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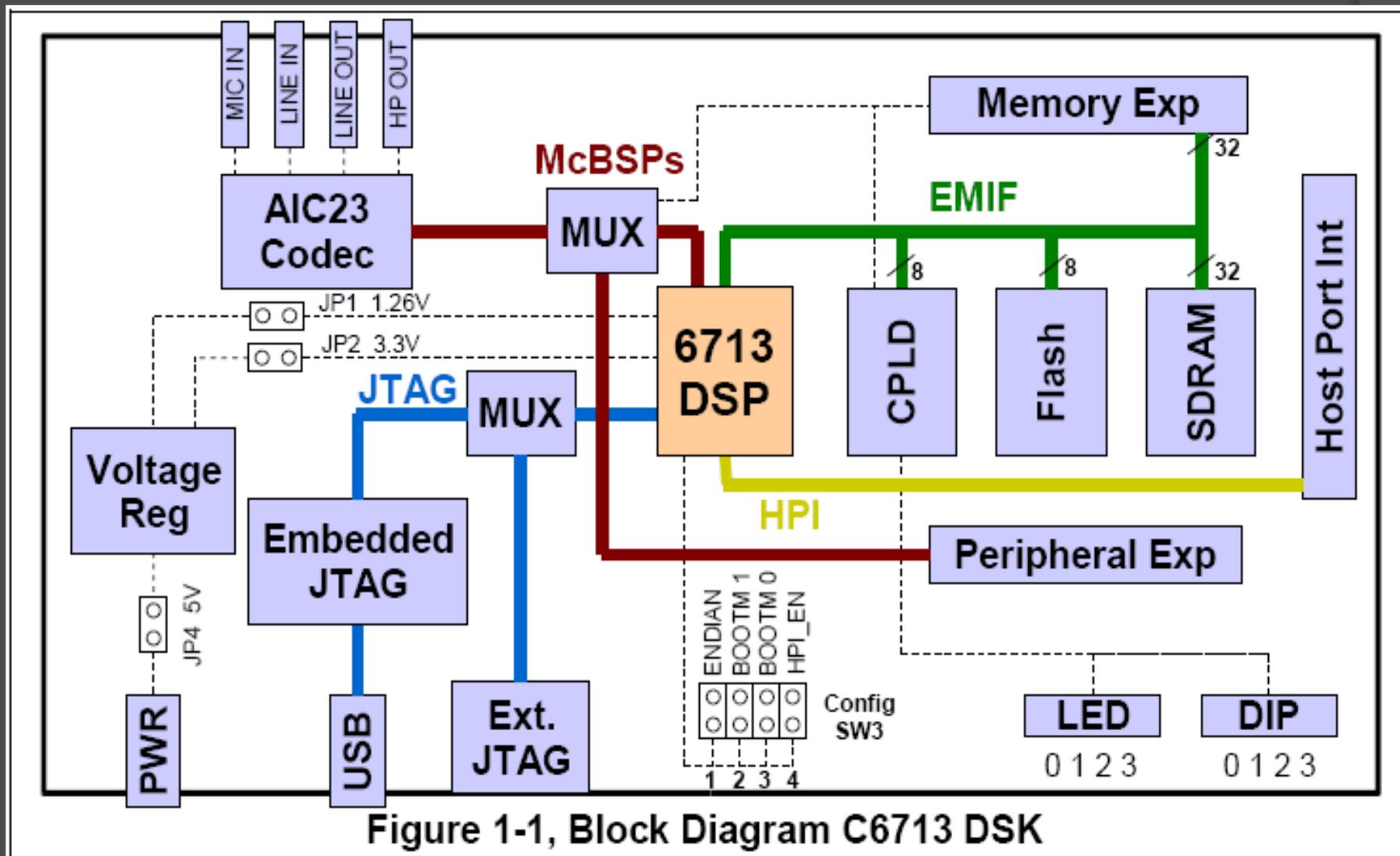
ECE4703 REAL-TIME DSP LABORATORY ORIENTATION



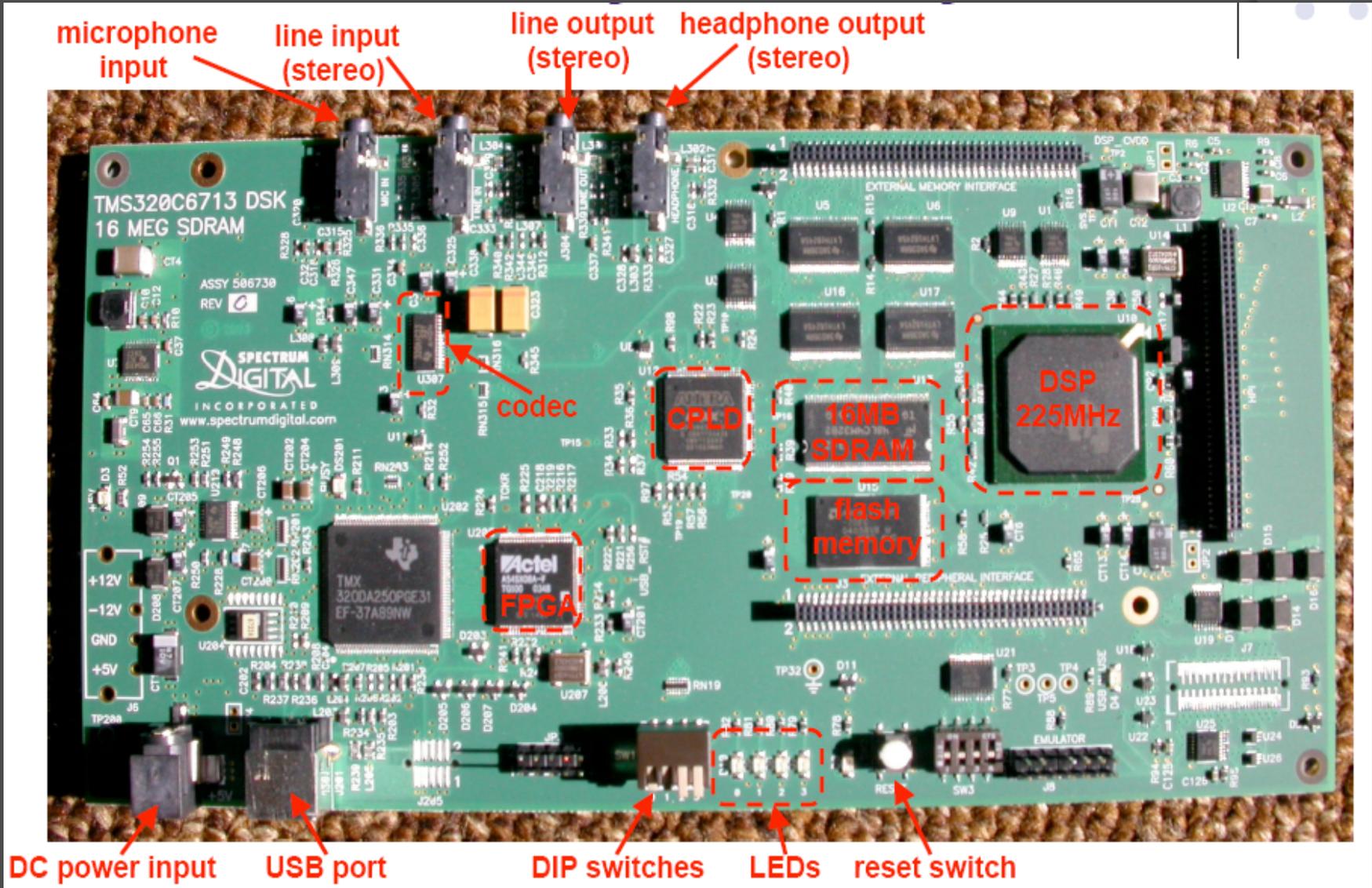
C6713 DSK Overview

- ⦿ Texas Instruments TMS320C6713 *floating point* DSP running at 225 MHz
- ⦿ AIC23 stereo codec (ADC and DAC)
 - Ideal for audio applications
 - 8-96 kHz sample rates
 - Line in/out (we use these most of the time)
 - Microphone in
 - Headphone out
- ⦿ Memory
 - 16 MB dynamic RAM
 - 512 kB nonvolatile FLASH memory
- ⦿ General purpose I/O
 - 4 LEDs
 - 4 DIP switches
- ⦿ USB interface to PC

