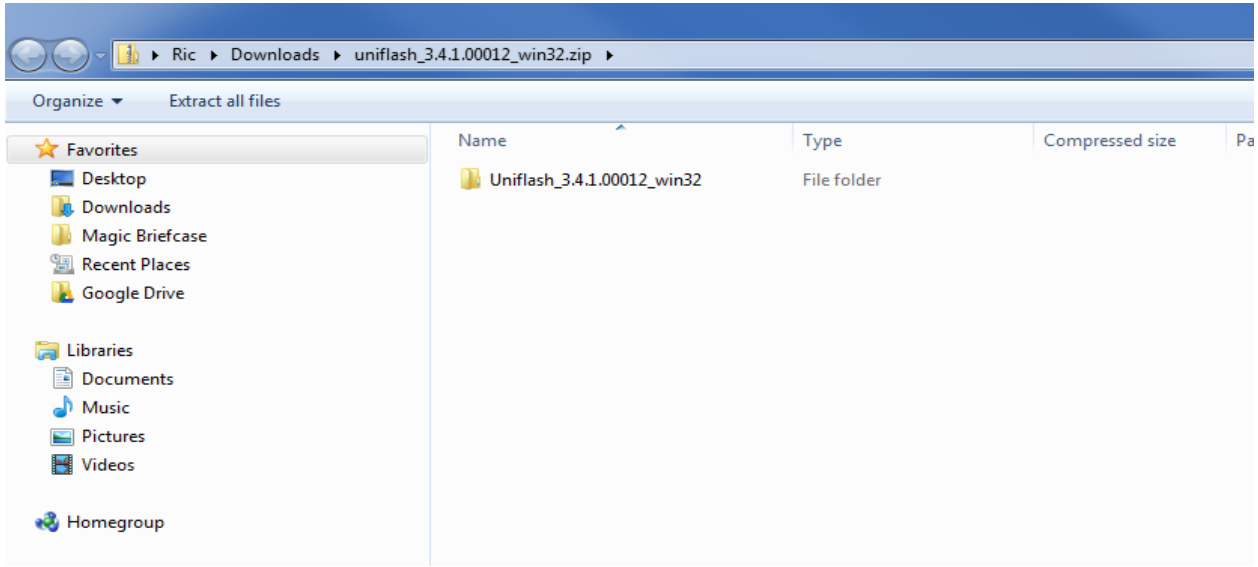
List of Supported Devices

C2000™ 32-bit Real-time Control MCUs

Device Series	Part #	Device List
	TMS320F280x	

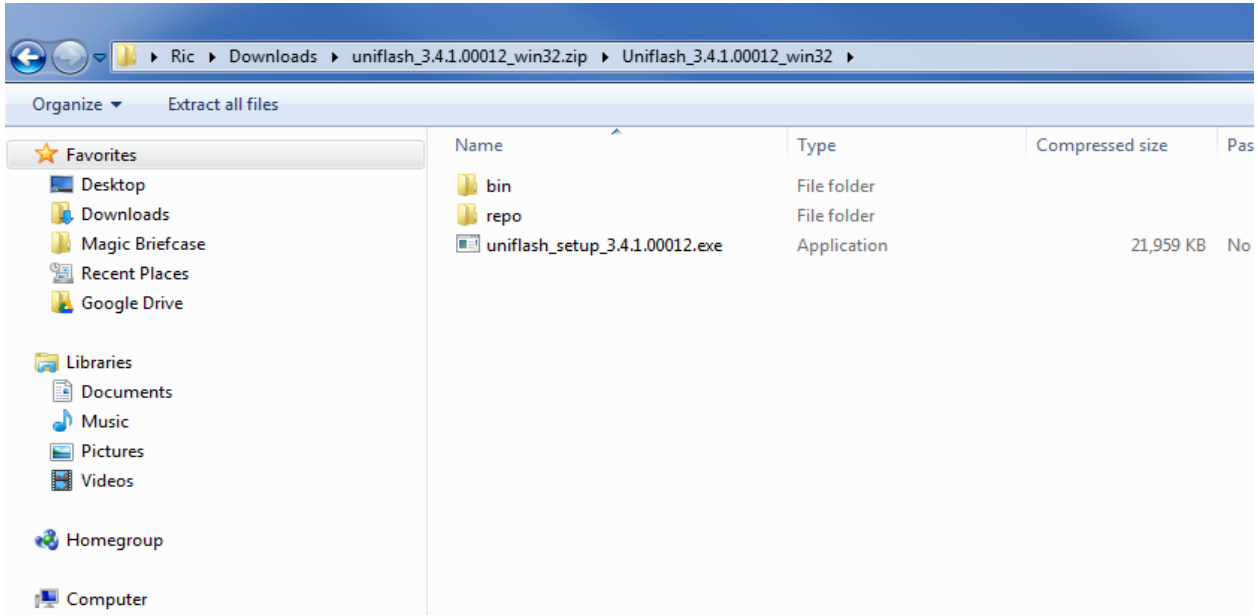
Step 3: UniFlash Installation (2/14):

After the download completes navigate into the “Uniflash_3.4.1.00012_win32” folder;



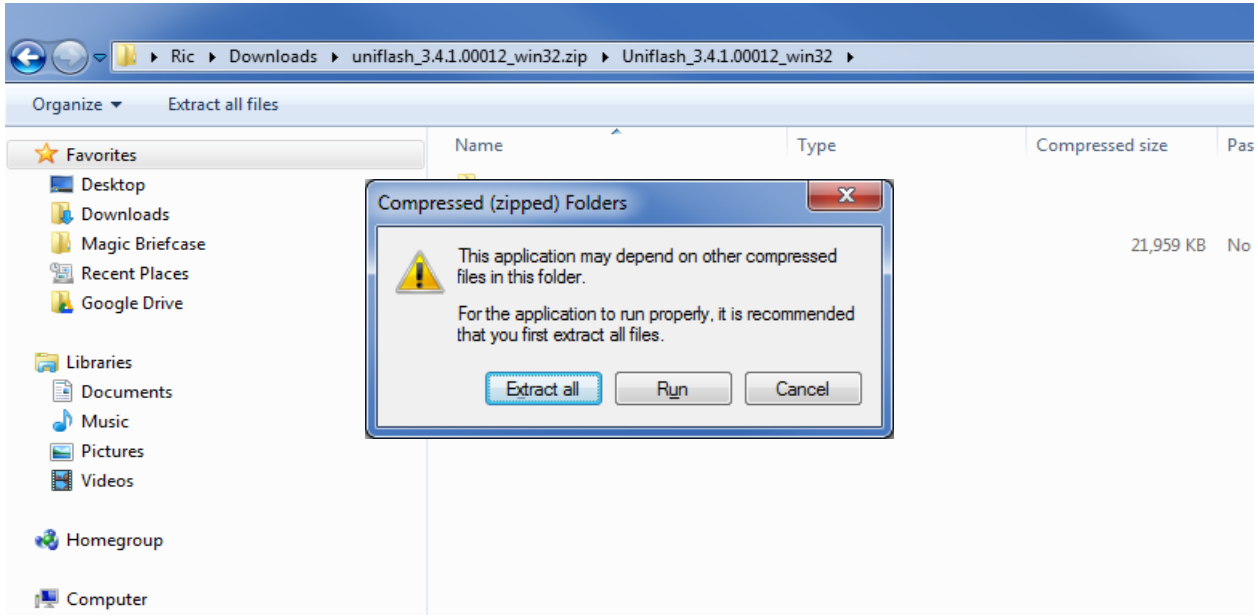
Step 3: UniFlash Installation (3/14):

