PSoC 4 DMA ADC Example Project

1.0

Features

- Data transfer between ADC and memory location
- Indication of ADC conversion results using RGB LED

General Description

This example project demonstrates reading data from ADC and writing it to a RAM register. The eoc of ADC triggers DMA to transfer an ADC result to a variable. RGB LED is switched different colors depending on this variable value.

Development Kit Configuration

This example project is designed to run on a CY8CKIT-044 development kit from Cypress Semiconductor. A full description of the kit, along with more example programs and ordering information, can be found at http://www.cypress.com/go/cy8ckit-044.

The project requires configuration settings changes to run on other kits from Cypress Semiconductor. Table 1 is the list of the supported kits. To switch from CY8CKIT-044 to any other kit, change the project's device with the help of Device Selector called from the project's context menu.

Table 1. Development Kits vs Parts

Development Kit	Device
CY8CKIT-042-BLE	CY8C4248LQI-BL583
CY8CKIT-044	CY8C4247AZI-M485
CY8CKIT-046	CY8C4248BZI-L489

The pin assignments for the supported kits are in Table 2.

Table 2. Pin Assignment

Pin Name	Development Kit		
	CY8CKIT-042-BLE	CY8CKIT-044	CY8CKIT-046
RED	P2[6]	P0[6]	P5[2]
GREEN	P3[6]	P2[6]	P5[3]
BLUE	P3[7]	P6[5]	P5[4]
V1	P2[0]	P2[0]	P2[0]

Connect a source voltage to P2[0] on your development kit. The voltage range should be between 0V and 1.024 V for correct reading.

Projects Description

This example illustrates how a trigger initiates a transfer of a 16-bit sample from an ADC source to a memory destination. The ADC source has a bus interface that only supports 32-bit transfers. The memory has a bus interface that supports 8-bit, 16-bit, and 32-bit transfers. The transferred sample should be written to 16 memory bits.

The ADC sample location is at address `ADC_SAR_CHAN0_RESULT_PTR`. The memory location is determined by the address of the `adcSample` variable. The number of data elements to transfer is set to 1 in the DMA customizer. As a result, a new ADC sample overwrites a previous ADC sample in memory. Once the trigger is received, DMA loads 32 bits from the ADC location and stores the lower 16 bits to the `adcSample` variable. Successive triggers will result in the same behavior. After every transfer completes, DMA sets the corresponding bit in the interrupt register to '1', signaling to the CPU that a new sample has been captured.

In the main firmware routine, the `adcSample` variable is used to control the color of RGB LED.

Expected Results

RGB LED changes the color depending on the ADC conversion results as shown in the table below.

Range #	Value	Color
RANGE0	0x000-0x1FF	Blue
RANGE1	0x200-0x3FF	Green
RANGE2	0x400-0x5FF	Red
RANGE3	0x600-0x7FF	Yellow

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