PSoC Creator 101: CY8CKIT-049 Prototyping Kit Getting Started

Hello, my name is Alan Hawse; I'm Executive Vice President of Software at Cypress Semiconductor. I'd like to give you an introduction to the exciting new CY8CKIT-049 Prototyping Kit.

This is a four dollar kit that has either a PSoC 4200 or a PSoC 4100 chip as well as a USB serial programmer. The prototyping board can easily be used directly in your application by soldering standard 100 mil center headers on to the dev kit. I like to have a female connection on the top of the board with long male pins on the bottom of the board. This allows me to either plug the board into a bread board or to connect wires to the top.

The 4100 and 4200 boards are identical except for the PSoC chips; which have more or less resources. In addition, the kit comes with a programming interface implemented with the CY7C65211 configurable USB bridge controller chip. This chip lets you download new applications into the PSoC with our bootloader host utility. After you've finished your designs, you can snap off this chip and use it as a USB to serial bridge.

Before we ship the kit to you, it is programmed with two applications; a simple blinking LED application, in this case, called a bootloadable application and a bootloader application that runs automatically when you plug it into your USB port. If the button on the board is not pressed the bootloader with immediately launch the bootloadable application. To start the bootloader, remove the kit then hold down the button, then reinsert it and let go of the button. Do you see how the LED blinks at a different rate? That's because the PSoC has entered the bootloader program. The bootloader is now waiting on a serial port connection from your PC. The board enumerates as a COM port in the Windows device manager. Be aware that the first time you do this on a new USB port, Windows has to install a device driver. The online download process can sometimes take a minute or more, so be patient. Make sure the installation is complete before trying to program the board.

Start the Bootloader Host utility from the PSoC Creator tools menu. You should now see the new connection appear automatically. If it does not, you will need to set it up manually using the Windows device manager. See our user guide on the kit webpage for details of that straightforward process. To program the PSoC, first select the new port and choose the UART configuration from the pull-down menu; then set up the communication to be at 115200 baud, 8 data bits, one stop bit and no parity. Now you're ready to program the board. If you haven't done it already, download the kit installer from the kit webpage and run the installer.

Start by making a simple change to the application and then download it into your board. From the start page expand the kit under examples and kits, CY8CKIT-049-42xx, or 41xx and click on the SCB Bootloader example. Choose a location to save the project. In the project called bootloadable_blinking_LED open the schematic. Then open the customizer dialogue for the PWM. You're going to change the way the LED blinks. Let's leave it at the same rate, but reduce the time that the LED is on, thereby changing the duty cycle. Instead of a 50% duty cycle, we're going to have a short flash followed by a longer off time. Set the compare value to a 50, representing a 5% duty cycle.

Once that's done, rebuild the project by selecting build from the build menu in PSoC Creator. This will create a file named Bootloadable_Blinking _LED.cyacd. Now you need to tell the Bootloader Host tool where the application is on the disk. Press the folder button and find your project folder, then navigate through the architecture folder: CortexM0, the compiler folder: ARM GCC, and the build configuration folder: Debug, to locate the file with the extension cyacd. The cyacd stands for Cypress Application Code and Data, that's the equivalent of the hex file in bootloading. Press the download button and your project will be bootloaded onto your board.

See how the new application runs immediately? You can see that the LED is blinking really briefly and then it's off for a noticeably longer time, representing the 5% duty cycle that you set when you changed the compare value in your PWM.

Give this a try for yourself by changing the application and bootloading in your update. Change the blinking speed of the LED, vary the on and off times from the firmware. It doesn't really matter what you make the application do, you're just getting used to the bootloading process and building bootloadable applications in PSoC Creator and then downloading them; also known as bootloading them, from the Host utility.

If you have questions about PSoC Creator, or PSoC in general or if you just want to chat; you're welcome to email me: alan_hawse@cypress.com and I will make sure your questions are answered. Yes, I actually read and respond to all of these. Please send me a question if you have a problem and I'll help you deal with it.