UNIVERSITY OF ENGINEERING AND TECHNOLOGY, TAXILA
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Embedded Systems Design

LAB MANUAL 2

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Input / Output operations with LED's and Push Buttons on Balckfin Processor (BF-561)

The EZ-KIT Lite provides four push buttons and sixteen LEDs for general- purpose IO. Sixteen LEDs, labeled LED5 through LED20, are controlled by the processor's programmable flags PF32 through PF47 (equivalent to PPI0_D15–8 and PPI1_D15–8). These LEDs are accessed through the FLAG 2 registers. First, the direction must be configured to output by setting the bits of the FIO2_DIR register to 1. Then the values of the LEDs are modified using one of the FIO2_FLAG_D, FIO2_FLAG_C, FIO2_FLAG_S, or FIO2_FLAG_T registers. The four general-purpose push buttons are labeled SW6 through SW9. The buttons connect to the programmable flags PF8–5. A status of each individual button can be read through the FIO0_FLAG_D register. A switch is being pressed-on when the corresponding bit of the register reads 1. When the switch is released, the bit reads 0. A connection between the push button and PF input is established through the SW4 DIP switch. The programmable flag pins and corresponding switches are shown in Table 1.

Table 1. Programmable Flag Switches:

Processor Programmable Flag Pin	Push Button Reference Designator
PF5	SW6
PF6	SW7
PF7	SW8
PF8	SW9

The position of the LED's and switches are shown in the figure 1. All the general purpose LED's are located on the bottom right corner of the EZ-Kit Lite BF-561.

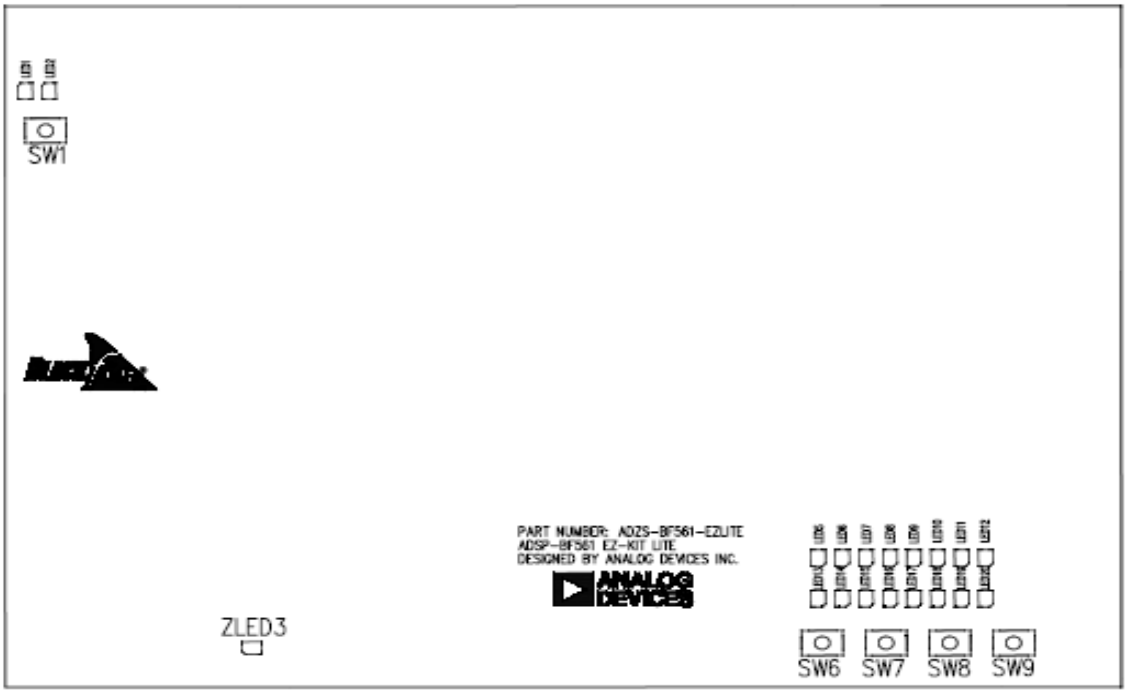

Figure 1: Position of LED's and Switches

Lab Questions:

Question 1: Write a program that output the counting on the LED's when SW6 presses and in reverse order when the SW7 presses?

Question 2: Write a program that prints to standard output which push button was pressed?

Question 3: Write a program that output any random number on the LED's when SW6 is pressed and toggle this random number when the SW7 presses?