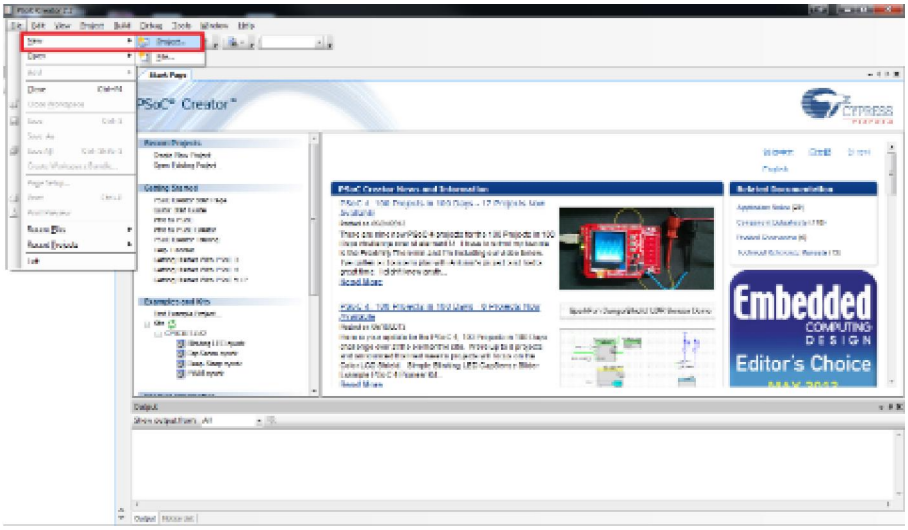
PSoC 4 Pioneer Kit Community Project#20 - Starter Designs

Did you know that PSoC Creator ships with many example projects to get you quickly up and running with PSoC 4?

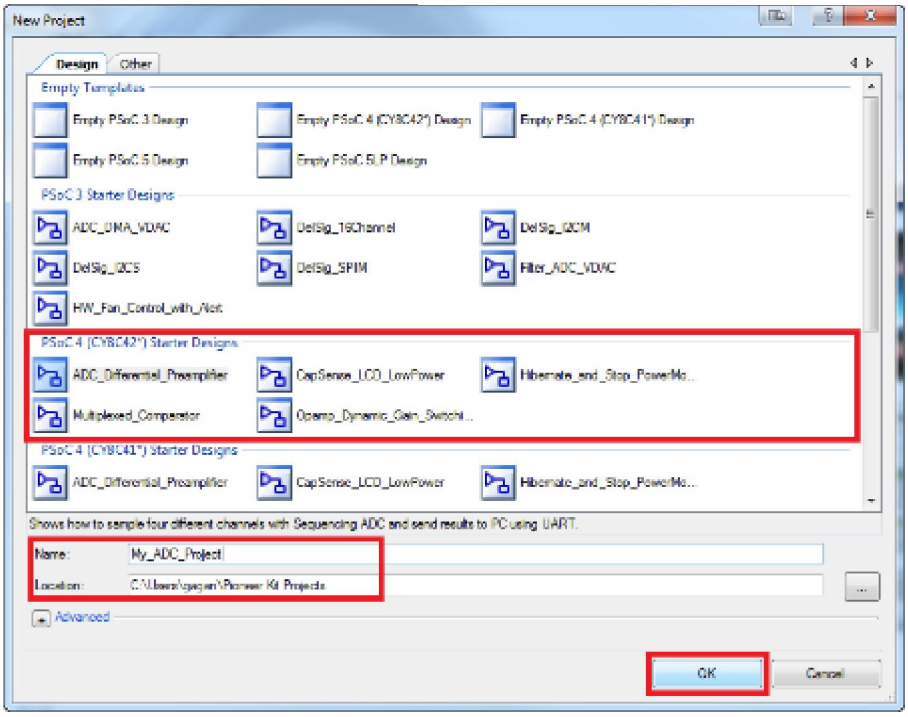
One category of these examples that ship with the tool are called "Starter Designs" -- intended to be examples of common design configurations used in typical embedded systems.