C6713 DSK Functional Block Diagram



C6713 DSK Physical Layout



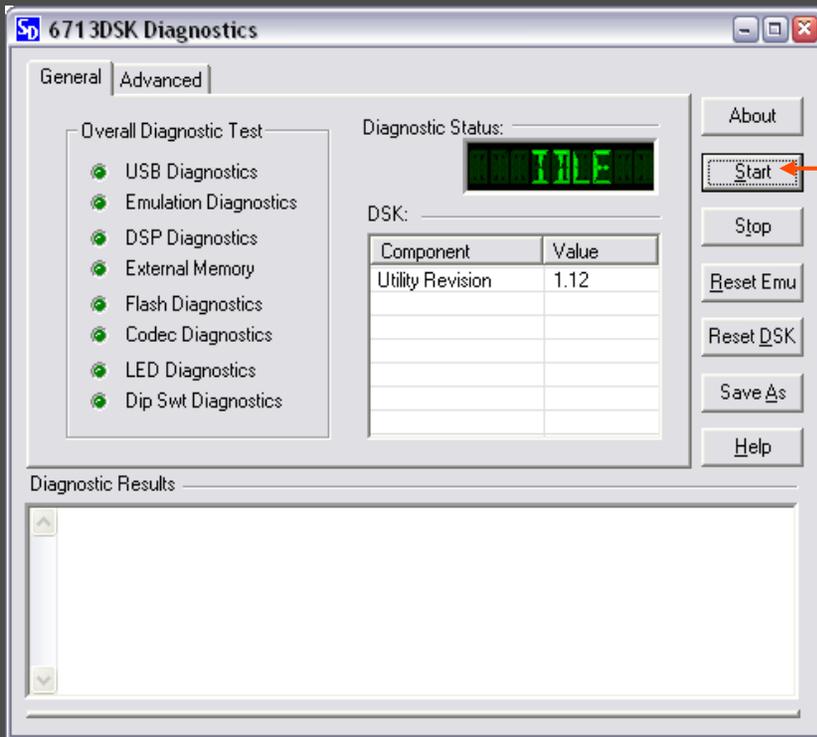
Is my DSK working?

DSK Power On Self Test

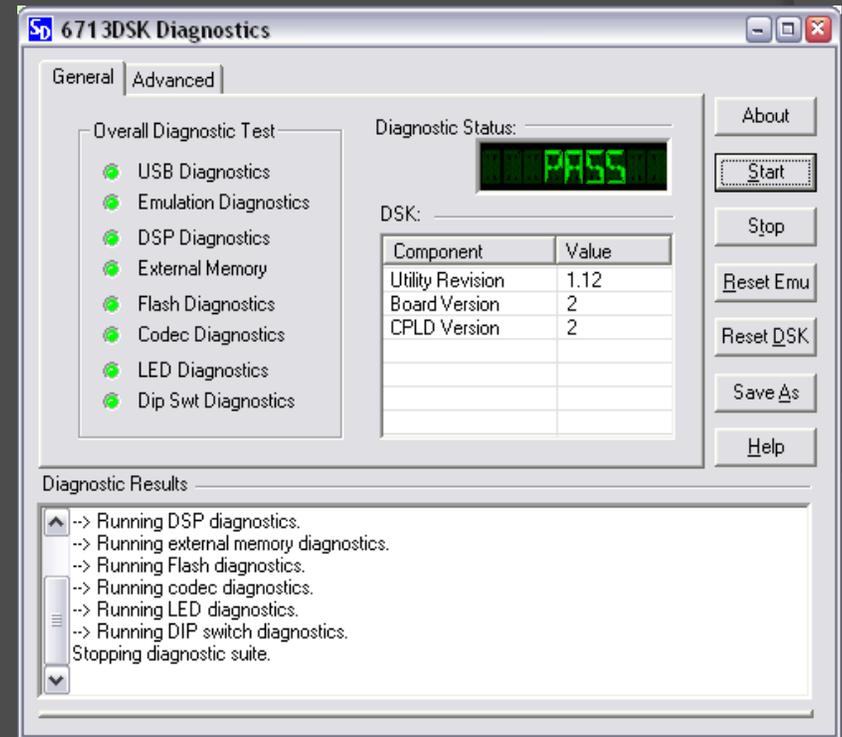
- Power up DSK and watch LEDs
- Power On Self Test (POST) program stored in FLASH memory automatically executes
- POST takes 10-15 seconds to complete
- All DSK subsystems are automatically tested
- During POST, a 1kHz sinusoid is output from the AIC23 codec for 1 second
 - Listen with headphones or watch on oscilloscope
- If POST is successful, all four LEDs blink 3 times and then remain on

Is my DSK working?

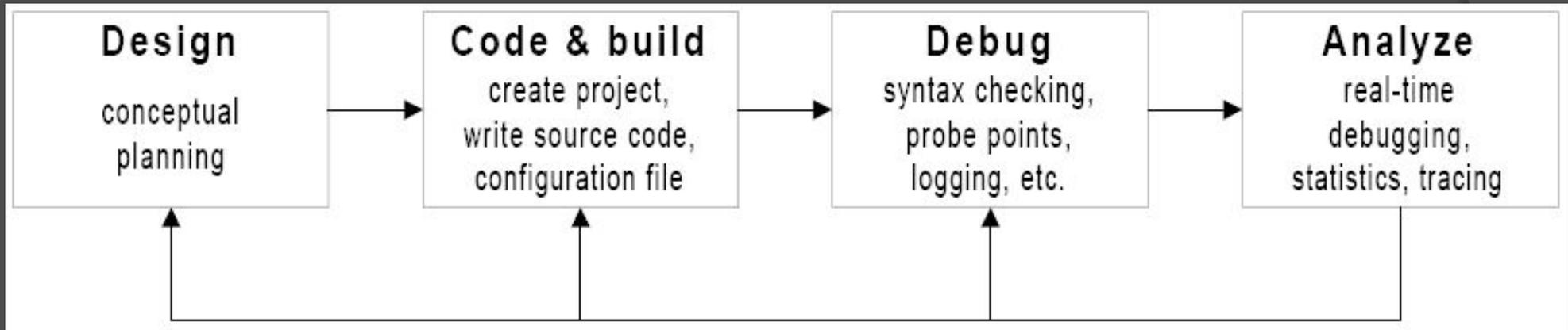
DSK Diagnostic Utility



press start



Code Composer Studio IDE



Useful TI documentation (available online or on your hard drive):

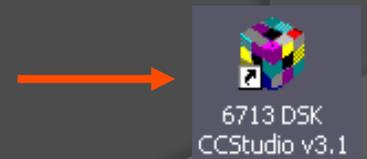
[SPRU509F.PDF](#) CCS v3.1 IDE Getting Started Guide

