

#### C67I3DSK & TI CCSV4 INSTALLATION INSTRUCTIONS

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Author: Cory J. Prust, Ph.D.

# 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

# CCSV4 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"







# CCSV4 INSTALL: 2 OF 6

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 are about to in	stall CCSv4 to C:\Program Files (x86)\Te	xas Instruments on Windows, w	hich vou will not be abl	e to run CCS with def	ault user privileges.				
			· ·						
If you wish to run C	CSv4 with default user privileges, please	2 choose a different install location	on.						
		OK							
lick"()K" :	nd proceed								
	ind proceed								

Code Composer Studio v4 Setup Choose Installation Location

Installation Folder

Texas Instruments

C:\Program Files (x86)\Texas Instruments

Where should Code Composer Studio v4 be installed?

To change the main installation folder click the Browse button.

Please note that a number of sub-folders will be created under the main installation folder. For example, installing in "C:\Program Files (x86)\Texas Instruments" would create "C:\Program Files (x86)\Texas Instruments" would create "C:\Program Files (x86)\Texas Instruments).

Browse...

### CCSV4 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

Code Composer Studio v4 Setup	×
Product Configuration Select the Product Configuration that best suits your nee	ds.
Select the Product Configuration that you wish to install. Me presented on the next screen.	ore detailed installation options will be
Platinum Edition	Description
Microcontroller Edition Misrocontroller Edition C2000-only Core Tools C2000-only Core Tools Scripting Tools Custom	This is a complete installation including all features and support for all device families. By default a 30 day evaluation license will be generated.
Texas Instruments	Next > Cancel



# CCSV4 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

Installing	Installing						
Installing Code Composer Studi	o v4						
Please wait while Setup installs Co	de Composer Studio v4 on your	computer.					
Installing XDC Tools							
CG Tools. Completed.	XDS560. Completed.	MSP430. Not selected					
Simulation. Completed.	SP/BIOS 5. Completed.	JRE JRE					
Emulation. Completed.	DSP/BIOS 6. Completed.	Debug Server					
V Spectrum Digital. Completed.	IPC and I/O. Completed.	DVT					
Blackhawk. Completed.	XDC Tools. Installing	CCS IDE					
	XDAIS	CCS Core					
XDS100. Completed.							
▼ XDS100. Completed.							

#### If during installation you see messages similar to the following



### CCSV4 INSTALL: 5 OF 6

#### Upon completion you should see the following screen



Choose "Finish" to exit the installation process

### CCSV4 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







Code Composer Studio v4

Congratulations!! CCS v4 has been successfully installed!

#### RUNNING CCSV4 THE FIRST TIME: 1 OF 3

#### 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"

Workspace	Launcher	×
Select a w	orkspace	
Code Compo Choose a wo	ser Studio stores your projects in a folder cal kspace folder to use for this session.	lled a workspace.
<u>W</u> orkspace:	D:\DSPworkspace	▼ <u>B</u> rowse
Use this a	s the default and do not ask again	OK Cancel
		OK Cancel

#### RUNNING CCSV4 THE FIRST TIME: 2 OF 3

You will then be prompted to select a license

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

Address: licserver1.msoe.edu

1555

Port:

Welcome to Code Composer Studio No valid license for Code Composer Studio could be found. Evaluate Code Composer Studio for 30 days Activate a License Step 1 - Generate License File Note: If you already have a license file, skip to the next step. Please note that you will need to use one of the following Host IDs during the registration process: 025041000001 or 705ab6b53558 or 0024d72aa61c or 0800270044de Register Register online using an activation code. Click to activate a free license that enables you to work with XDS100 class of Use Free Limited License emulators and emulators built onto standard EVM and DSK development boards. Step 2 - Install License File Specify a license file Browse... Specify a license server Address: licserver1.msoe.edu Port: 1555 ? OK Cancel

X

#### RUNNING CCSV4 THE FIRST TIME: 3 OF 3

Select the CCS icon in the upper right hand corner to open the IDE



### SUPPORT LIBRARIES: I OF 3

Using the DSK requires additional libraries provided by the hardware vendor (Spectrum Digital) and Texas Instruments

Navigate your web browser to <u>https://faculty-web.msoe.edu/prust/c6713dsk</u> 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:

		COMPTOT No.	should be	a the failure			×
Compu	tter 🖡 (C:) Local Disk 🖡 DSK6/13 🖡	_	_		Search DSK6/13	_	Q
Organize 🔻 Include	in library <b>*</b> Share with <b>*</b> Burn	New folder				• ==	0
🔆 Favorites	Name	Date modified	Туре	Size			
📰 Desktop 🚺 Downloads 🗐 Recent Places	<u> </u> c6000	8/4/2010 10:49 AM	File folder				
Libraries Cocuments Cocuments Cocuments Libraries Libraries							

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:

	STEREO AU							
Compu	uter 🕨 (D:) Local Disk 🕨 DSPworkspace	•				Search DSPworkspace		9
Organize 🔻 Include	in library 🔻 Share with 💌 Burn	New folder				833	• 🗊	0
🔆 Favorites	Name	Date modified	Туре	Size				
🧮 Desktop	🌗 .metadata	8/3/2010 6:08 PM	File folder					
퉳 Downloads	퉬 Support	8/3/2010 9:57 AM	File folder					
Recent Places	퉳 TestPrograms	8/4/2010 11:30 AM	File folder					
🧊 Libraries 🗈 🔯 Documents								

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: I OF I

- I) 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



Please follow this procedure each time you connect the DSK!

