

## Objective

This code example demonstrates the use of the current digital to analog converter (IDAC).

## Overview

This code example shows the capability of the [Current Digital to Analog Converter](#) (IDAC) to dynamically change its current output through the firmware. A button is used to double the current output.

## Requirements

**Tool:** PSoC Creator™ 4.0 or higher

**Programming Language:** C (ARM® GCC 4.9.3)

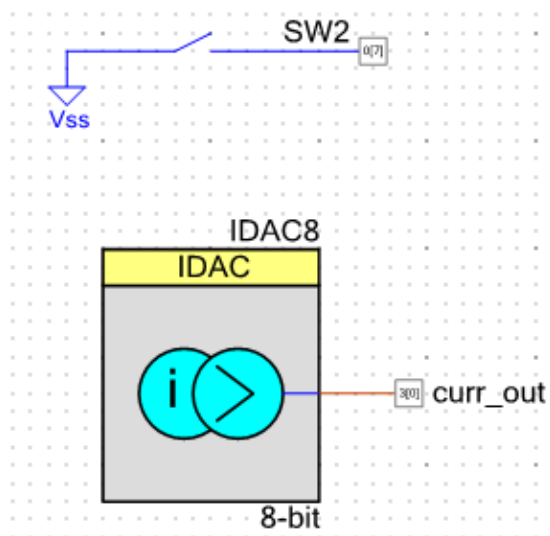
**Associated Parts:** PSoC® 4

**Hardware:** [CY8CKIT-042](#), [CY8CKIT-042-BLE](#), [CY8CKIT-044](#), [CY8CKIT-046](#)

## Design

The example demonstrates one way of using the IDAC Component. It is configured as an 8-bit (total count of 255) IDAC with a range of 0–306  $\mu\text{A}$  (1.2  $\mu\text{A}/\text{count}$ ), as shown in [Figure 1](#). A button is also used so that when the button is pressed, the current output will double. The IDAC current output can also be set through the IDAC8\_SetValue() API.

Figure 1. Top Design Schematic



## Kit Configuration and Pin Assignments

1. Select the appropriate device in the project's Design-Wide Resources file (.cydwr file) according to [Table 1](#).

Table 1. Development Kits and Associated Devices

Development Kit	Device
CY8CKIT-042	CY8C4245AXI-483
CY8CKIT-042-BLE	CY8C4247LQI-BL483
CY8CKIT-044	CY8C4247AZI-M485
CY8CKIT-046	CY8C4248BZI-L489

2. The project is designed for the CY8CKIT-042. Edit the project's .cydwr file to modify the physical pins to match [Table 2](#).

Table 2. Pin Assignments

Pin Name	Development Kit			
	CY8CKIT-042	CY8CKIT-042-BLE	CY8CKIT-044	CY8CKIT-046
curr_out	P0[0]	P0[0]	P0[0]	P1[2]
SW2	P0[7]	P2[7]	P0[7]	P0[7]

## Components

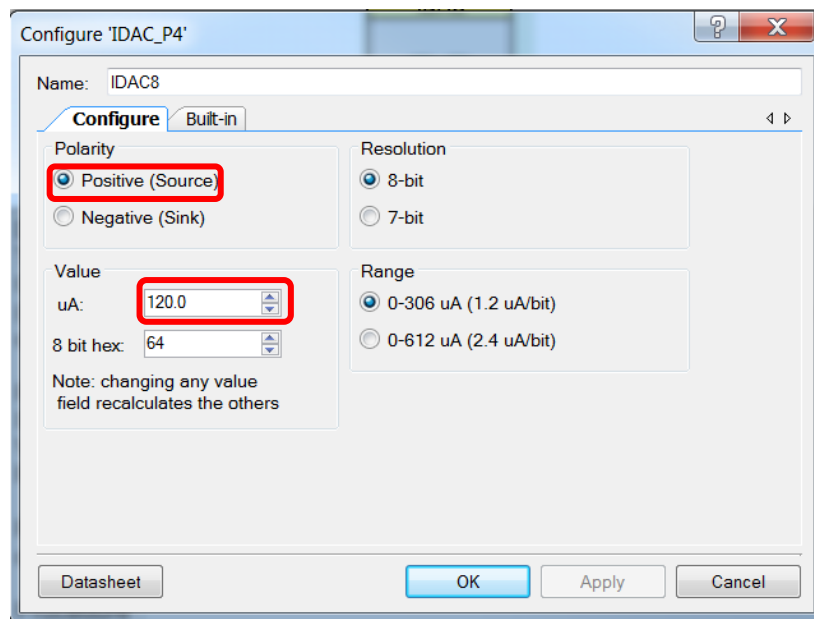
[Table 3](#) lists the PSoC Creator Components used in this example, as well as the hardware resources used by each.

Table 3. PSoC Creator Components

Component	Version	Hardware Resources
IDAC	1.1	Universal Analog Block
Pin	2.2	GPIO

The IDAC is configured for positive polarity, and the default current value is set to 120  $\mu$ A, as shown in Figure 2.

Figure 2. IDAC Configuration



## Operation

This example project requires a multimeter to measure the output current.

Follow these steps to communicate with the PC host.

1. Make sure that the kit has been configured as instructed in the [Kit Configuration and Pin Assignments](#) section.
2. Connect the USB cable between the PC and the kit.
3. Measure the current at pin 0[0] using a multimeter. The expected output current is 120  $\mu$ A when the button is not pressed. If the button is pressed, the expected current is 240  $\mu$ A.

This current can also be changed by modifying the IDAC\_VAL\_UNPRESSED value in *main.c*.

## Related Documents

Table 4 lists the relevant application notes, code examples, Component datasheets, and device and DVK documentation.

Table 4. Related Documents

Application Notes		
<a href="#">AN79953</a>	Getting Started with PSoC 4	Describes PSoC 4 and shows how to build the attached code example
<a href="#">AN60590</a>	PSoC 3, PSoC 4, and PSoC 5LP – Temperature Measurement with a Diode	Explains the use of a diode and an IDAC as a temperature sensor
Code Examples		
<a href="#">CE204022</a>	PSoC 4 IDAC7 Sawtooth Waveform Generator	Shows the basics of using the IDAC7 available in some PSoC 4 devices. A simple sawtooth or voltage ramp waveform is generated using the IDAC7 current output digital-to-analog converter.
PSoC Creator Component Datasheets		
<a href="#">Current Digital to Analog Converter</a>	Supports the IDAC Component	
<a href="#">Pins</a>	Supports the connection of hardware resources to physical pins	
Device Documentation		
<a href="#">PSoC 4 Datasheets</a>	<a href="#">PSoC 4 Technical Reference Manuals</a>	
Development Kit (DVK) Documentation		
<a href="#">PSoC 4 Kits</a>		

## Document History

Document Title: CE95327 – PSoC® 4 Current Output Digital-to-Analog Converter

Document Number: 001-95327

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5526019	WESL	10/24/16	New code example

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