Execute “uniflash_setup_3.4.1.00012.exe” to extract all installation files.



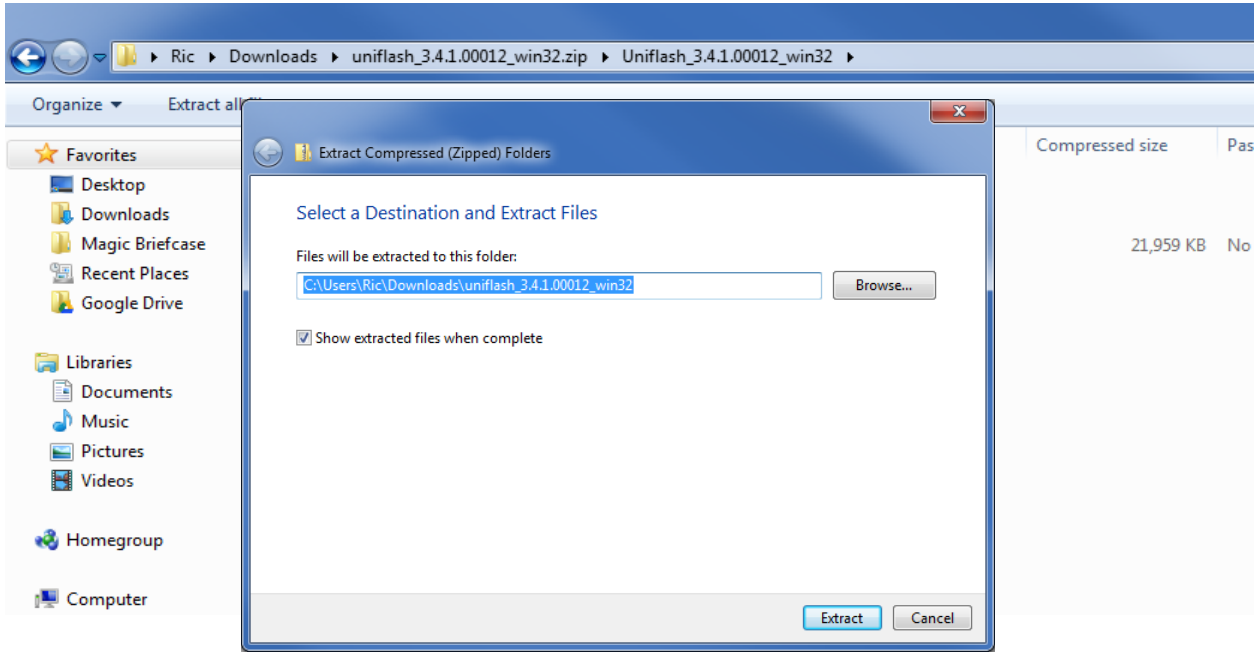
Step 3: UniFlash Installation (4/14):

Select “Extract all”



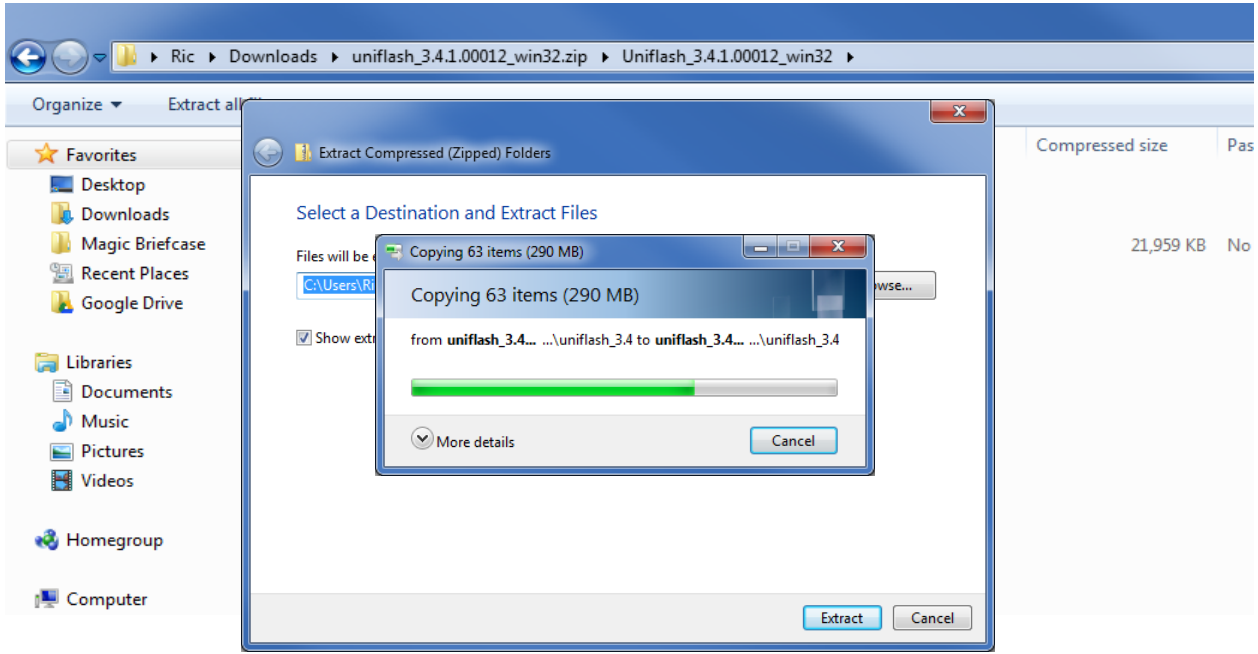
Step 3: UniFlash Installation (5/14):