I will show you how to access these Starter Designs today -

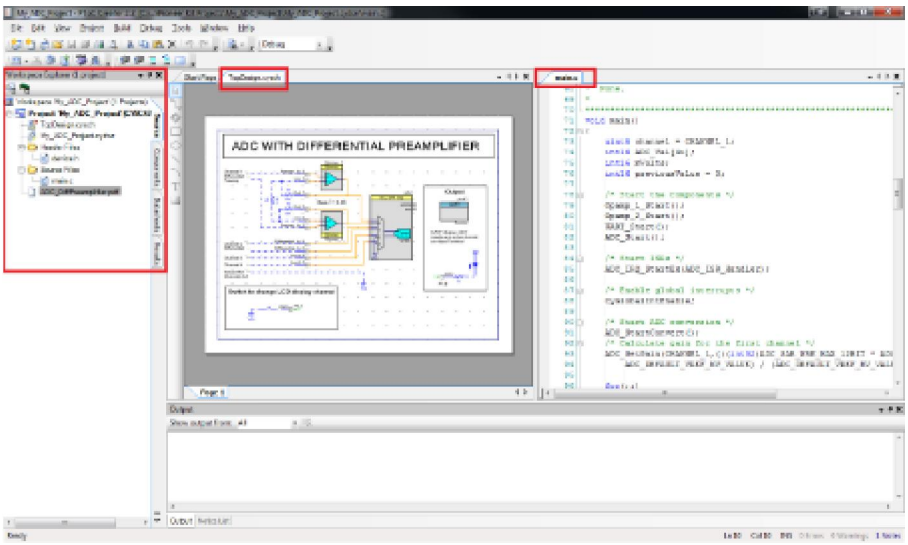
1. Launch PSoC Creator and start a New Project from the File menu



2.From the New Project window, scroll down to see the Starter Designs for the PSoC 42xx family. Here, you can select from the 5 included starter designs. You can also provide you own project name and path, and then press OK to create a new copy of this project on your computer.



3. In this example, I picked the first starter design "ADC_Differential_Preamplifier" and named it "My_ADC_Project". Once this new project is created, you will observe the already completed project schematic (topdesign.cysch), the project firmware (main.c) and also a document decribing this project in details (ADC_DiffPreamplifier.pdf).



4. To learn more about this particular project, see the included PDF document.

PSoC® Creator™ Example Project

ADC with Differential Preamplifier Example Project 1.0

Features

- CTBm Opamps are used as a Differential Preamplifier
- ADC is used in differential mode to cancel the common mode voltage
- UART to display ADC output on HyperTerminal
- LED to indicate when ADC input is outside the defined voltage window

General Description

This example project is a PSoC Creator starter design for PSoC 4 device. It's demonstrates PSoC 4's unique analog capability to use Opamps along with ADC to form a Differential preamplifier frontend. In this project, SAR Sequencer automatically scans four input channels and places the result into a SRAM buffer when complete. The user can change the channel to be displayed on HyperTerminal by pressing a switch on PSoC 4 Pioneer Kit.

