C6713DSK & TI CCS V4
INSTALLATION INSTRUCTIONS

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OVERVIEW

- This tutorial covers the following:
  - Installation of Code Composer Studio v4 on your MSOE laptop
  - Running CCS v4 for the first time
  - Setup of support libraries
  - Connection and installation of the C6713DSK hardware platform
  - Downloading a sample program into the DSK unit
  - Importing a template C project

CCS V4 INSTALL: 1 OF 6

- Locate and select "Code Composer Studio v4" from the network program installation menu
    - Click "Install"
    - If prompted with a security warning, select "Run"
    - If prompted with an "Operating System not supported" message, choose "Yes"
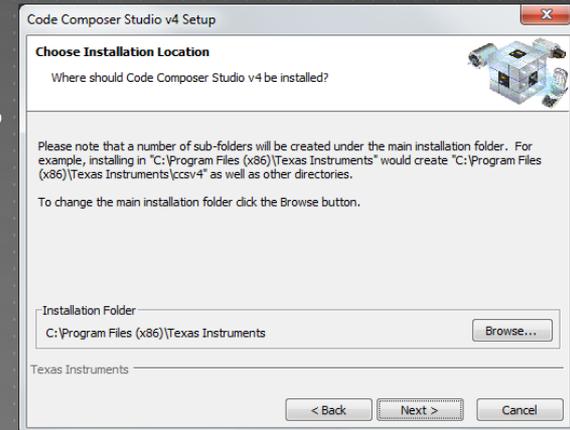
- Select "Next" at the Welcome screen
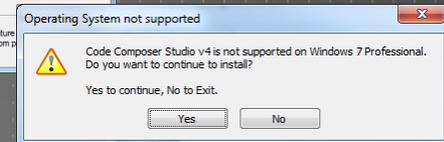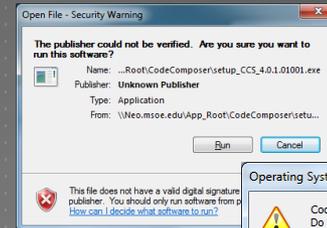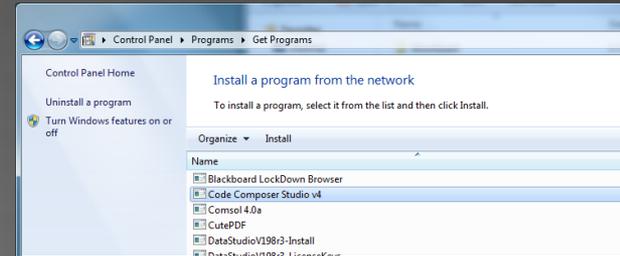
▶ Accept the license agreement and select "Next"

▶ Choose the Installation Location and select "Next"

  ▶ Using the default installation folder "C:\Program Files (x86)\Texas Instruments" is STRONGLY recommended
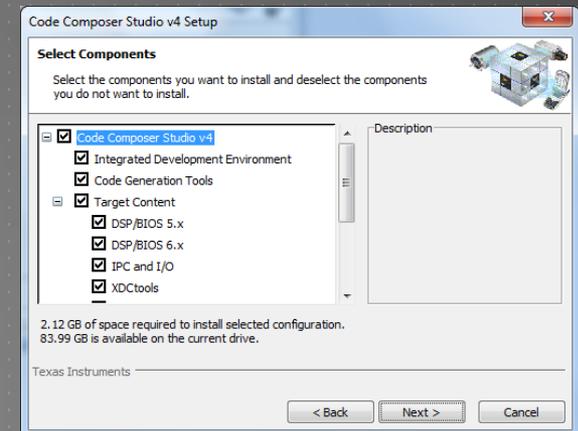
▶ You may see the following message:

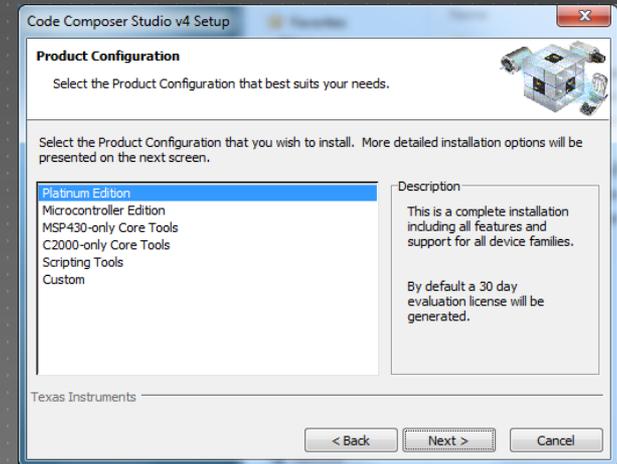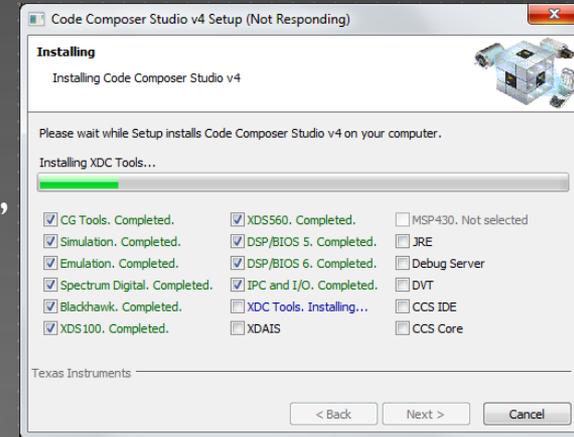 ▶ Click "OK" and proceed