Extraction folder (default is recommended):



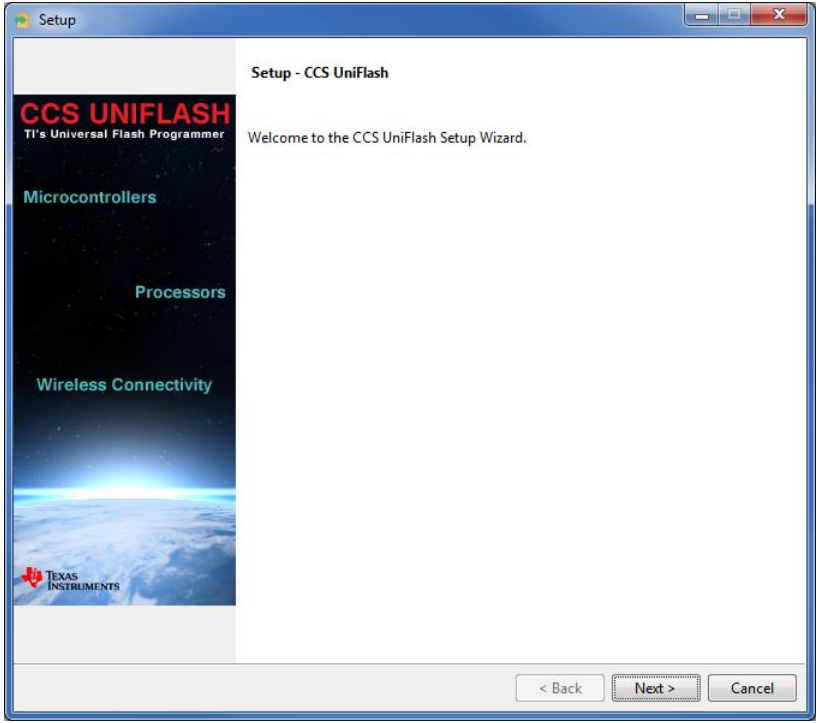
Step 3: UniFlash Installation (6/14):

Extract



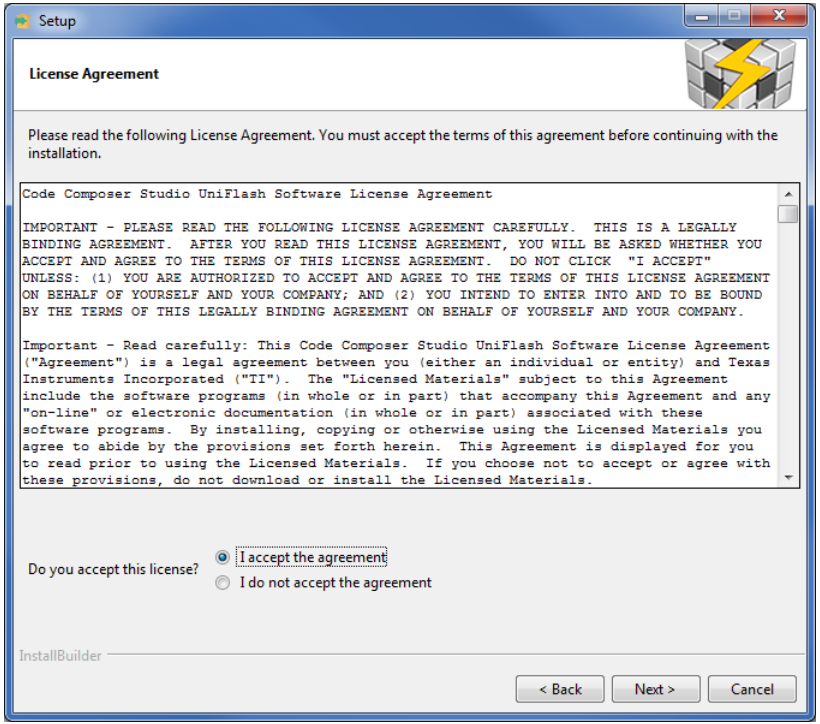
Step 3: UniFlash Installation (7/14):

Navigate back and execute "uniflash_setup_3.4.1.00012.exe"



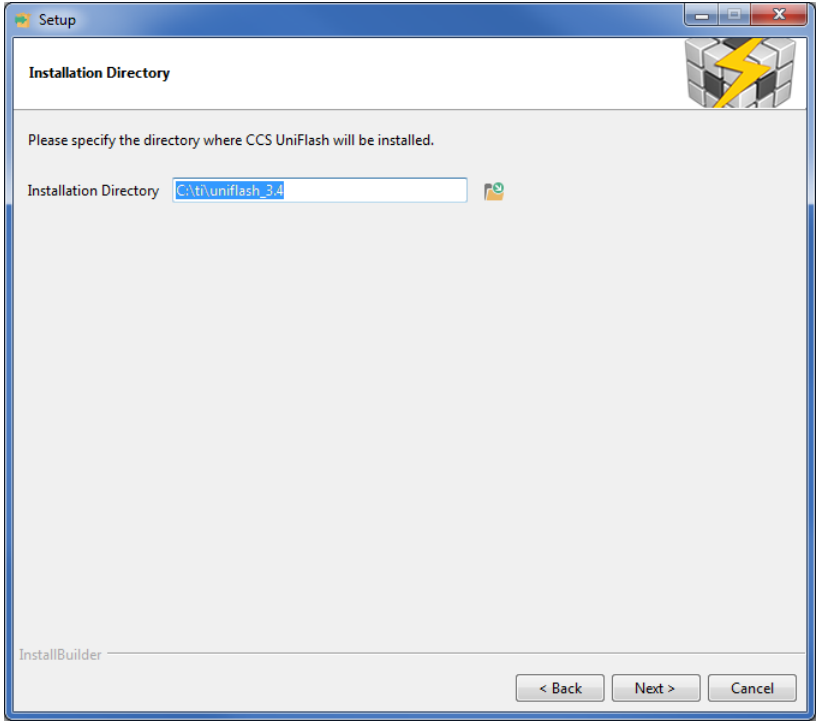
Step 3: UniFlash Installation (8/14):

Agree to the license:



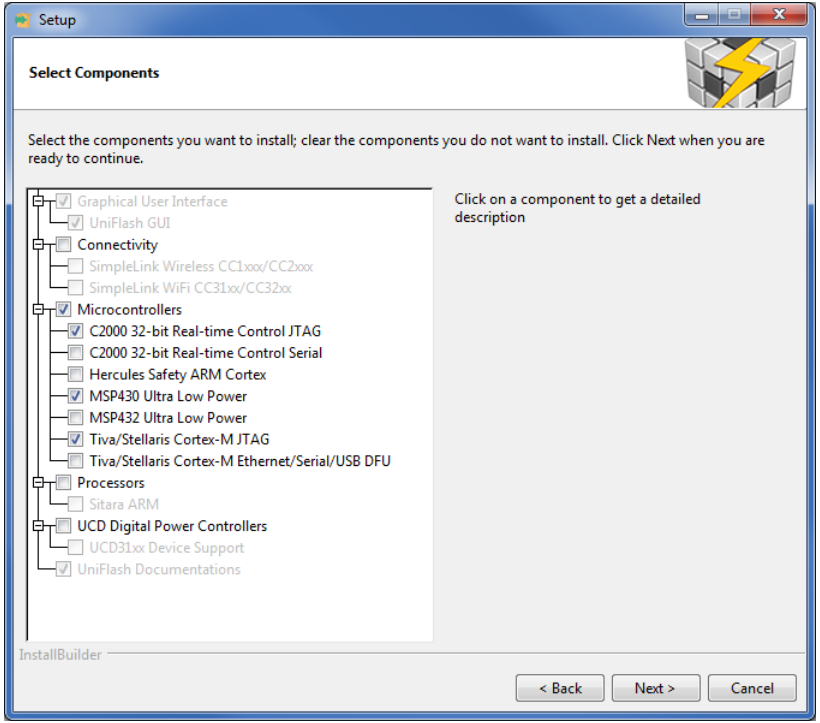
Step 3: UniFlash Installation (9/14):

Select the installation folder (default is recommended):



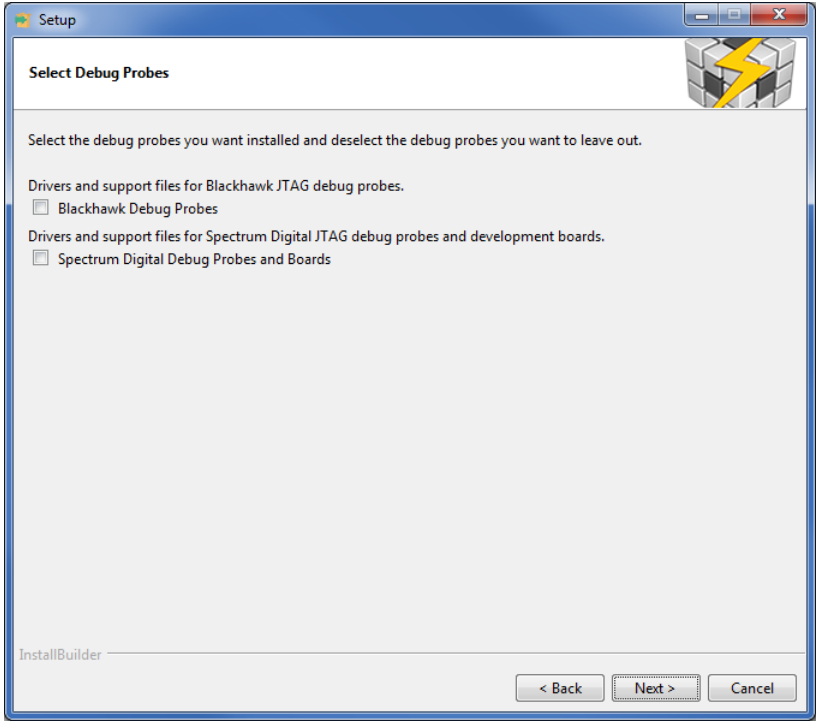
Step 3: UniFlash Installation (10/14):

Select the Product Families (sTE supports the three product families checked):



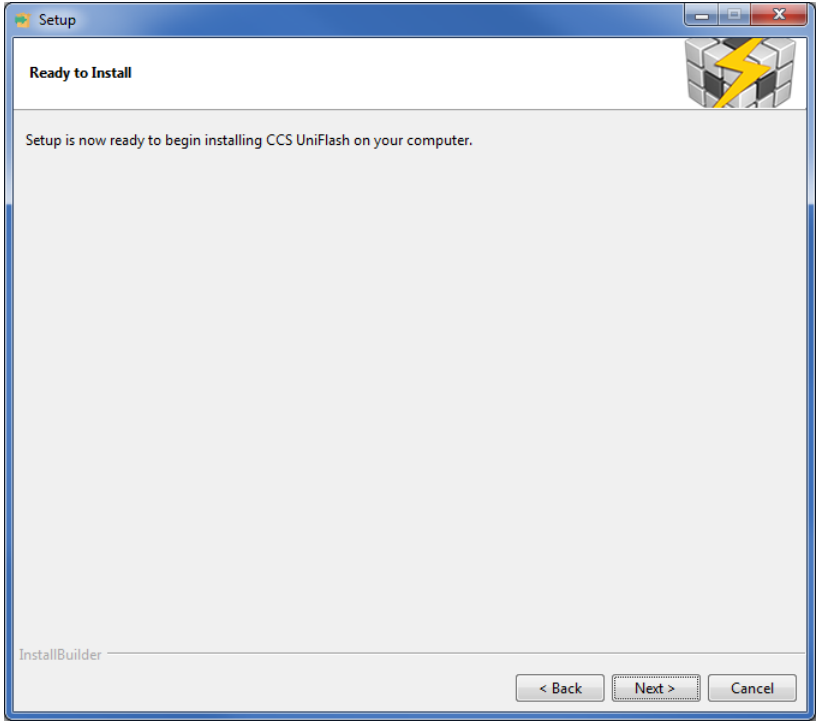
Step 3: UniFlash Installation (11/14):