Development Kit Configuration

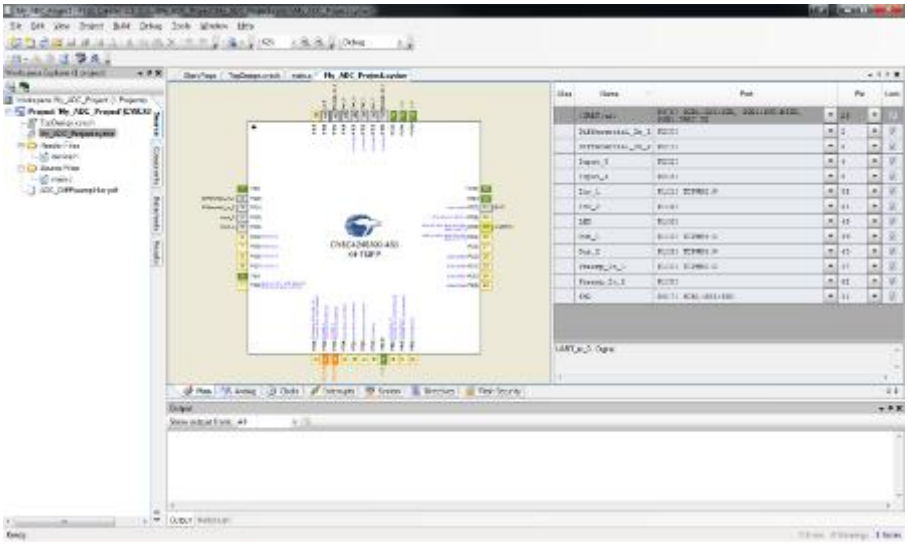
The following configuration instructions provide a guideline to test this design. For simplicity, the instructions describe the stepwise process to be followed when testing this design with the PSoC 4 Pioneer Kit (CY8CKIT-042). However, this starter design can be validated on any other PSoC 4 development kit. Please refer to the "Schematic and Pin mapping" section at the end of this document for details.

1. Set jumper J9 to 5.0V position.
2. Connect all the external resistors (R1=10K, R2=10K and Rg=2.2K) as shown in the top design schematic.
3. Connect input signals as shown in top design schematic.
4. Connect P0[5] to pin P12[6] on header J8.
5. Connect USB cable to the PSoC 4 Pioneer Kit DVK and PC with HyperTerminal program.

Project Configuration

This example project consists of SAR ADC with Sequencer, Opamp, and UART components. The top design schematic is shown in Figure 1. The hardware sequencer in the SAR ADC component continuously scans through four input channels. Two of these channels are configured in differential mode and the remaining two are configured in single ended mode. The first differential channel is connected to a preamplifier output and remaining channels are

5. Finally, assign the GPIO for your project based on what target hardware you are going to run it on (e.g. the PSoC Pioneer Kit). Once completed, you can then Build and Program this project on your PSoC 4 Pioneer Kit.



Here's a list of the 5 Starter Designs included with the current version of PSoC Creator 2.2 SP1.