CCS V4 INSTALL: 3 OF 6

▶ Select "Platinum Edition" as the Product Configuration and select "Next"

▶ Use default settings for "Select Components" and select "Next"

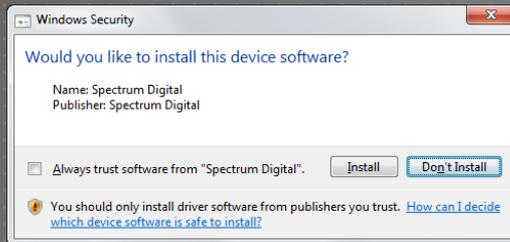▶ Select "Next" to begin copying files

CCS V4 INSTALL: 4 OF 6

- ▶ You should see the "Installing" screen
  - ▶ Windows may report the install as "Not Responding"
  - ▶ Don't worry; allow the install to continue

- ▶ If during installation you see messages similar to the following

Choose "Install"

▶ Upon completion you should see the following screen
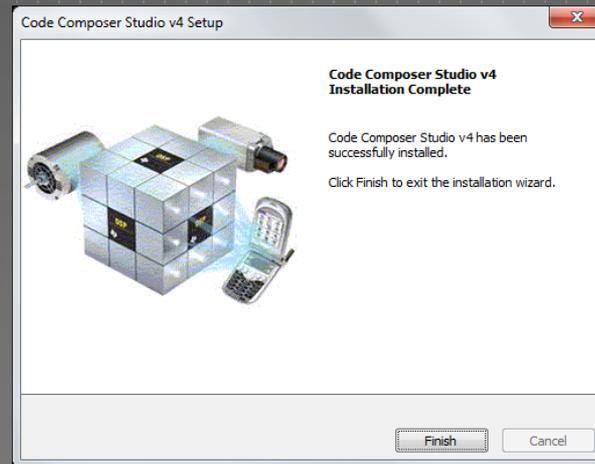
▶ Choose "Finish" to exit the installation process

CCS V4 INSTALL: 6 OF 6

▶ You should see three new icons on your desktop

▶ You should only ever need "Code Composer Studio v4"
   ▶ You may safely delete the other shortcuts from your desktop

▶ Congratulations!! CCS v4 has been successfully installed!

▶ Run Code Composer Studio

▶ You will be prompted to "Select a workspace"
  ▶ The workspace is essentially just a folder that will store your DSP projects
  ▶ Choose a suitable location and folder name (e.g., D:\DSPworkspace), and select "OK"

▶ You will then be prompted to select a license

  ▶ Choose "Activate a license" and "Specify a license server"