Optional: if you are using debug probes



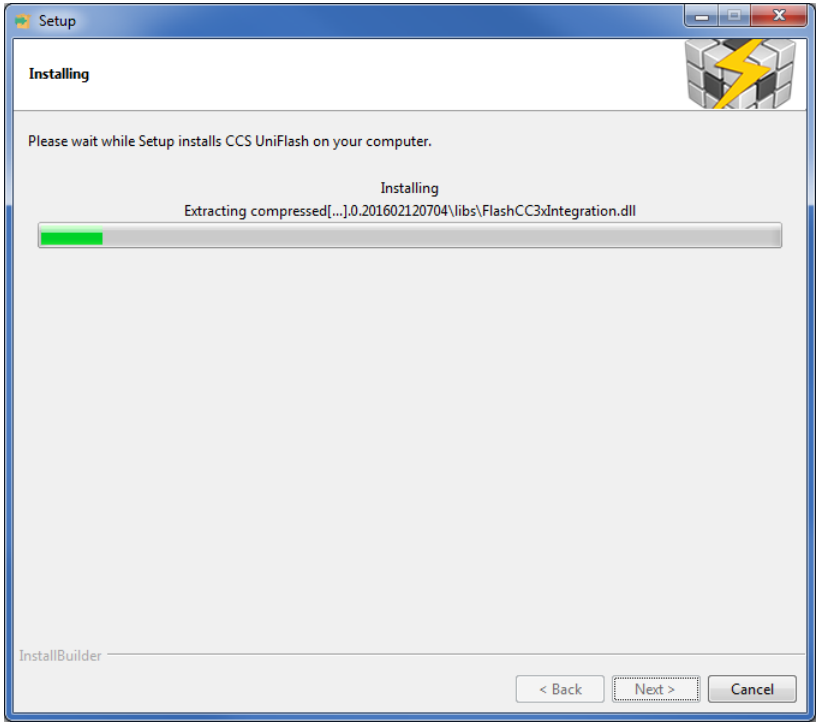
Step 3: UniFlash Installation (12/14):

Ready to Install



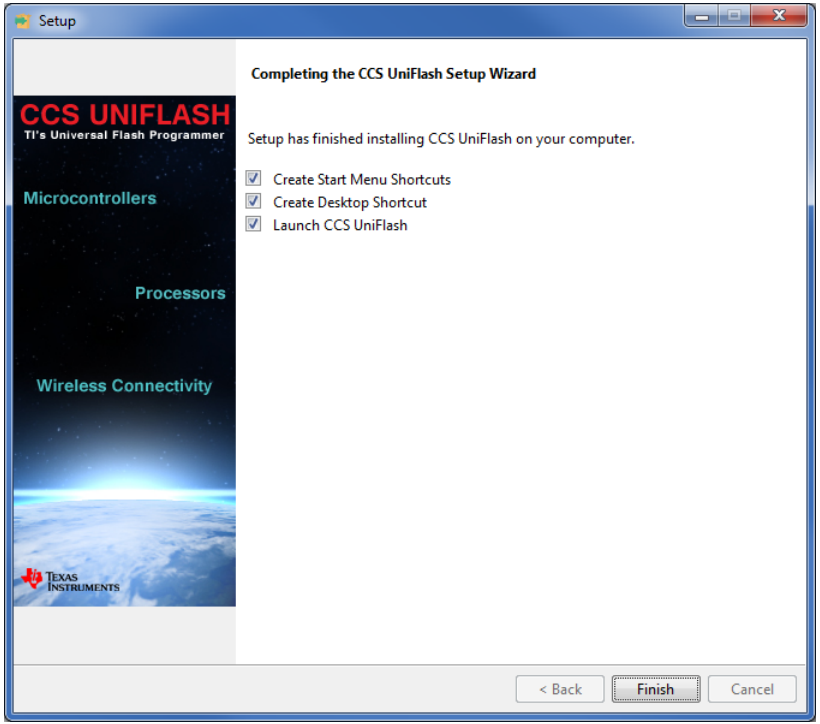
Step 3: UniFlash Installation (13/14):

Installing Files



Step 3: UniFlash Installation (14/14):

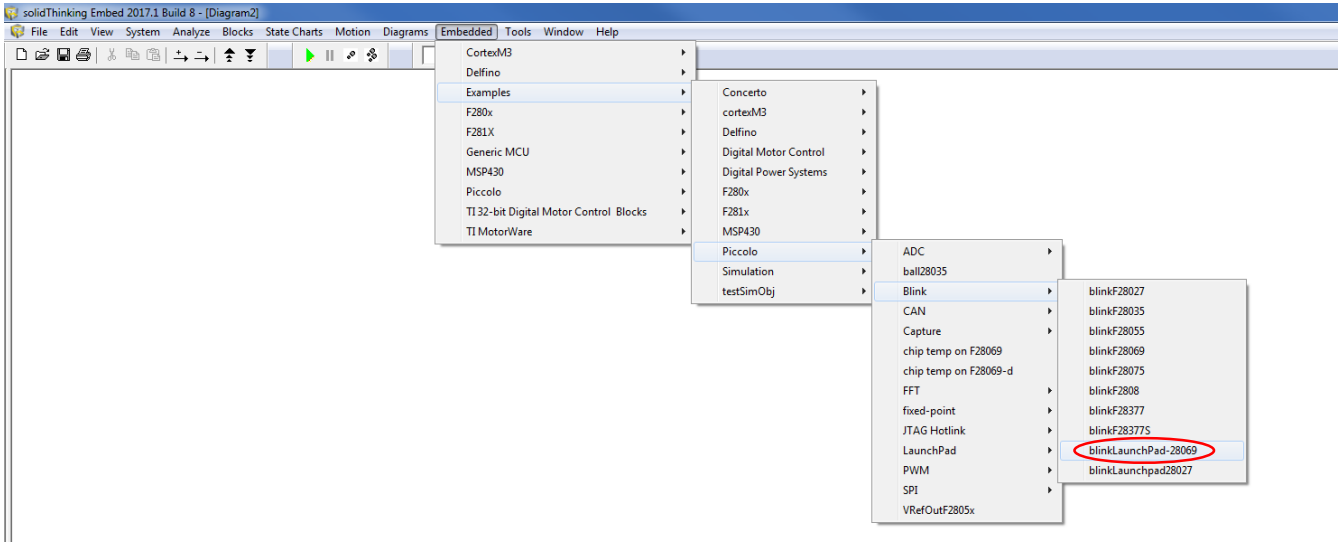
UniFlash installation is completed successfully!



Test the UniFlash Installation with sTE and CCS (1/10):

The following procedure may be used to check that UniFlash operates correctly with solidThinking Embed and Code Composer Studio

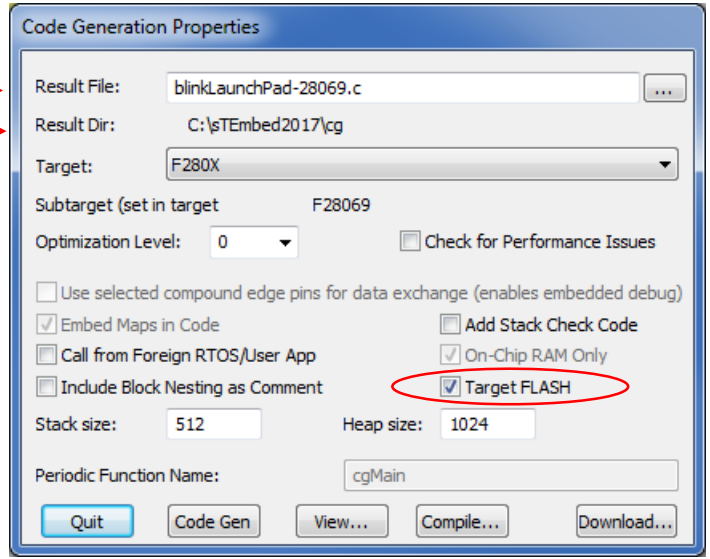
1. Connect the Texas Instruments F28069M Launchpad to your computer using the USB cord (supplied)
2. Launch solidThinking Embed
3. Under “Embedded/Examples/Piccolo/Blink”; Open the file “blinkLaunchPad-F28069”