[C6713DSK.HLP](#) C6713 DSK specific help material

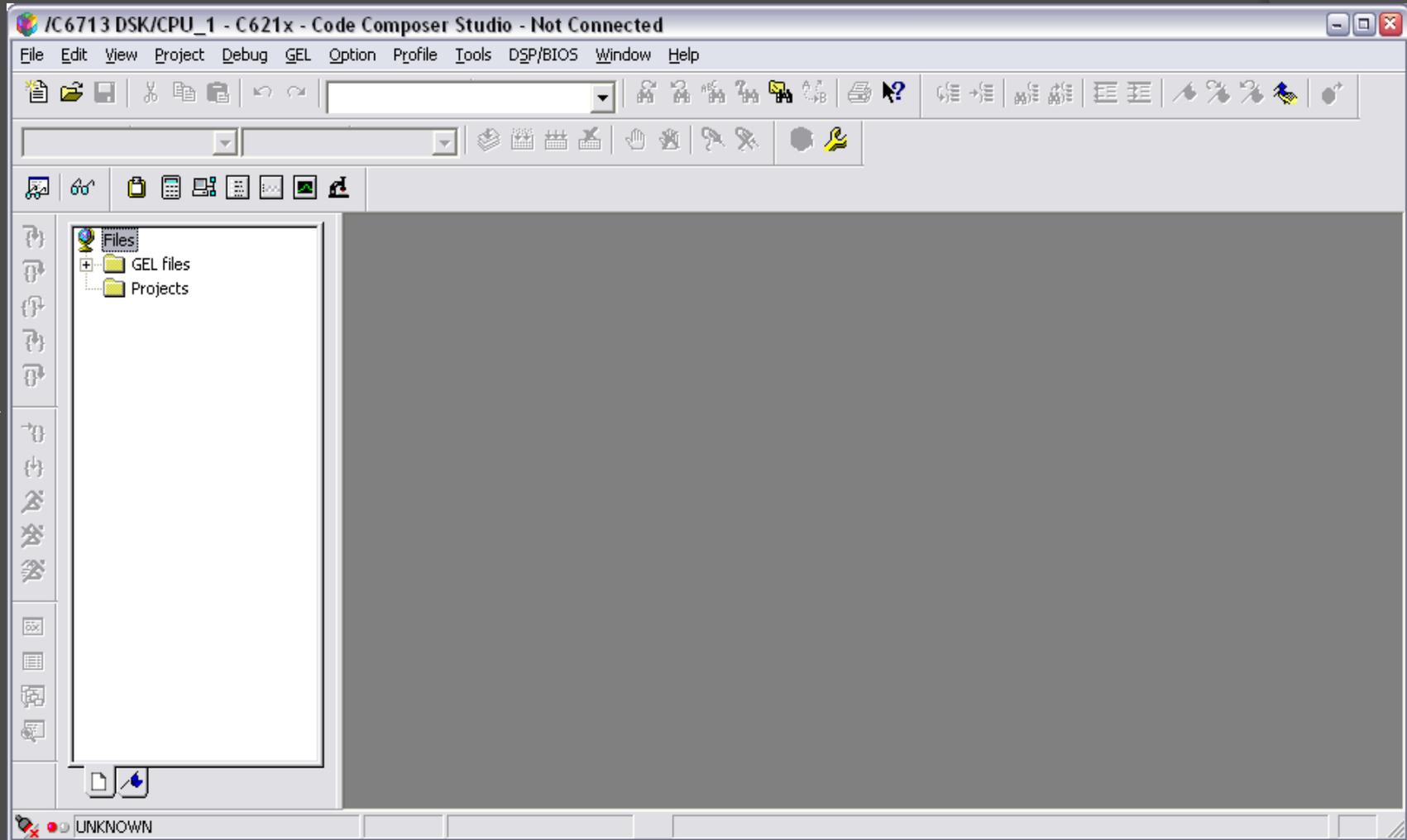
Note that we will be using CCS v3.1.

Code Composer Studio IDE

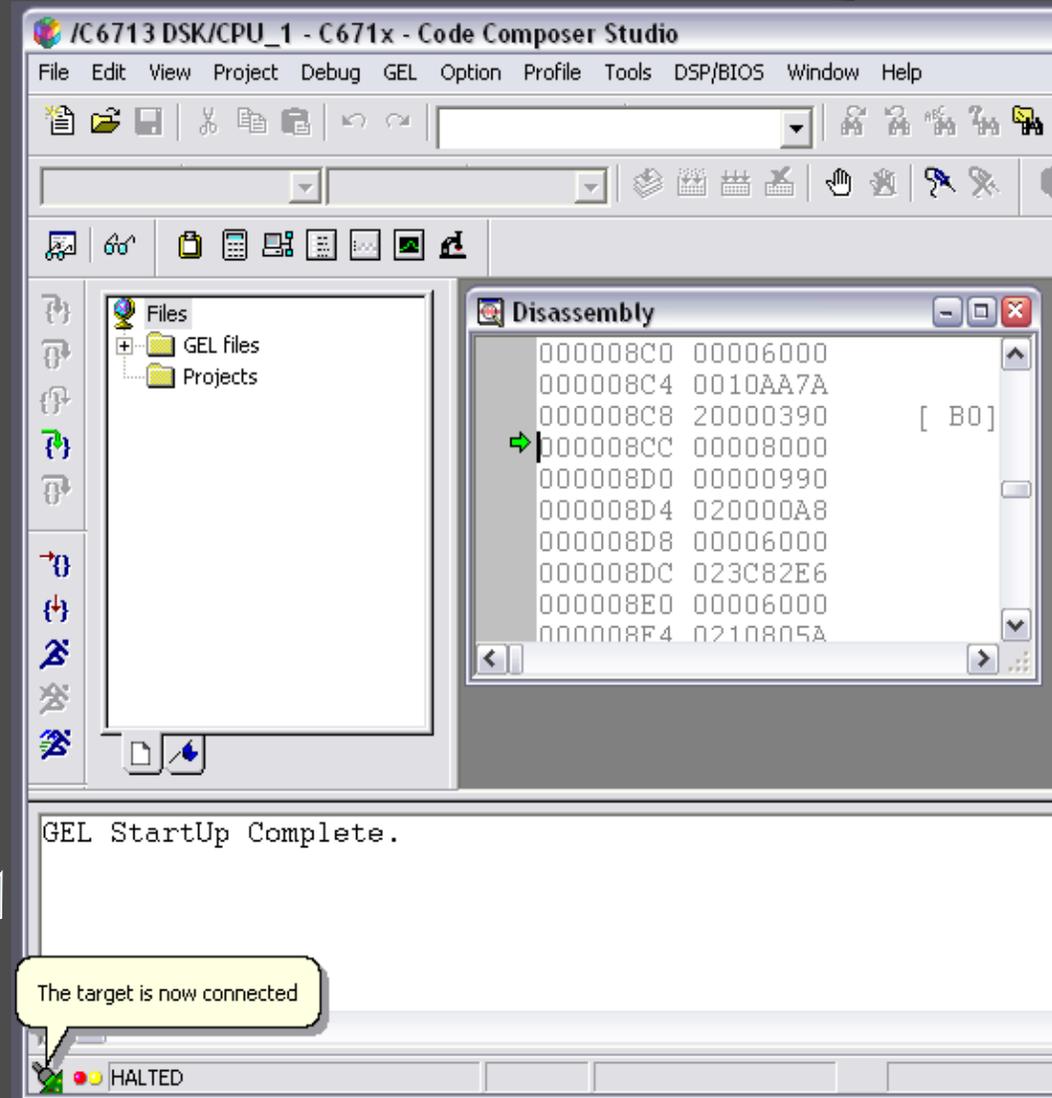
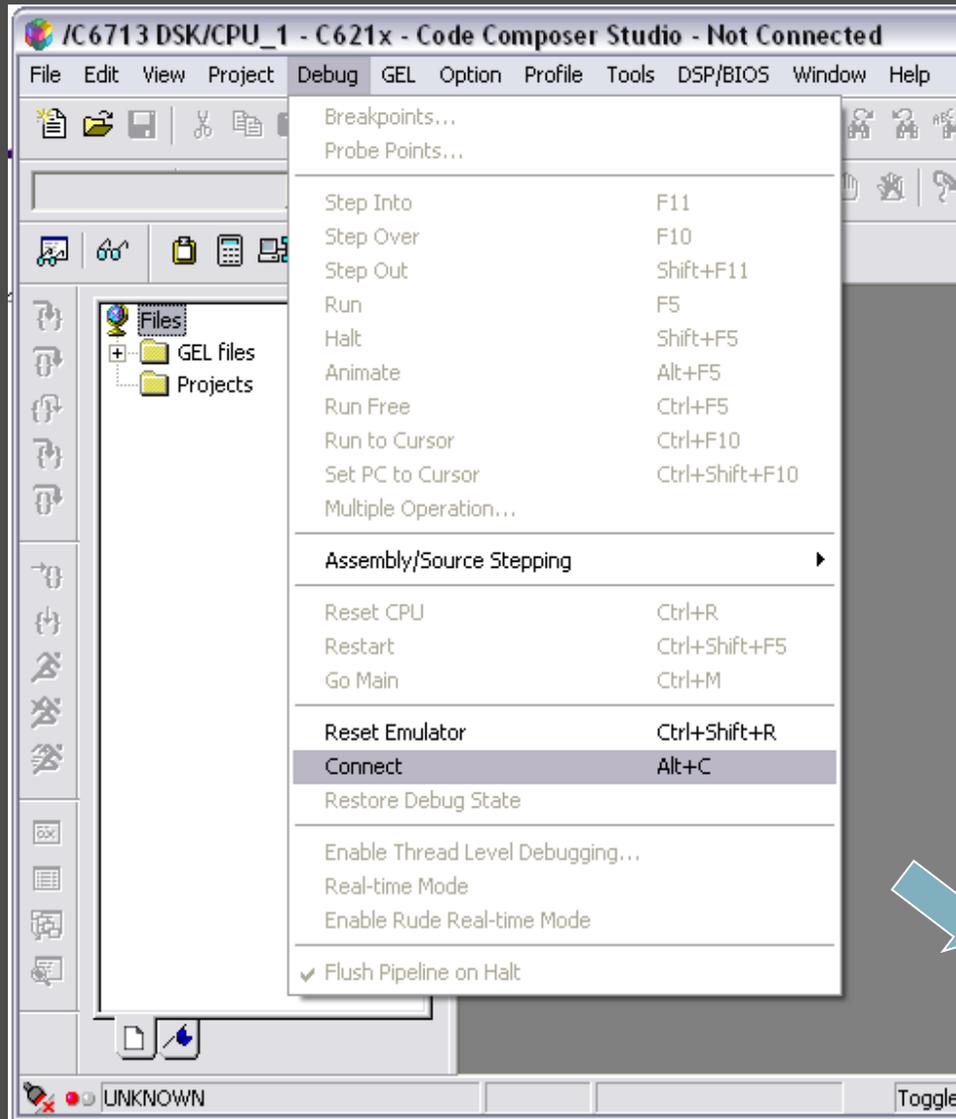
- Connect power supply to DSK
- Wait for POST to complete
- Connect USB cable from PC to DSK
 - If this is the first time connecting the DSK, you may be asked to install a driver. The driver is on the Code Composer Studio CD and will automatically be found by Windows if the CD is in the drive.
- Launch Code Composer Studio C6713 DSK
- CCS will load and wait for your input