  Address: **licserver1.msoe.edu**
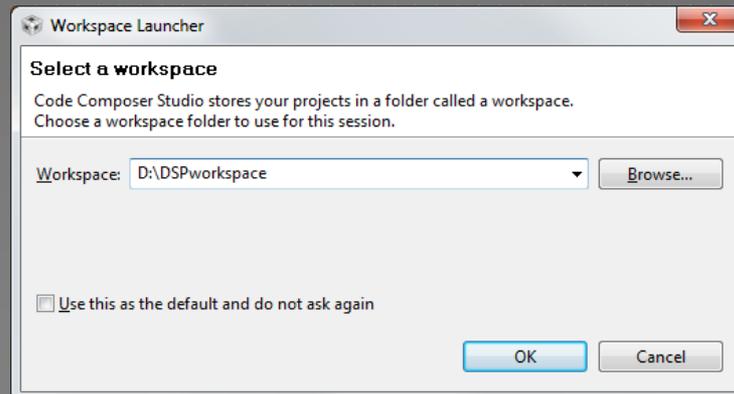
  Port: **1555**
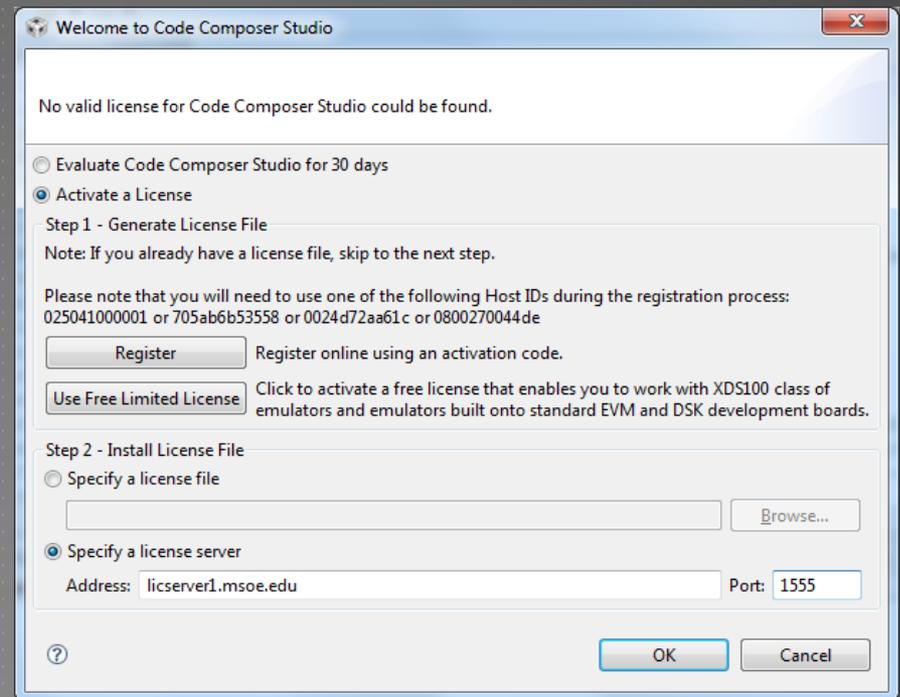
RUNNING CCS V4 THE FIRST TIME: 3 OF 3

▶ Select the CCS icon in the upper right hand corner to open the IDE
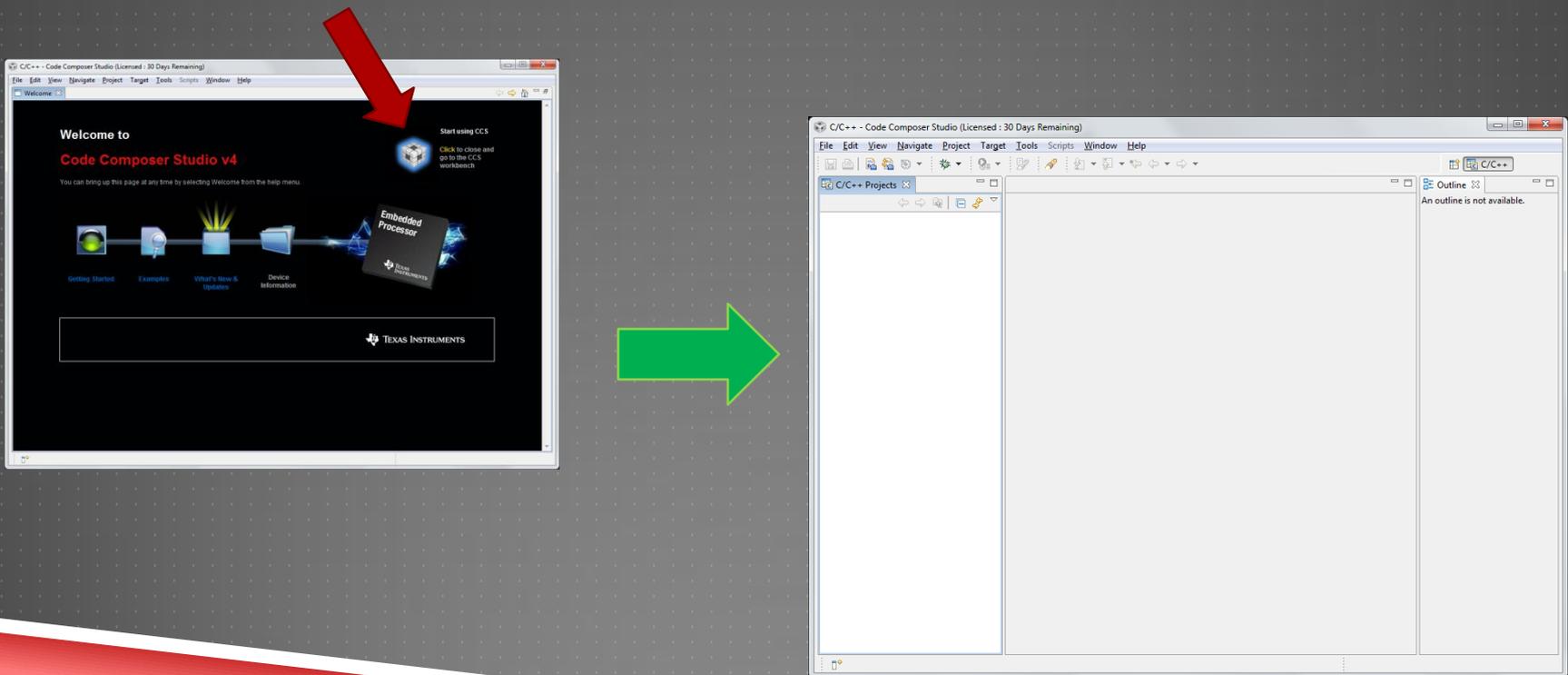
▶ Using the DSK requires additional libraries provided by the hardware vendor (Spectrum Digital) and Texas Instruments