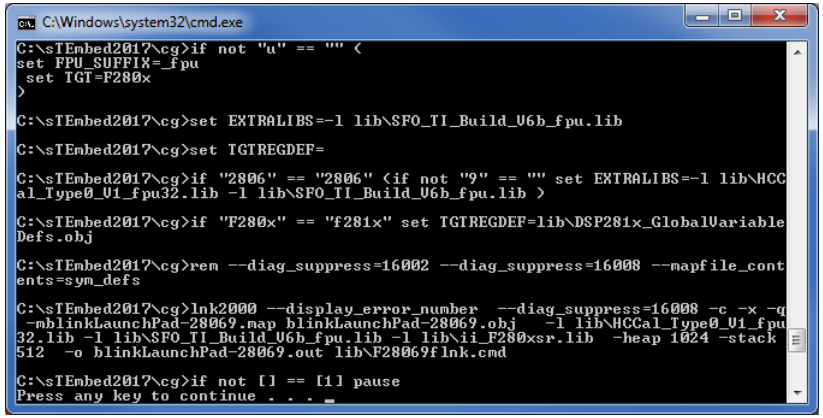
Test the UniFlash Installation with sTE and CCS (2/10):

4. Under “Tools”; select “Code Gen…”. The “Code Generation Properties” window will display the following default settings;

Name of the C code file
Location of the C code file



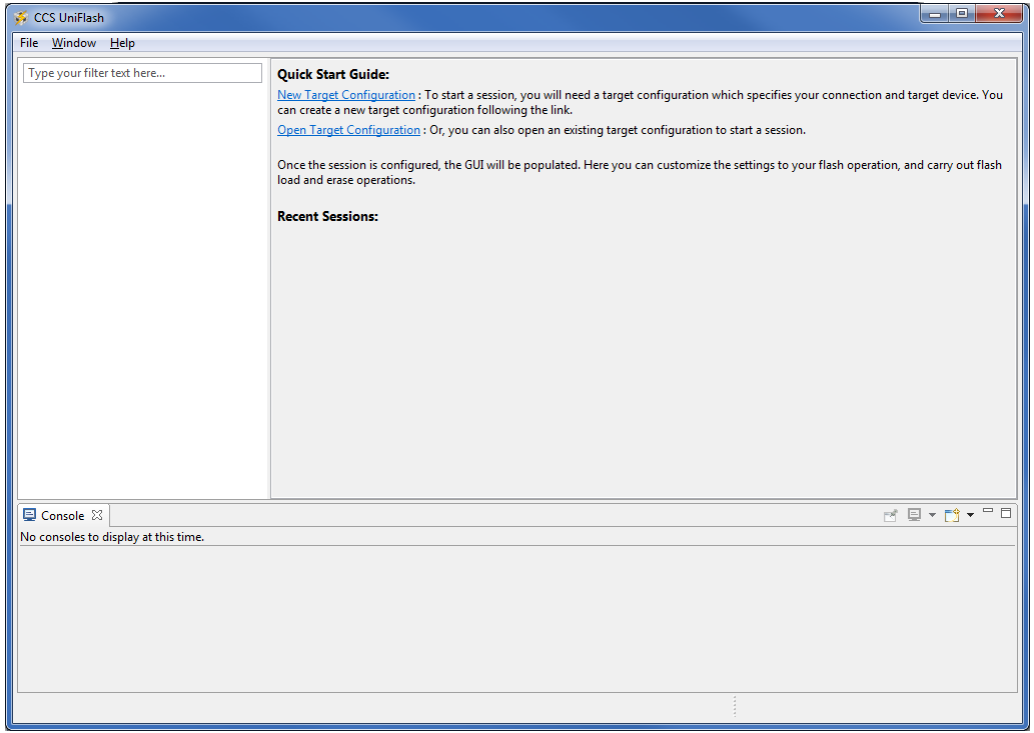
5. Select the “Compile…” option, the following DOS window will appear;



Test the UniFlash Installation with sTE and CCS (3/10):

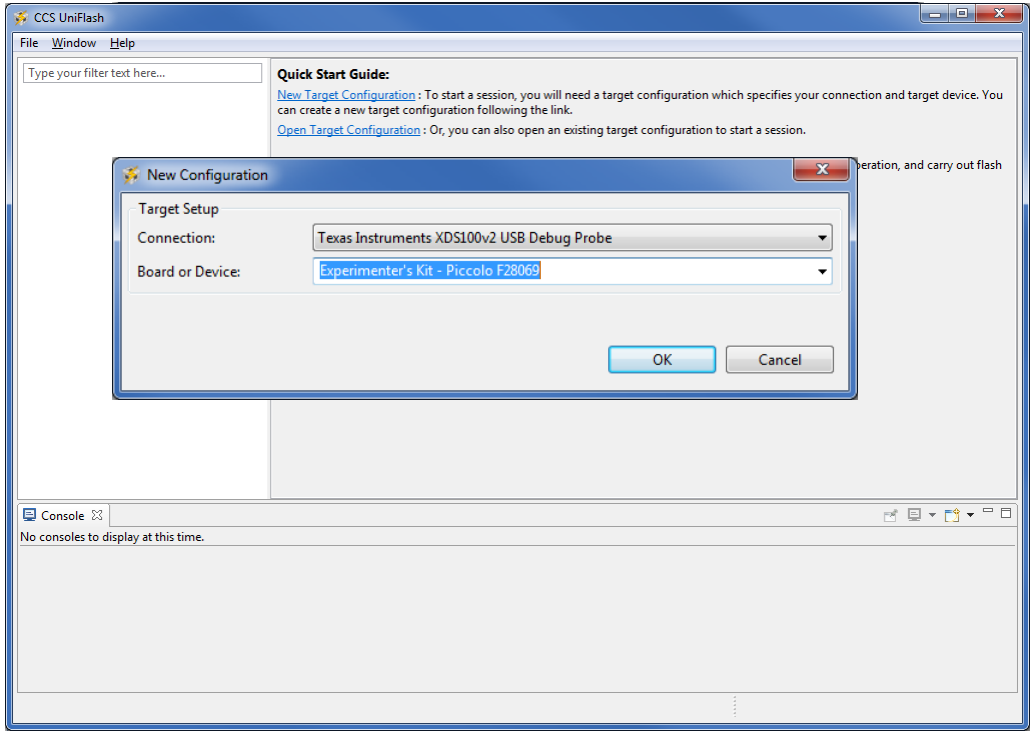
Now we will launch UniFlash and setup a “New Target Configuration” for the F28069 LaunchPad;

NOTE: Please attach the F28069M LaunchPad to your PC via the supplied USB before running this step.