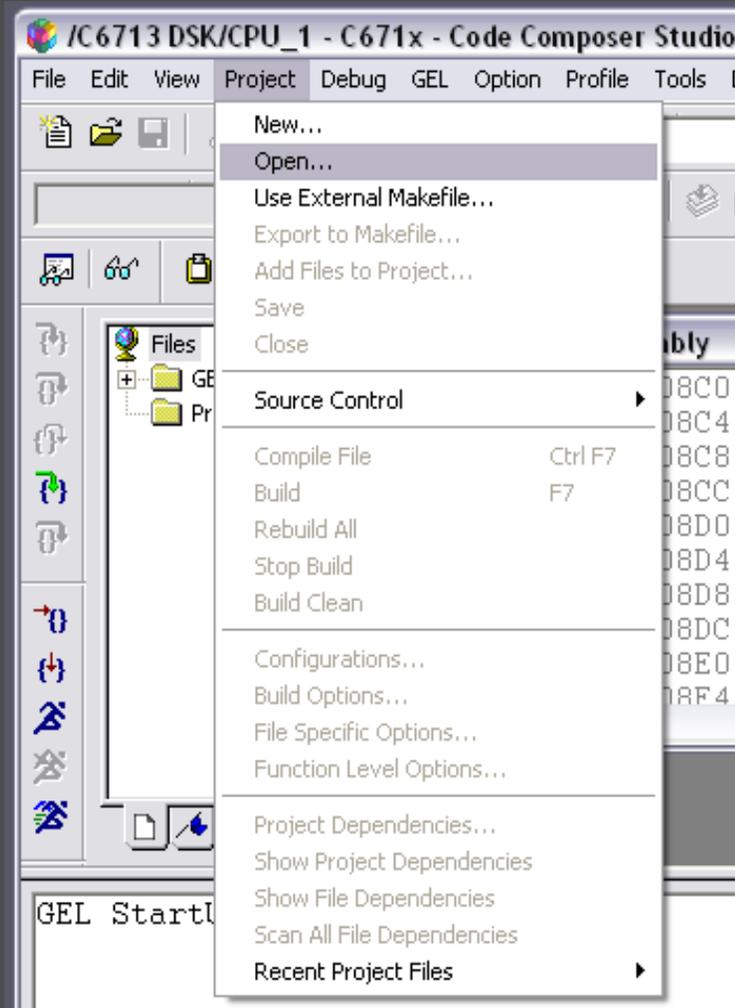
Code Composer Studio IDE



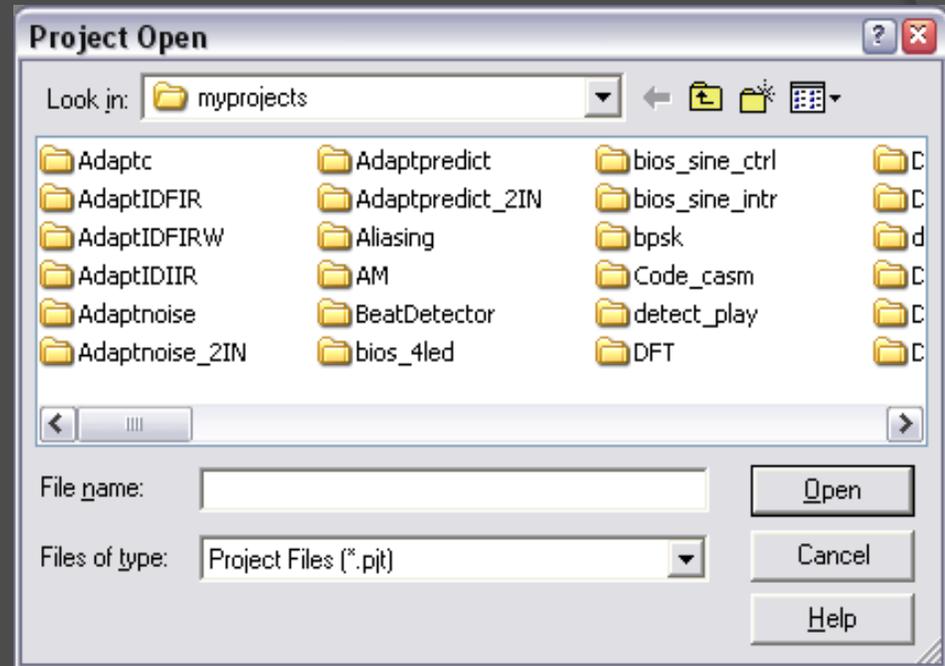
Connecting to the C6713 DSK



Opening an Existing Project



Project->Open

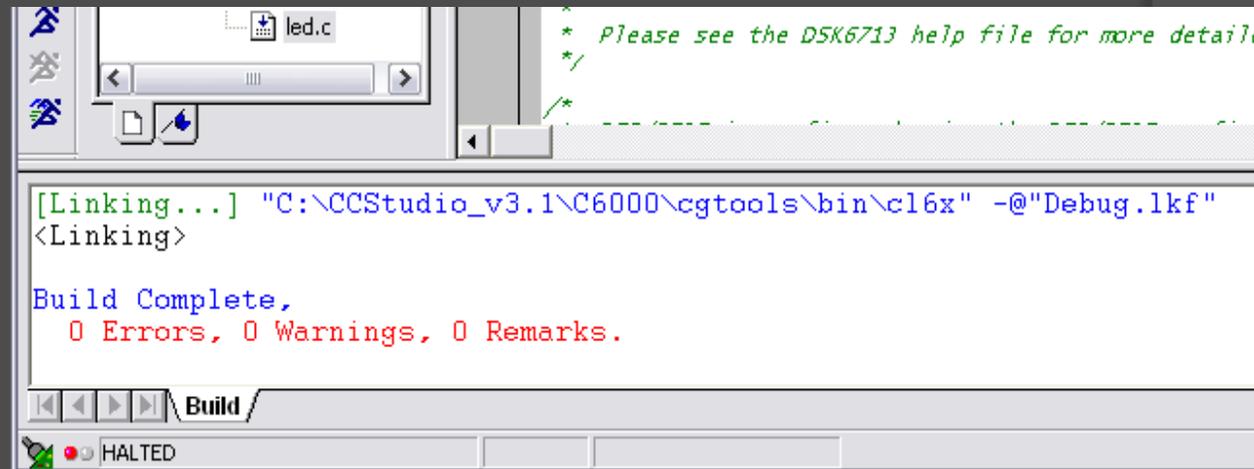
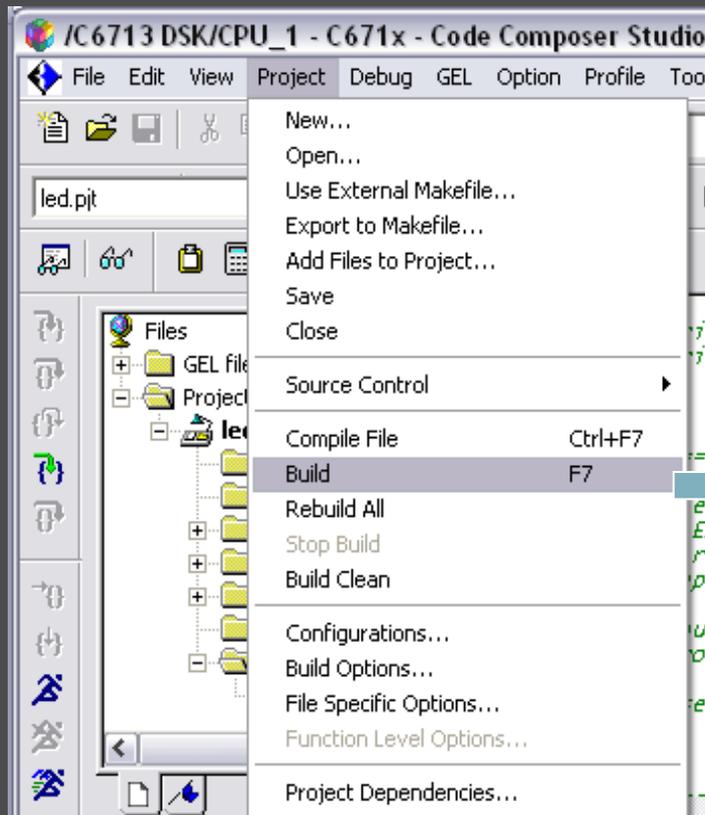


Select a .PJT file and press “Open”. You have several example projects on the CD included in your Kehtarnavaz textbook. There are also lots of example projects from the Chassaing and Reay