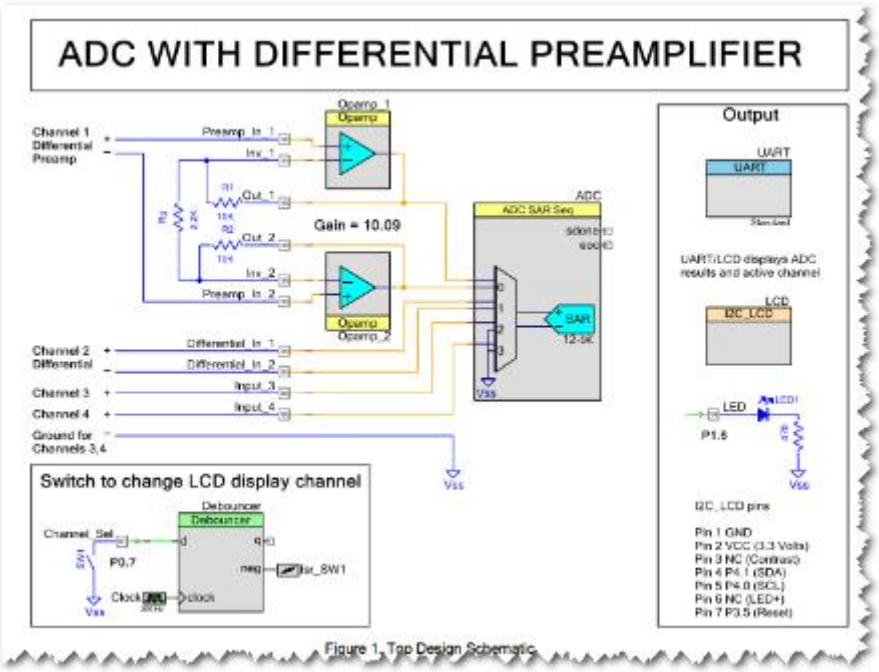


Figure 1. Top Design Schematic

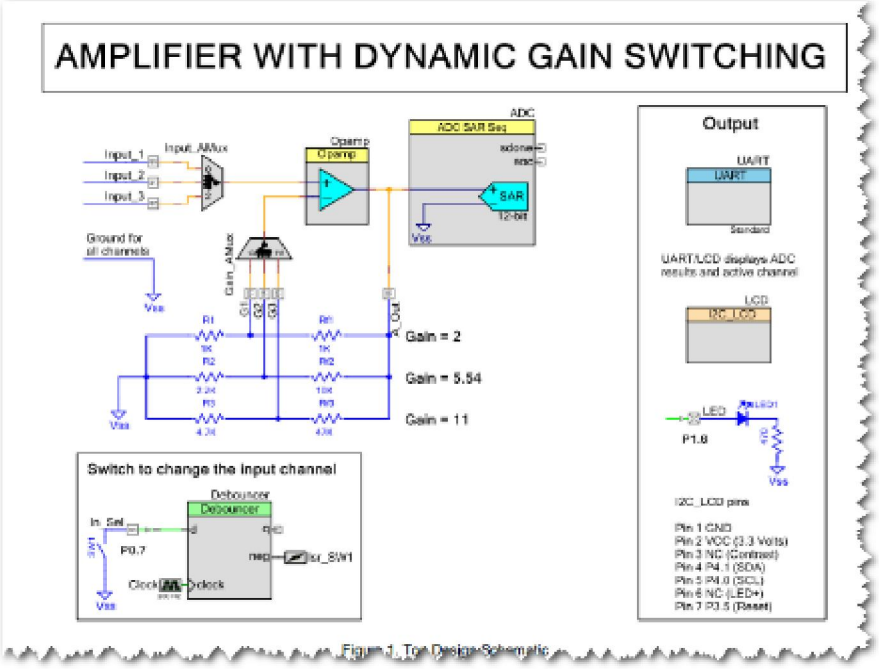


Figure 1. Top Design Schematic

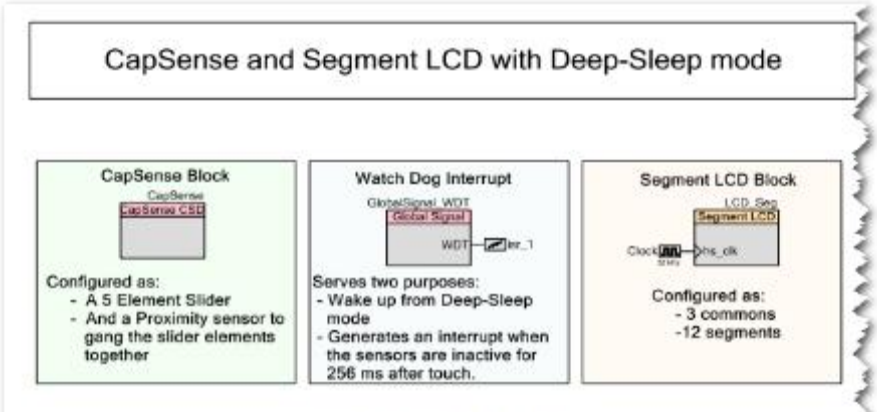


Figure 1: Top Design Schematic

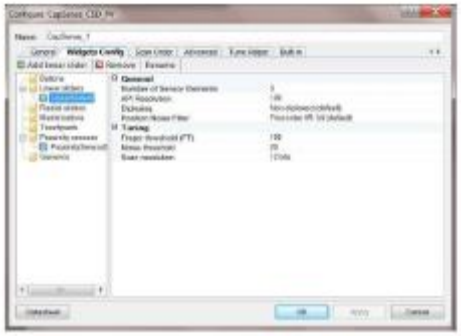


Figure 2: CapSense Widget Configuration

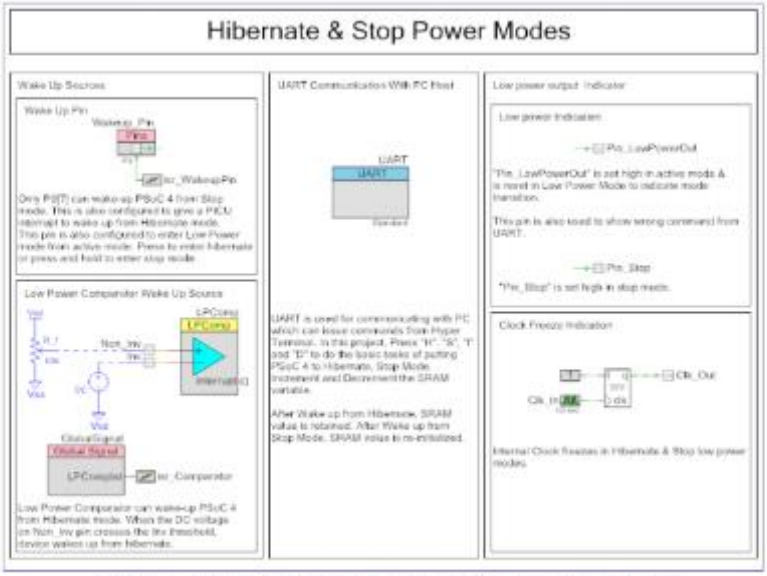