▶ Navigate your web browser to https://faculty-web.msoe.edu/prust/c6713dsk and download the following files:

  ▶ dsk6713libs.zip

  ▶ dskSupport.zip

▶ Unzip the file "dsk6713libs.zip" directly to your harddisk (C:\)

▶ Unzip the file "dskSupport.zip" directly to your CSS workspace directory

  ▶ e.g., "D:\DSPworkspace"

SUPPORT LIBRARIES: 2 OF 3

▶ Navigate to "C:\DSK6713". You should see the following directory structure:
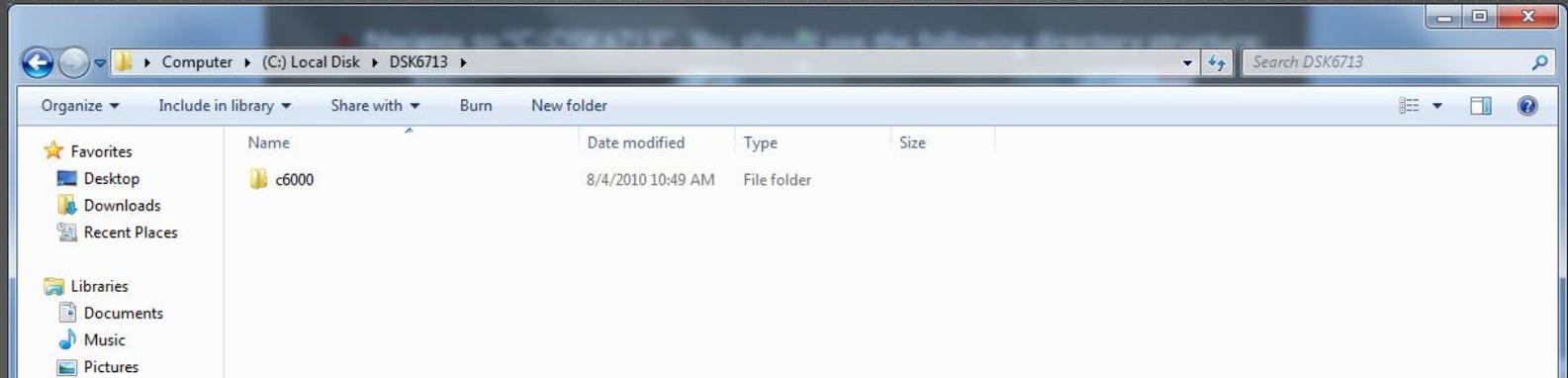
▶ Several of these files and directories will be linked into our CCS projects
▶ You should never need to modify any of these files

SUPPORT LIBRARIES: 3 OF 3

▶ Navigate to your workspace directory (e.g., "D:\DSPworkspace). You should see the following directory structure:
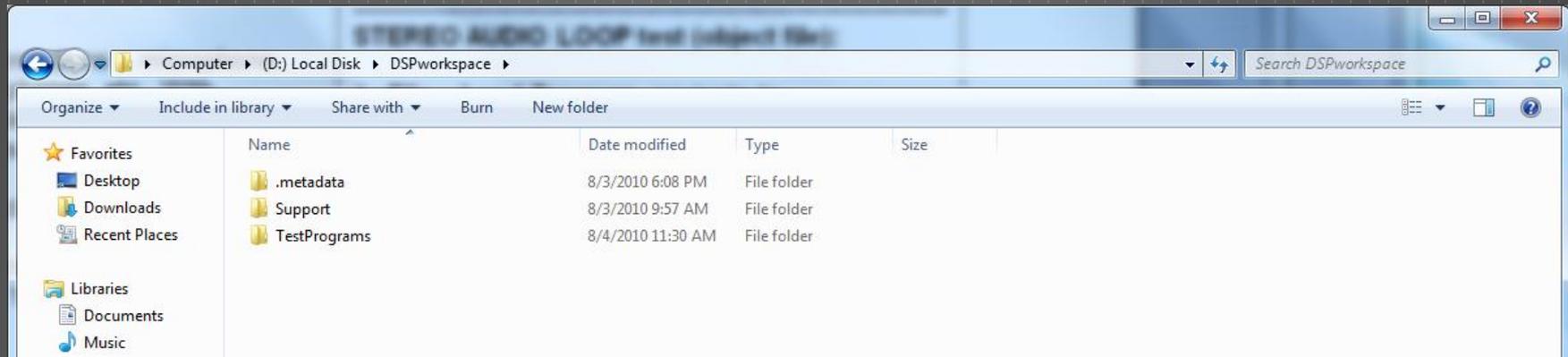
▶ The "Support" directory contains files for use in writing DSK software

▶ The "TestPrograms" directory contains a pair of executable files that can be downloaded to the DSK.