textbook in [c:\CCStudio_v3.1\myprojects\](c:\CCStudio_v3.1\myprojects)

Other example projects for the C6713 can be found in c:\CCStudio_v3.1\examples\dsk6713

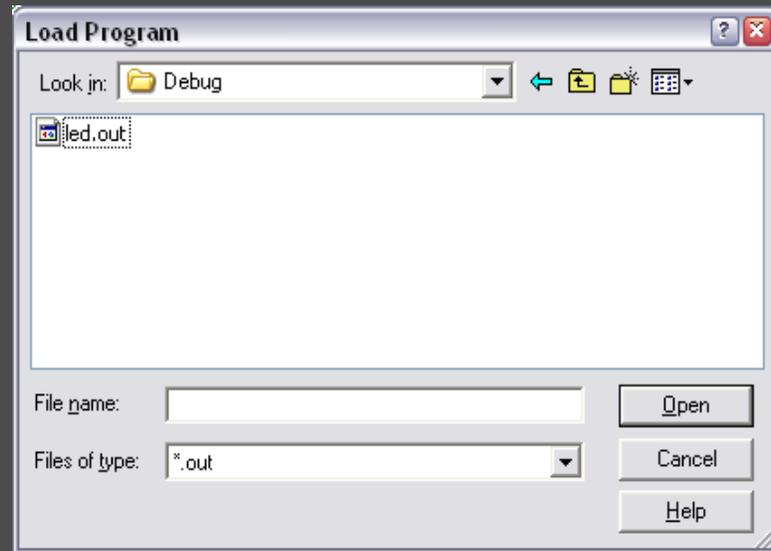
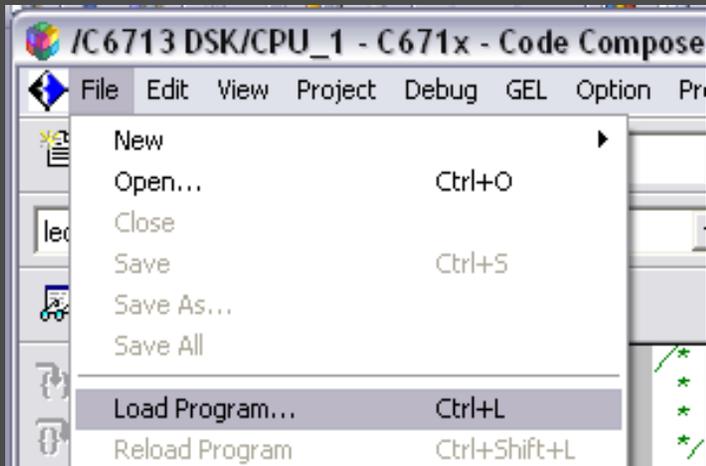
Compiling/Building a Project

Project->Build (F7)



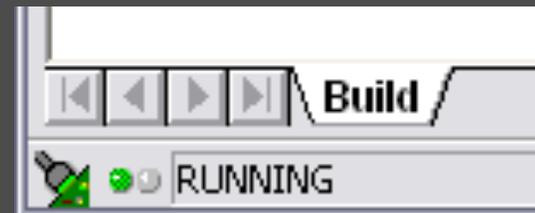
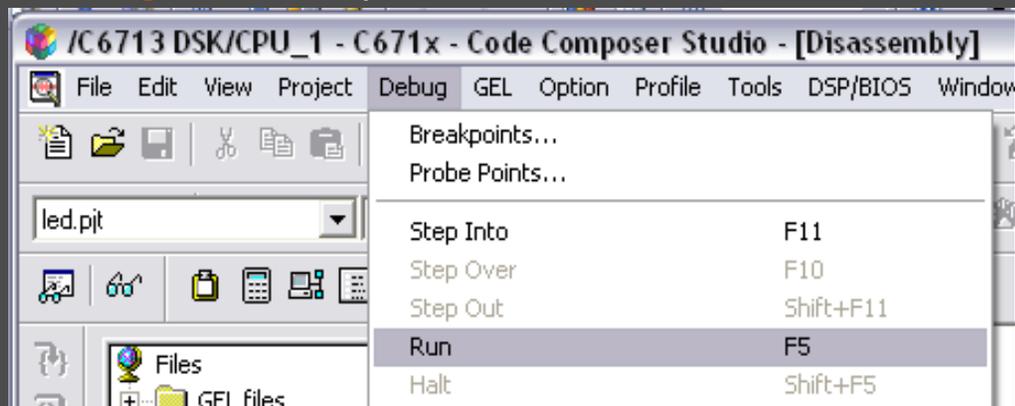
Loading and Running a Project on the C6713 DSK

File-> Load Program (ctrl+L)