# TESTING THE DSK: I 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"



😯 New Targ	get Configuration
Target Co	onfiguration
Create a new	w Target Configuration file.
<u>F</u> ile name:	c6713DSK.ccxml
🔽 Use <u>s</u> ha	ared location
Location:	D:\MyDocs\user\CCSTargetConfigurations

### 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

Chudie (Lissenard - 20 De

	. code composer :	staaro (cicerisee	ar zo bays nemaning,	
	e <u>P</u> roject Tar <u>g</u> et	<u>T</u> ools Scrip	ots <u>W</u> indow <u>H</u> elp	
Select "Device"	\$\$ ▼ 8 ▼	9 1	by ▼ ♀ ★ ♀ ★ ◆ ★ ◆ ★ ◆ ★ ◆ ★ ◆ ★ ◆ ★ ◆ ★ ◆ ★	
		🕄 *c6713DSK.	.coxml 🛛	
DSK6713		Basic		
		General Set	tup	Advanced Set
		This section	n describes the general configuration about the target.	
		Connection	Spectrum Digital DSK-EVM-eZdsp onboard USB Emulator 👻	Target Config
		Device	type filter text	
Press "Save"			DSK6416	Save Configu
			DSK6455	Save
			☑ DSK6713	
			DSKTCI6482	
			EVM6413	
			EVM6418	
			EVM6455	
			EVMC6424	
			EVMC6474	
			EVMTCI6482	
			· · · · · · · · · · · · · · · · · · ·	
			Spectrum Digital C6713 DSK Board	
	•			

### TESTING THE DSK: 3 OF 6

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"



### TESTING THE DSK: 4 OF 6

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"

😵 Load Progra	m	×
Program file Code offset	D:\DSPworkspace\TestPrograms\Sine8_LED.out	Browse Browse project
Data offset		OK Cancel

### 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
<u>Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Code Composer Studio (Licensed : Debug - 0 main() at Sine8 LED.c:10 0x00001a80 - Co</u>



#### TESTING THE DSK: 6 OF 6

- 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.

### PROJECT TEMPLATE: 1 OF 4

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

#### 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]

### PROJECT TEMPLATE: 3 OF 4

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.

### PROJECT TEMPLATE: 4 OF 4

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

#### implement digital filter here

	C Loo	pp_stereo_test.c 뙤								
	1	//Loop_stereo_test.c								
1	2	<pre>#include "dsk6713_aic23.h"</pre>	//codec-DSK support file							
	3	Uint32 fs=DSK6713 AIC23 FREQ 48KHZ;		//set sampling rate						
	4	#define LEFT 0								
	5	#define RIGHT 1	RIGHT 1							
	6	union {Uint32 combo; short channel[	ata;							
	7									
	86	interrupt void c_int11()		//interrupt service routine						
	9	{								
	10	float lc;		//left channel from A/D						
	11	float rc;		//right channel from A/D						
	12	float lcnew;		//left to D/A						
	13	float rcnew;		//right to D/A						
	14	AIC23_data.combo = input_sample	();	//input 32-bit both chan						
	15	<pre>lc=(float) (AIC23_data.channel[L</pre>	EFT]);	//get left sample from A/D						
	16	<pre>rc=(float) (AIC23_data.channel[R</pre>	IGHT]);	//get right sample from A/D						
		<pre>// more floating point proc</pre>	essing here,	such as						
		<pre>lcnew=lc;</pre>		<pre>//calculate new left</pre>						
	19	<pre>rcnew=rc;</pre>		<pre>//and right data samples</pre>						
	20	// end of more processing -								
	21	AIC23_data.channel[LEFT]=(short	)(lcnew);	//prep left for D/A						
	22	AIC23_data.channel[RIGHT]=(shor	t) (rcnew);	//prep right for D/A						
	23	output_sample(AIC23_data.combo)	;	<pre>//output both channels</pre>						
	24	return;								
I	25	}								
	26									
	276	void main()	//main func	tion						
	28	{								
	29	comm_intr();	//init DSK,	codec, McBSP						
	30	while(1);	//infinite	loop						
	31	}								
	32									

# 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.