   ▶ We will test the DSK with these files momentarily…

CONNECTING THE DSK:

1) Connect one end (only) of the USB cable to your laptop computer

2) Connect AC power adapter to wall outlet

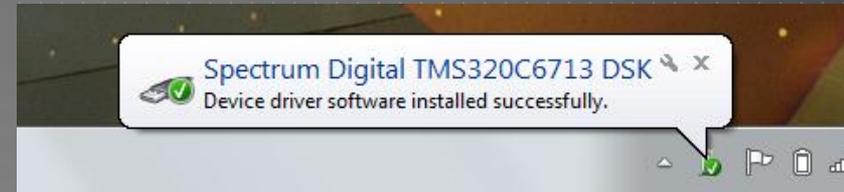3) Connect AC power adapter to DSK board and wait for 4 LEDs to cycle (10-15 seconds) -- they will finally remain all "on."

4) Connect the other end of the USB cable to the DSK board

5) Windows should automatically find the appropriate driver

Spectrum Digital TMS320C6713 DSK
Device driver software installed successfully.

Please follow this procedure each time you connect the DSK!

TESTING THE DSK: OF 6

▶ The first task is to create a configuration file for the DSK inside of CCS

▶ With CCS running:

  ▶ Select "Target > New Target Configuration"

  ▶ Set the "File name:" as "c6713DSK.ccxml"

  ▶ Use the default "Location:"

  ▶ Select "Finish"
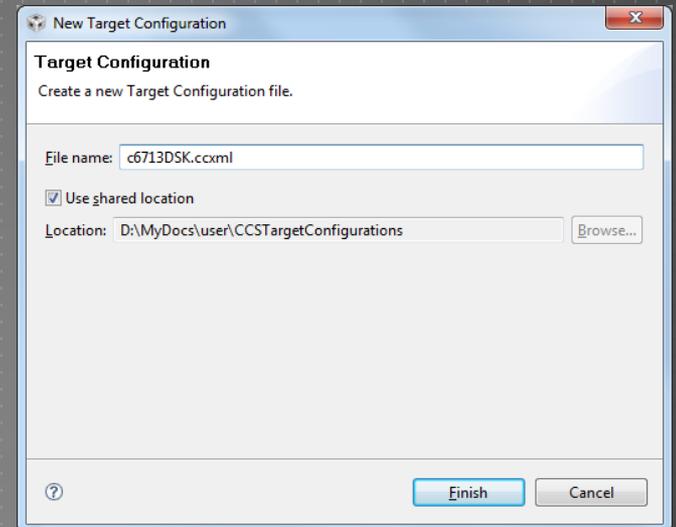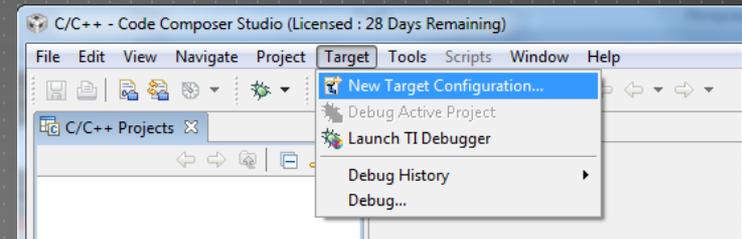
TESTING THE DSK: 2 OF 6

▶ The configuration file will then open inside of CCS

  ▶ Set the "Connection" field to

   Spectrum Digital DSK-EVM-eZdsp onboard USB Emulator

  ▶ Select "Device"

