

Tutorial 2: Controlling the XF LED

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| 1. | The term <i>set</i> when applied to a control bit means make high. This corresponds to approximately the supply voltage, typically 5V for the TMS323F243 and 3.3V for the TMS320LF2407. |
| 2. | The term <i>clear</i> when applied to a control bit means pull low. This corresponds to approximately 0V. |
| 3. | a) SET XF ; Incorrect. Should be SETC XF b) SETC XF ; Correct c) CLR XF ; Incorrect. Should be CLRC XF d) CLRC XF ; Correct. |
| 4. | In order turn on the XF LED on the TMS320F243 DSK we use the instruction SETC XF. |
| 5. | To turn off the XF LED on the TMS320F243 DSK, we use the instruction CLRC XF. |
| 6. | When we repeatedly flash the XF LED on and off rapidly, the XF LED appears dimmed because it is being switched on and off faster than we can see. The average brightness (i.e. dimmed) is what we see. |
| 7. | The frequency on the CLKOUT pin is important because it tells us the speed at which the TMS320F24x is working internally. |
| 8. | We express execution time in cycles rather than in divisions of seconds because we can change the clock speed of the processor. However, the number of cycles taken by each instruction always remains the same. The actual timings can be easily calculated when the number of cycles is known. |
| 9. | The instruction NOP means No Operation and has no effect other than to take up execution time. It is commonly used in delay loops. |
| 10. | a) B label, BIO ; Incorrect. BIO not needed. b) BCND label, BIO ; Correct. c) BCND label, ; Incorrect. Missing operand. d) BCND BIO, label ; Incorrect. Label comes first. e) BCND BIO ; Incorrect. Missing operand. f) BCND label1, label2 ; Wrong operand type. |
| 11. | We use the BIO pin to control software by using the an instruction sequence such as the following: <i>loop</i> : BCND <i>loop</i> , BIO ; Branch to label while the ; BIO pin is low. NOP ; Next instruction. |
| 12. | The instruction BCND does not always takes 4 cycles to execute. When the test condition evaluates to FALSE, the instruction B requires only 2 cycles. |

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| 13. | Timing cycles important for real-time programming because they determine the speed of a program. To gain optimum performance in terms of program speed, we write code to use the minimum number of cycles. |
| 14. | We can use the output on the XF pin as a simple digital-to-analog converter (D-to-A) by pulsing it on and off. This is known as pulse width modulation (PWM). |