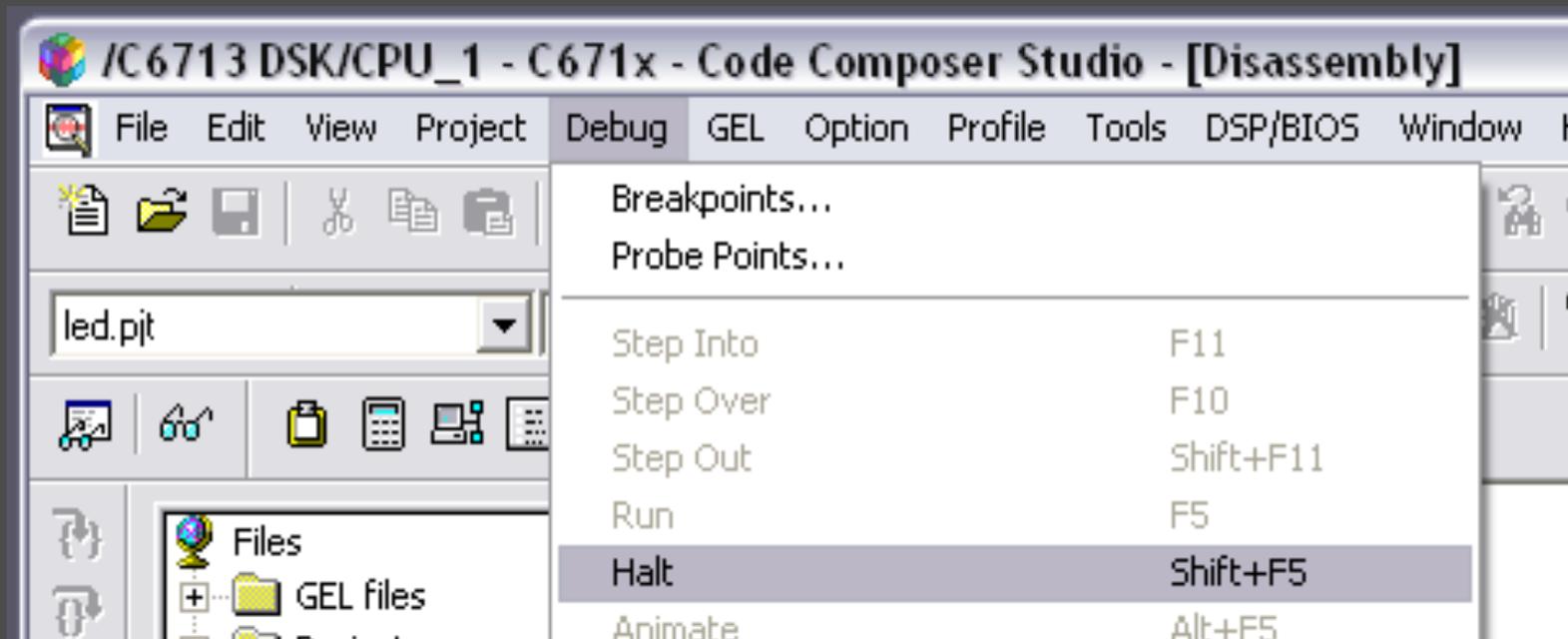
Select the .out file in the project\Debug directory. Program is sent to DSK.

Debug->Run (F5 or the Run button )



Halting a Running Program on the C6713 DSK

Debug->Halt (shift+F5 or the Halt button ).



Fixing Some Problems with Example Projects

- ⦿ During compilation, the compiler can't find some header (.h) files?
 - **Fix: Add an item to the CCS search path.**
- ⦿ During compilation, the linker can't find some libraries?
 - **Fix: Remove hard links to libraries and add libraries manually to the project.**
- ⦿ During compilation, you get warnings about “far calls” to data?
 - **Fix: Set the memory model to “data=far”**

Tip: Fixing the search path

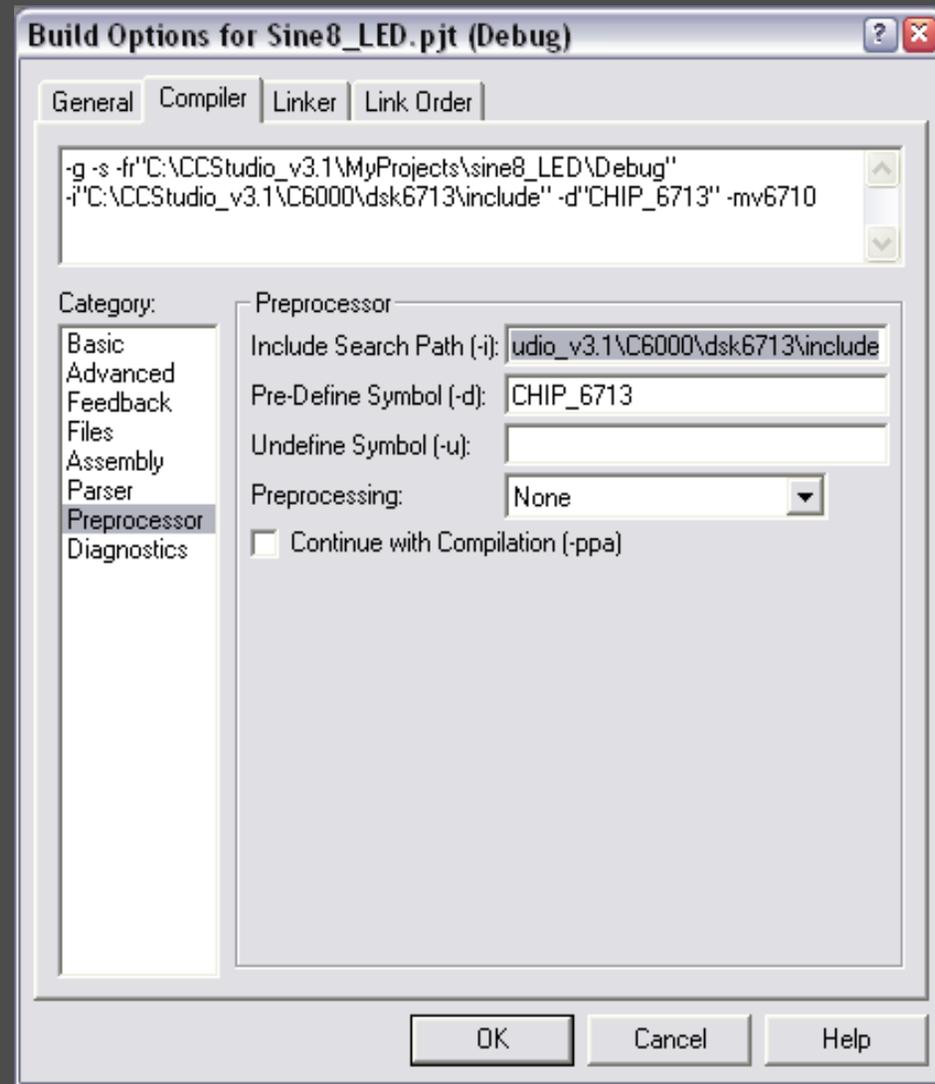
Add `C:\CCStudio_v3.1\C6000\dsk6713\include` to the search path

Project ->

Build Options ->

[Compiler tab] ->

[Preprocessor category]



Tip: Removing Hard Links to Libraries

```
[Loop_store.c] "C:\CCStudio_v3.1\C6000\cgtools\bin\cl6x" -g -q -fr"C:/
[Linking...] "C:\CCStudio_v3.1\C6000\cgtools\bin\cl6x" -@"Debug.lkf"
<Linking>
>> C:\DOCUME~1\drb\LOCALS~1\Temp\TI5643, line 21:  err
        can't find input file 'DSK6713bsl.lib'

>> Compilation failure

Build Complete.
```

Problem is caused by a bad path for the include libraries in the linker options (**Project -> Build Options -> Linker tab**)