   DSK6713

  ▶ Press "Save"
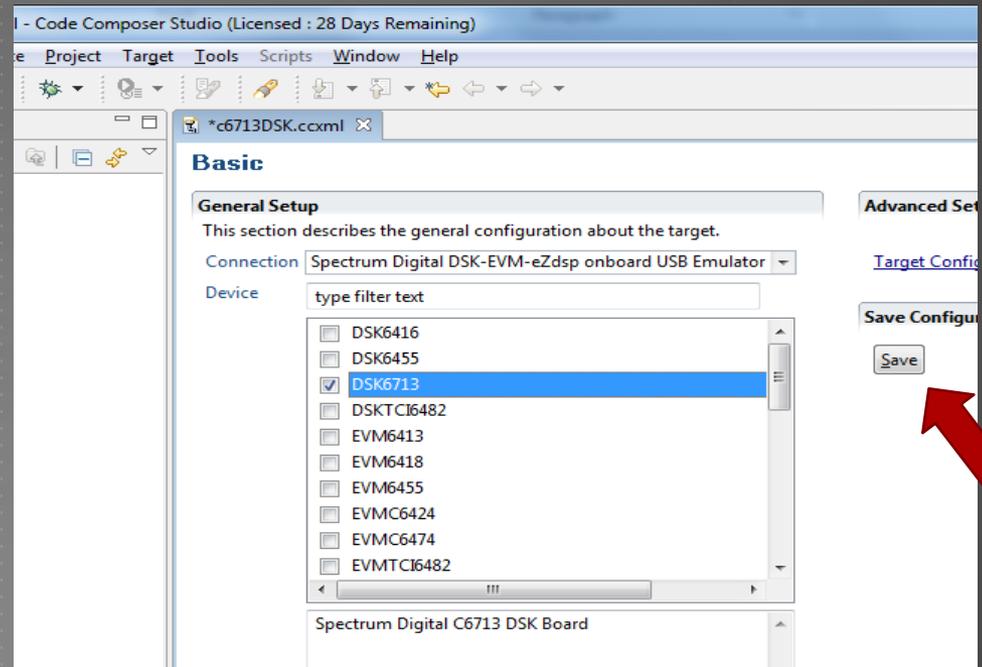
▸ We will now start the CCS Debugger which handles communication with the DSK unit

    ▸ Click the "Debug" icon
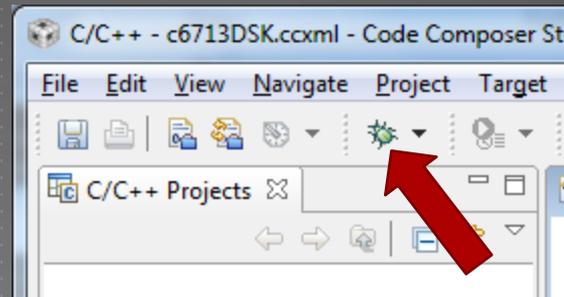
    ▸ After a few seconds, the debug window should appear

    ▸ Select "Target > Connect Target"
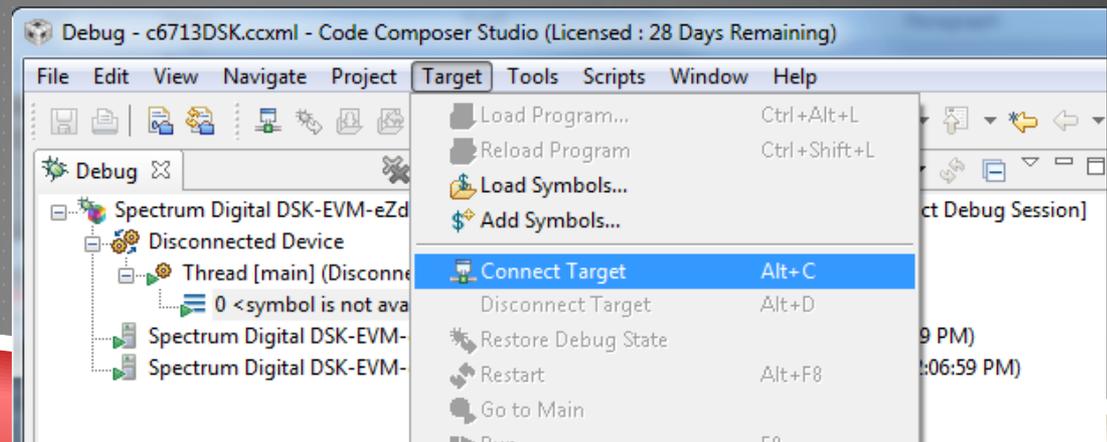
▸ We will now load an executable file into the DSK

   ▸ Select "Target > Load Program"
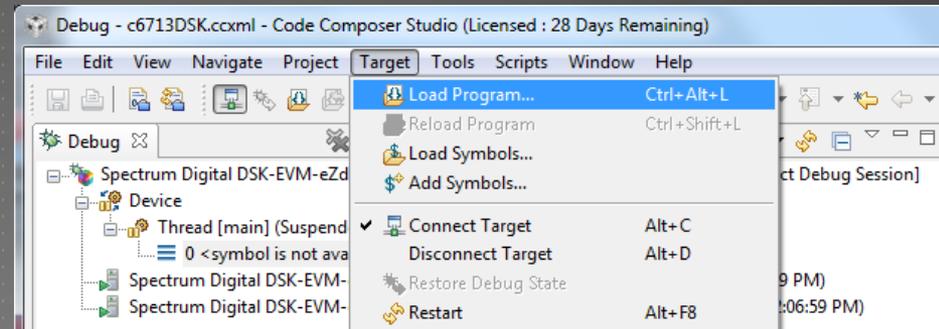
   ▸ "Browse" to the "TestPrograms" directory and select "Sine8_LED.out"