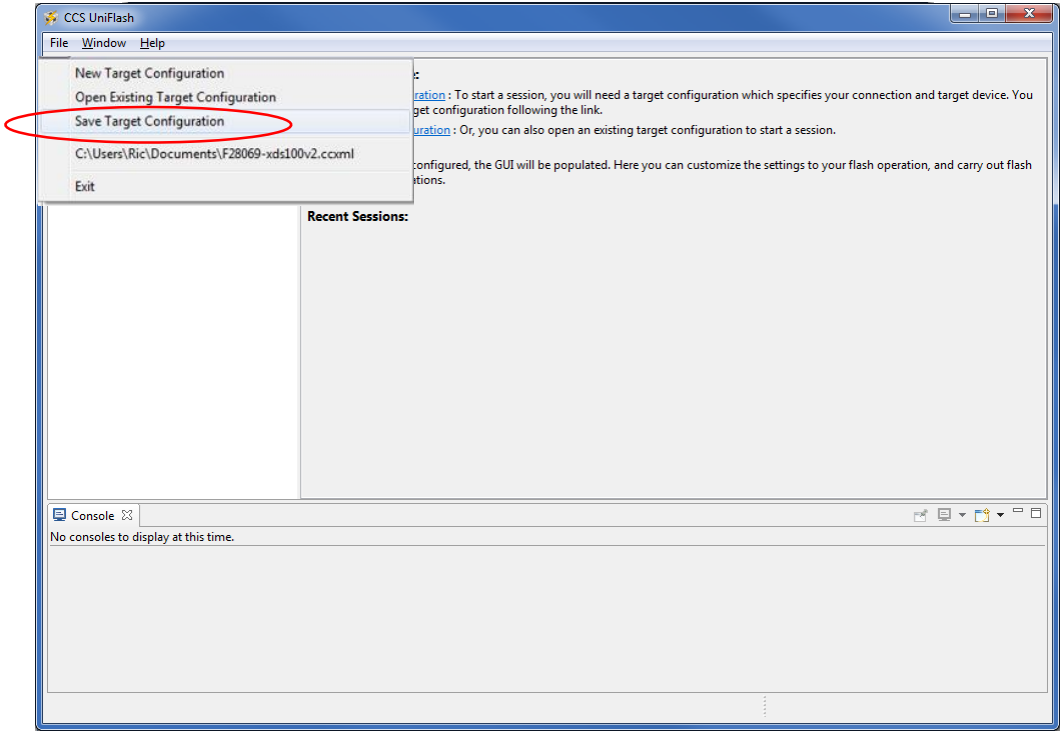
Test the UniFlash Installation with sTE and CCS (4/10):

By default, sTE uses the “Texas Instruments XDS100v2 USB Debug Probe” and the Board is the F28069;



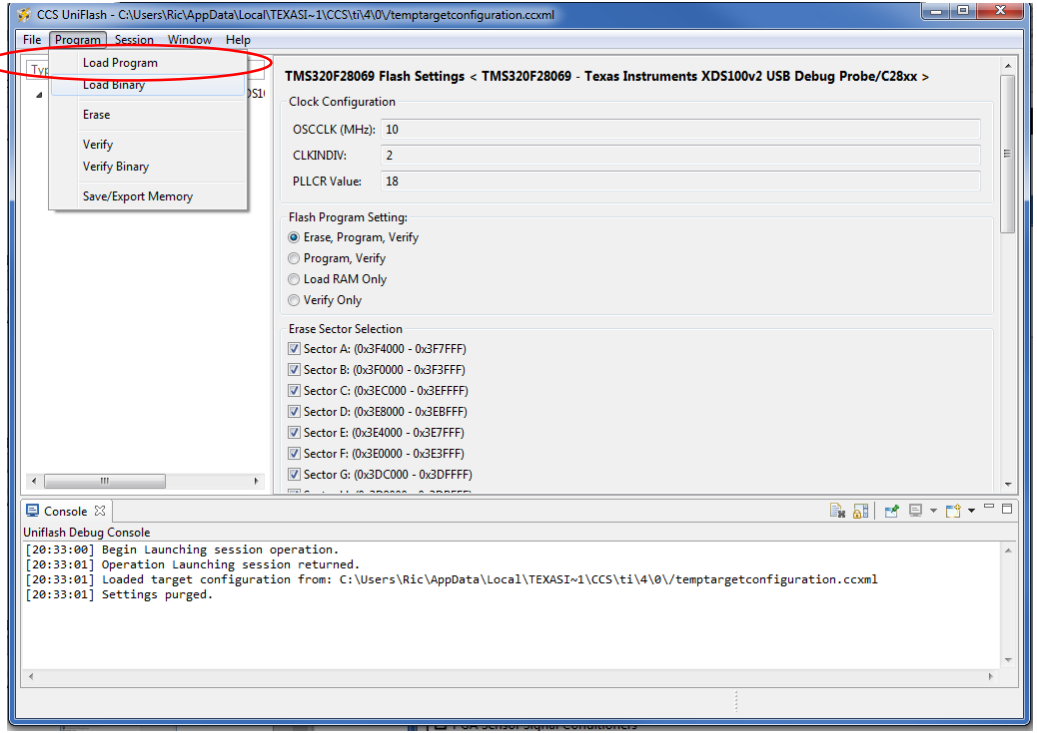
Test the UniFlash Installation with sTE and CCS (5/10):

Save your configuration for future use;