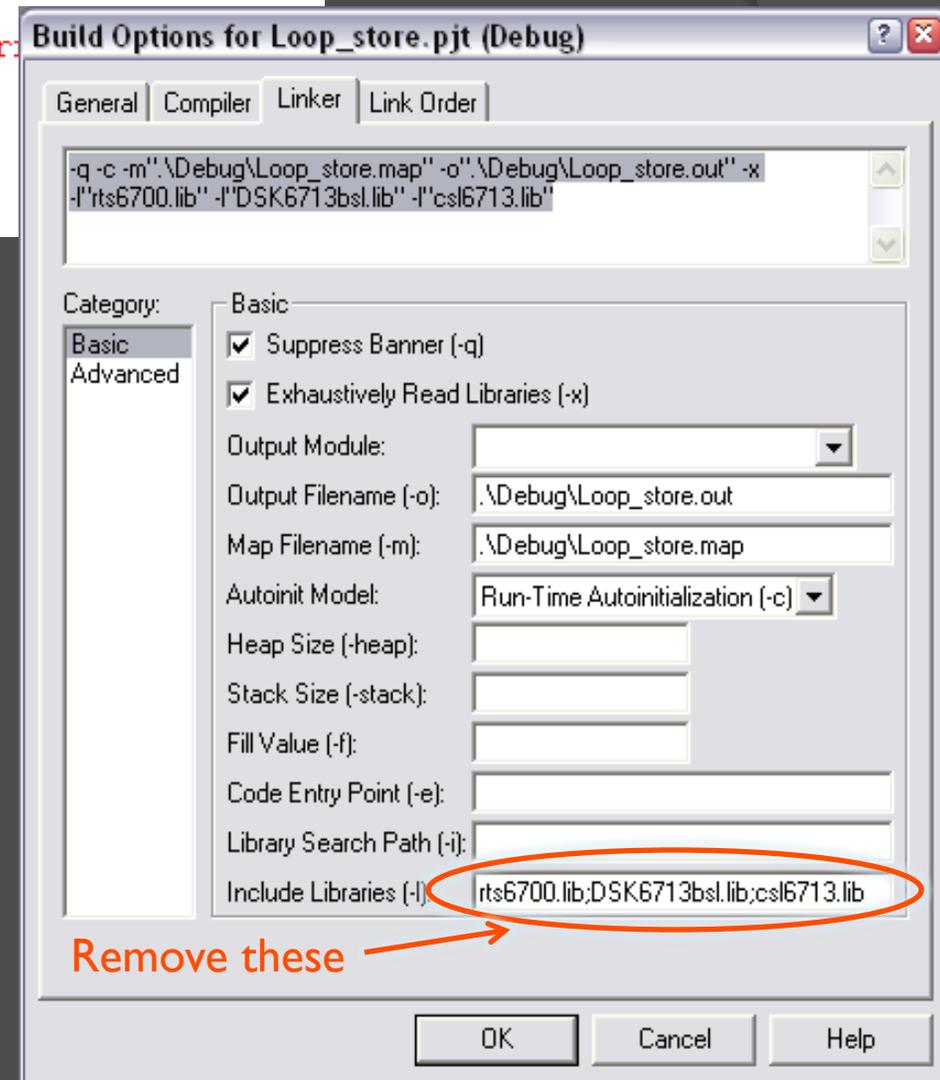
A fix for this is to remove rts6700.lib, DSK6713bsl.lib, and csl6713.lib from the linker options and add these files manually (**Project -> Add files to Project...**)

C:\CCStudio_v3.1\c6000\cgtools\lib\rts6700.lib

C:\CCStudio_v3.1\c6000\cs\lib\csl6713.lib

C:\CCStudio_v3.1\c6000\dsk6713\lib\dsk6713bsl.lib

Or you can add the appropriate directories to the library search path.



Tip: Fixing the memory model

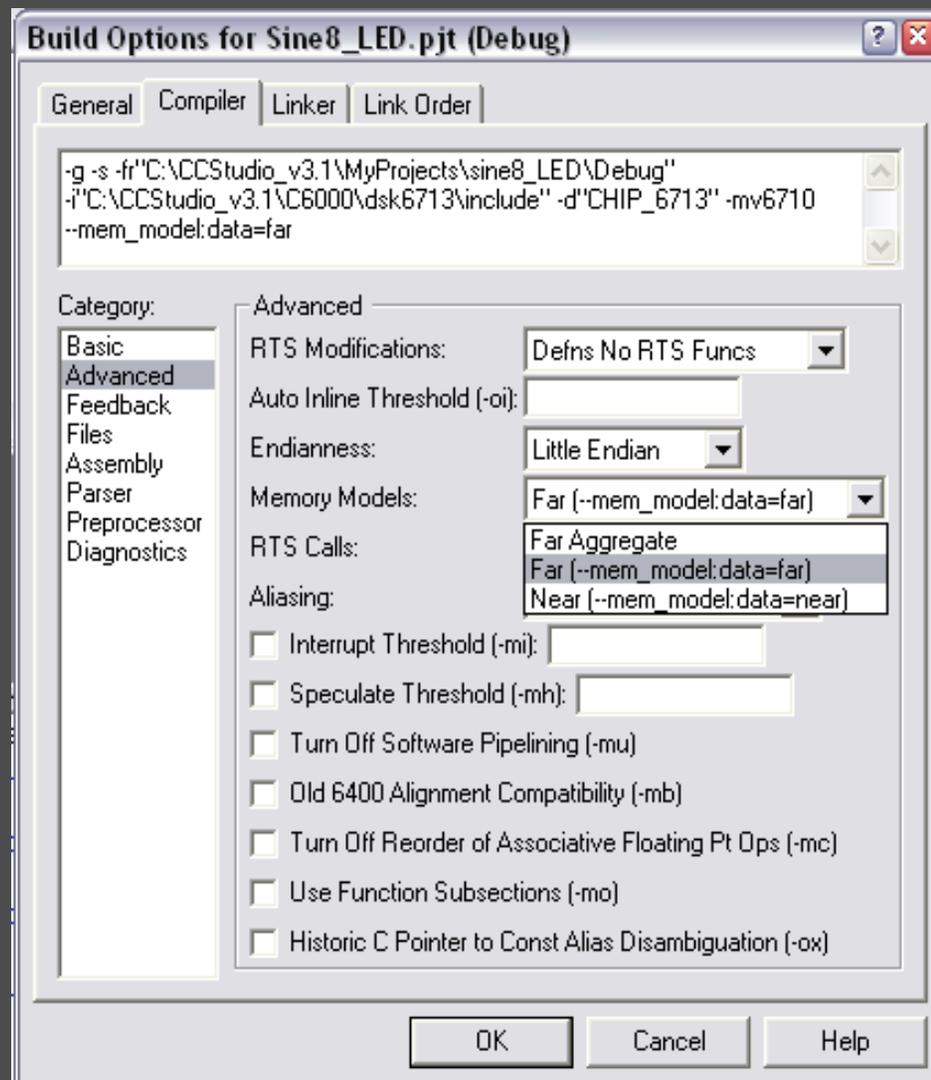
Change the memory model to “data=far”

Project ->

Build Options ->

[Compiler tab] ->

[Advanced category]