   ▸ Select "OK"
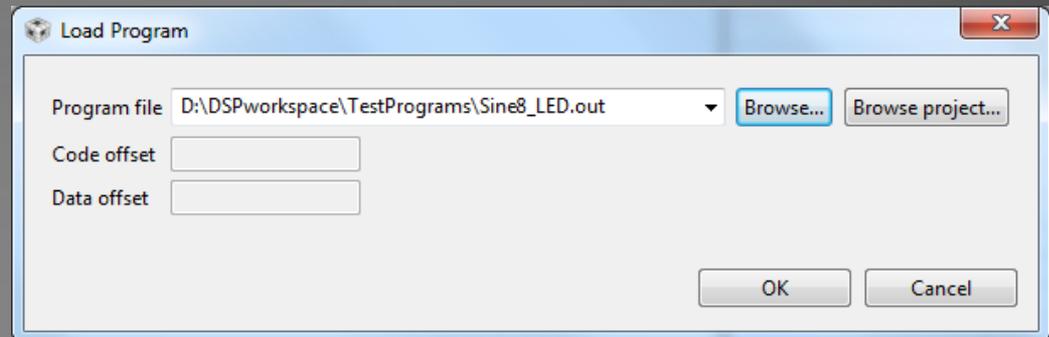
TESTING THE DSK: 5 OF 6

▶ To begin execution of the program, select "Target > Run"

▶ To pause execution, select "Target > Halt"

▶ To stop execution (and exit the debugger), select "Target > Terminate All"

▶ *Hint:* These operations, as well as other debugger commands, are available as icons in the debug window
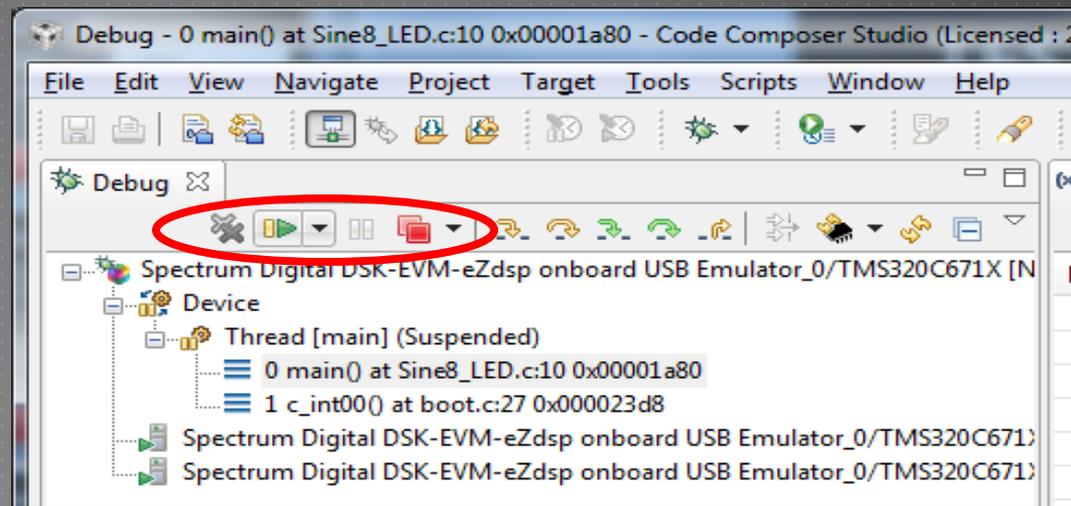
▶ The program "Sine8_LED.out" produces a 1kHz sine wave on the LINE OUT and HEADPHONE jacks when pushbutton 0 (on SW1) is pressed.

▶ To test the program, connect the LINE OUT jack to an oscilloscope and monitor the output while pressing pushbutton 0

▶ Following the same procedure, load the program "Loop_stereo_test.out" into the DSK

▶ This program samples a stereo audio signal on the LINE IN jack and outputs the signal (unchanged) to the LINE OUT and HEADPHONE jacks.

▶ To test the program, play stereo audio (e.g., from an IPOD or laptop) into the LINE IN jack and monitor the output

…but, REMEMBER…

USING THE C6713DSK: IMPORTANT!!!

- If using HEADPHONES to monitor output signals:
  - **NEVER** download software to the DSK while headphones are affixed to your ears
  - The onboard headphone amplifier has high gain and could damage your hearing
  - When testing software, slowly lift headphones to your ears

- If applying signals to the LINE IN port
  - *ALWAYS* check signals on the oscilloscope prior to connecting to the DSK
  - *ALWAYS* monitor signals on the oscilloscope while connected to the DSK
  - Input signals should never exceed *1.0V peak-to-peak*.
  - Large voltages can damage the DSK. Replacement cost is ~$500.

- We will now import a C Project that can be used as a template for creating an original CCS program for the DSK.
- Download the ZIP file "templateProject.zip" from
  - https://faculty-web.msoe.edu/prust/c6713dsk

- DO NOT UNZIP THE FILE!