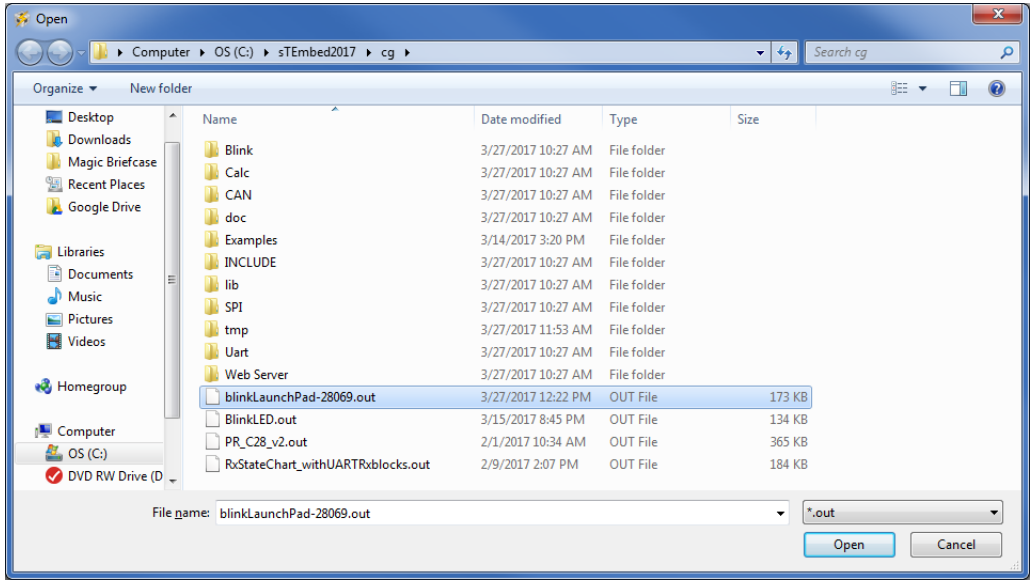
Test the UniFlash Installation with sTE and CCS (6/10):

Load the sTE generated ".out" file to the target using "Program/Load Program"



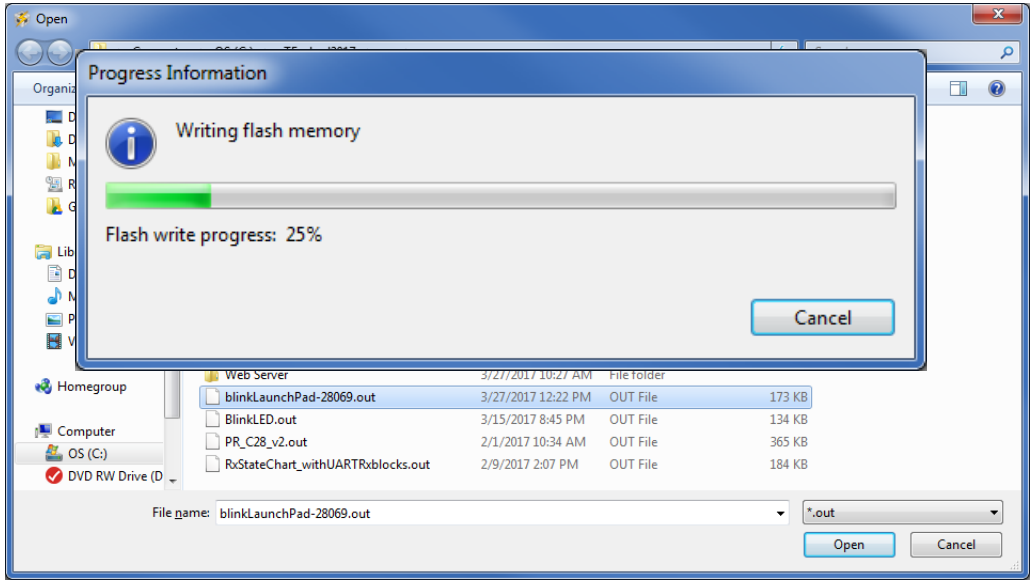
Test the UniFlash Installation with sTE and CCS (7/10):

sTE creates the “.out” file in the “sTEmbed2017/cg” folder;



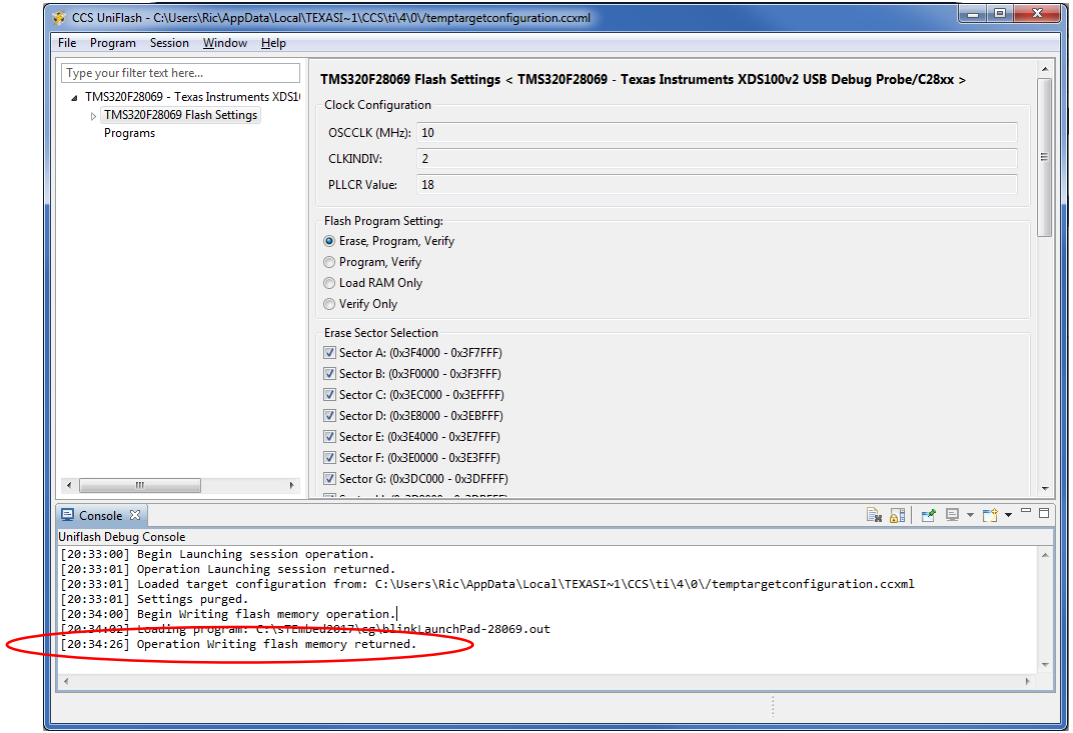
Test the UniFlash Installation with sTE and CCS (8/10):

Open the file to write it to flash;



Test the UniFlash Installation with sTE and CCS (9/10):

Flash load was successful;



Test the UniFlash Installation with sTE and CCS (10/10):

Powercycle the target by disconnecting and reconnecting the JTAG connection.

Observe the LED behavior.

Thank You:

For more information and training videos like this, please visit;

www.solidthinking.com/embed

Thank You

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