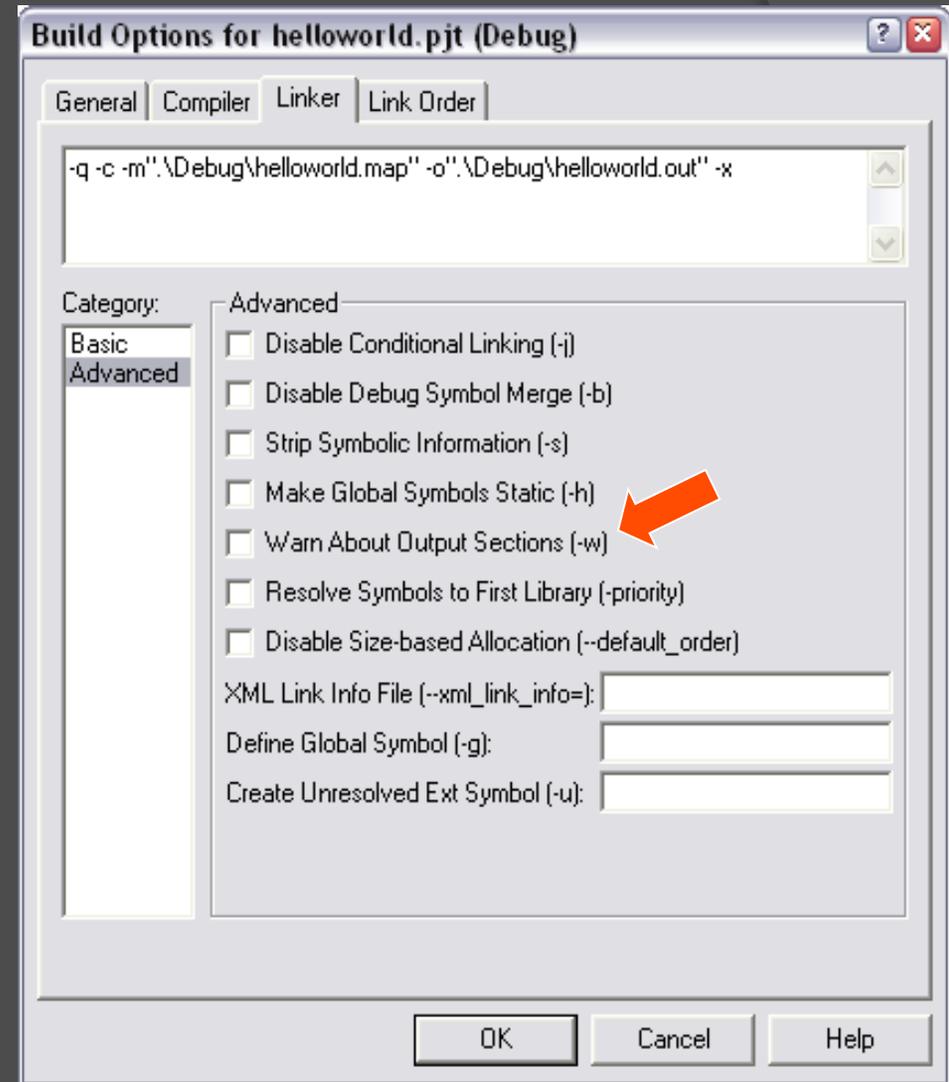


Optional: Suppress Linker Warnings

Project->Build Options
[linker tab]

In the Advanced category,
uncheck “warn about output
sections”.

Alternatively, put values for
stack and heap in the **Basic**
category.



Creating a New Project (1 of 5)

1. Create new project
Project->New

Project Creation

Project Name: helloworld

Location: C:\CCStudio_v3.1\MyProjects\hellowo ...

Project Type: Executable (.out)

Target: TMS320C67XX

< Back Finish Cancel Help

Creating a New Project (2 of 5)

2. Write your C code:

File->New->Source File

3. Save it in your project directory (make sure it has a .c extension):

File->Save

4. Add your C code to the project:

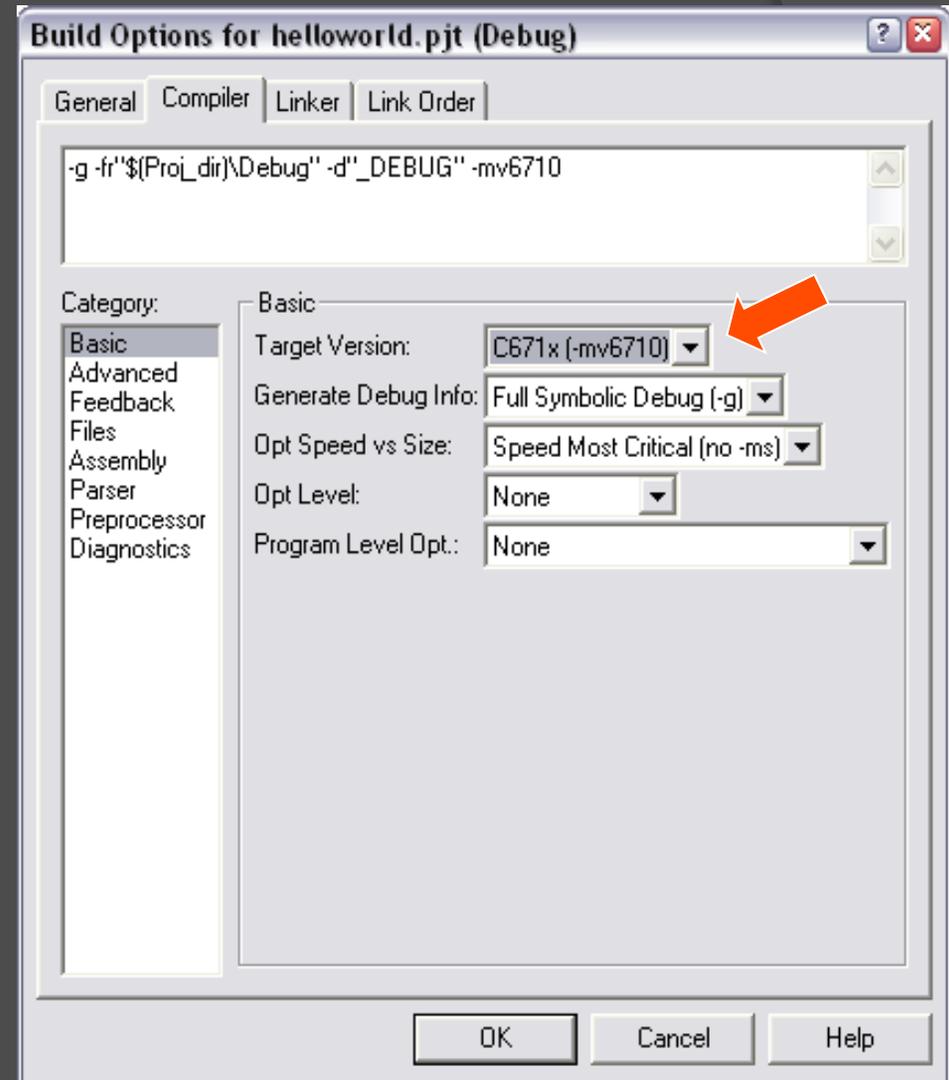
Project->Add Files to Project

Creating a new project (3 of 5)

5. Add required support files to project
Project->Add Files to Project
 - a) `myprojects\support\c6713dsk.cmd`
[linker command file – this or another cmd file is required]
 - b) `c6000\cgtools\lib\rts6700.lib`
[run-time support library functions - required]
6. Add optional support files to project, e.g.
Project->Add Files to Project
 - a) `myprojects\support\vectors_poll.asm` or `vectors_intr.asm`
[used to set up interrupt vectors]
 - b) `c6000\dsk6713\lib\dsk6713bsl.lib`
[DSK board support library functions – useful for interfacing to the codec, DIP switches, and LEDs]
 - c) `c6000\cs\lib\cs16713.lib`
[chip support library functions]

Creating a New Project (4 of 5)

7. Set up the build options for C6713:
Project -> Build Options
(compiler tab)
 - Make sure target version is C671x
 - Also make sure Opt(imization) Level is “none” - this will help with debugging



Creating a New Project (5 of 5)

8. Scan all file dependencies to automatically bring all header files and includes into the project:
Project -> Scan all file dependencies
9. Build the project:
Project -> Build
10. If successful, load the .out file to the DSK:
File -> Load Program
Select the Debug directory. Select the .out file.
11. Run it:
Debug -> Run or F5 or the run button.

Useful Reference Material

- Kehtarnavaz Chapter 4
- Kehtarnavaz CD with example projects
- Chassaing and Reay example projects
- CCS Help system
- SPRU509F.PDFCCS v3.1 IDE Getting Started Guide
- C6713DSK.HLPC6713 DSK specific help material
- Spectrum Digital TMS320C6713 DSK reference

**Latest TI documentation available at
http://www.ti.com/sc/docs/psheets/man_dsp.htm**