Figure 1. Top Design Schematic – Hibernate & Stop Power Modes

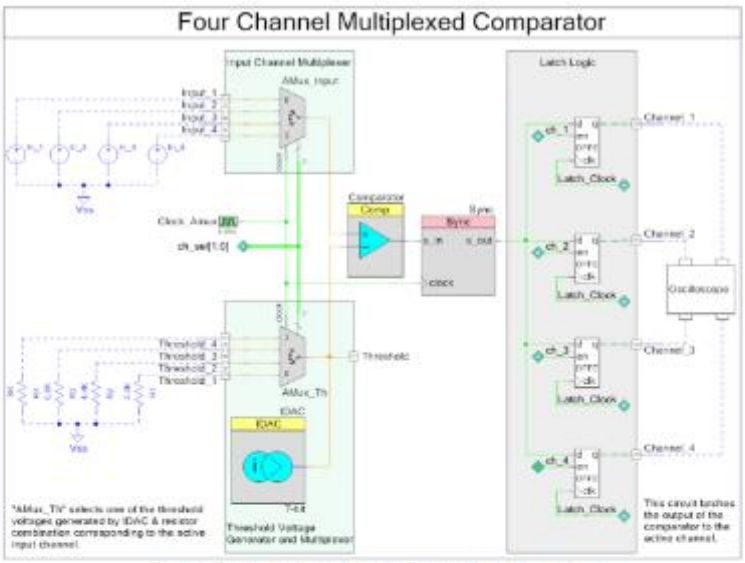


Figure 1. Top Design Schematic – Multiplexed Comparator (Page 1)

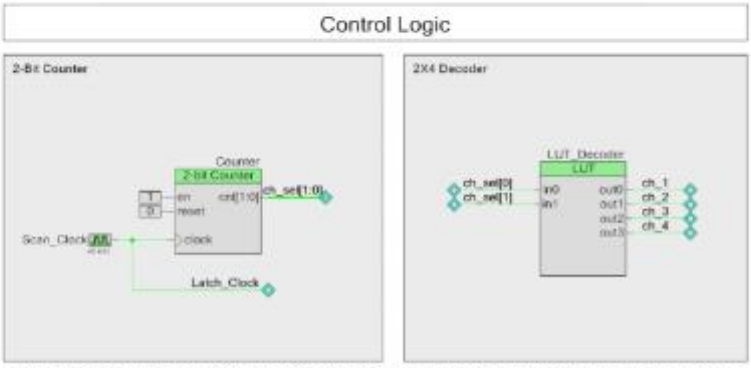


Figure 2. Top Design Schematic – Control Unit (Page 2)

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