- In CCS, select "Project -> Import Existing CCS/CCE Eclipse Project"
- Choose "Select archive file" and browse to the .zip file you just downloaded
- You should then see the project under "Projects." Choose Finish.

PROJECT TEMPLATE: 2 OF 4

▶ You should now see the project in the CCS Project Explorer window
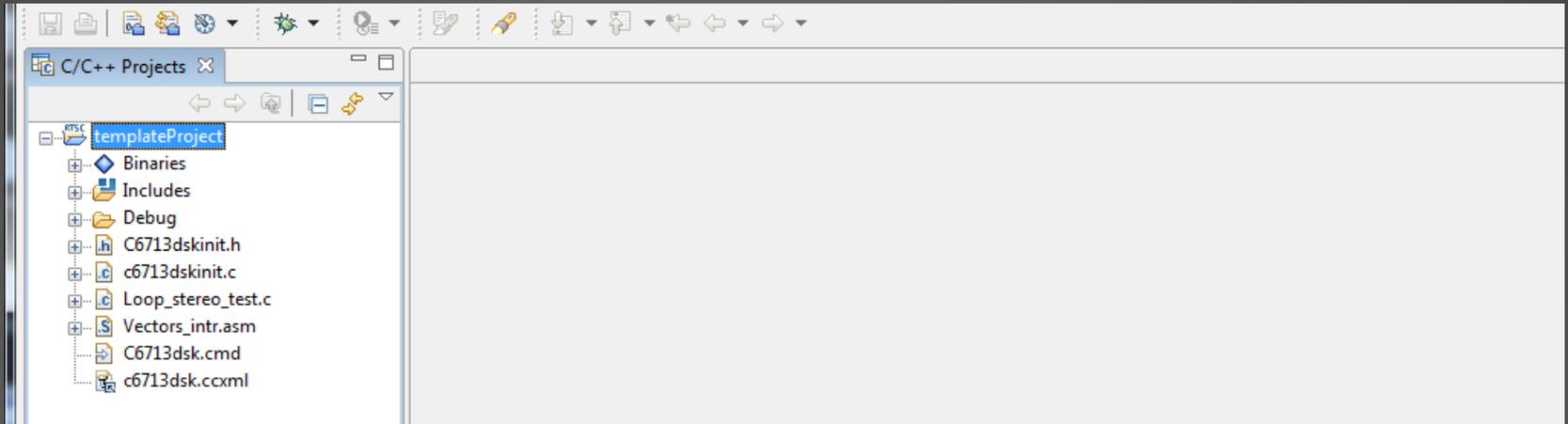
▶ Open the file "Loop_stereo_test.c" (double-click the file).

  ▶ This is the exact software that was previously loaded onto the DSK

  ▶ It simply loops a stereo audio signal through the DSP system (i.e. ,ADC to DSP to DAC)

  ▶ The software implements the difference equation: $y[n] = x[n]$

▶ Test the toolchain by selecting "Project -> Build All". You may see some warnings, but there should be no errors.

▶ Connect the DSK unit (per previous instructions) and launch the CSS debugger. The program will automatically be loaded onto the DSK.

  ▶ Click the "Play" icon to begin execution.

  ▶ Test the program with an audio source of your choosing. Remember to keep the voltage input around 100mV peak to peak.

▶ The source code can be customized to implement digital filters that you design.

implement digital filter here

```c
//Loop_stereo_test.c
#include "dsk6713_aic23.h"              //codec-DSK support file
Uint32 fs=DSK6713_AIC23_FREQ_48KHZ;    //set sampling rate
#define LEFT    0
#define RIGHT   1
union {Uint32 combo; short channel[2];} AIC23_data;

interrupt void c_int11()               //interrupt service routine
{
    float lc;                          //left channel from A/D
    float rc;                          //right channel from A/D
    float lcnew;                       //left to D/A
    float rcnew;                       //right to D/A
    AIC23_data.combo = input_sample(); //input 32-bit both chan
    lc=(float)(AIC23_data.channel[LEFT]);   //get left sample from A/D
    rc=(float)(AIC23_data.channel[RIGHT]);  //get right sample from A/D
//-------- more floating point processing here, such as ... ----------------
    lcnew=lc;                          //calculate new left...
    rcnew=rc;                          //...and right data samples
//-------- end of more processing -------------------------------------------
    AIC23_data.channel[LEFT]=(short)(lcnew);  //prep left for D/A
    AIC23_data.channel[RIGHT]=(short)(rcnew); //prep right for D/A
    output_sample(AIC23_data.combo);   //output both channels
    return;
}

void main()                            //main function
{
    comm_intr();                       //init DSK, codec, McBSP
    while(1);                          //infinite loop
}
```

CONGRATULATIONS!

▶ You now have a fully functioning IDE and hardware configuration for the TMS320C6713 DSK!

▶ Part III of this tutorial shows you how to create and configure your own DSK projects.