­­­EE 444

MSP430-Low Power Modes

Lab 5: *MSP430: Digit­­al I/O*

*3/27/2017*

**Chic J O’Dell**

Does your solution work the way it’s supposed to work? □YES □NO1

1If your answer is NO, please explain in your report.

Instructor/TA comments and grading

# Objective and Background

To explore low power modes available on the MSP430 in order to maxim

# Equipment

* CrossStudio for MSP430
* TI MSP-EXP430F5438 Experimenter Board
* Digital Multimeter

# Procedure

Using a global variable, “state” to keep track of button pushes and a simple switch statement to sequence through power modes the current draw of the MSP is tracked using a DMM. The switch statement as seen in the attached code lives in main. Based on the value of the global variable“state” the MSP will fall into different power modes (AM 🡪 LPM4) all with global interrupts enabled. After the MSP has settled into the “state” mandated power mode the “SW1” button can be pushed to trigger a port2 interrupt. This interrupt looks at the “state” variable and increments “state” in order to continue to the next power mode and then exits the current LPM mode using “LPMx\_EXIT;”. As the power mode is exited SR register is re written to return to the line below the power mode option that was in main, this puts the code back into the switch statement that will then select the next “state” value.

# 4. Results

Table : Power measurements at 1 MHz Sclk

|  |  |  |
| --- | --- | --- |
| Power Mode | Not Using Timer A | Using Timer A |
| AM | .294 mA | .295 mA |
| LPM0 | .105 mA | .107 mA |
| LPM1 | .104 mA | .106 mA |
| LPM2 | .036 mA | .105 mA |
| LPM3 | .031 mA | .107 mA |
| LPM4 | .028 mA | .107 mA |

Table : : Power measurements at 8 MHz Sclk

|  |  |  |
| --- | --- | --- |
| Power Mode | Not Using Timer A | Using Timer A |
| AM | 1.086 mA | 1.087 mA |
| LPM0 | .155 mA | .148 mA |
| LPM1 | .151 mA | .145 mA |
| LPM2 | .151 mA | .036 mA |
| LPM3 | .153 mA | .032 mA |
| LPM4 | .151 mA | .028 mA |

# 5. Conclusion

Low power modes are a very useful and simple way to save power in any MSP application. Though it is important to pick a low power mode that fits your application ie timers may need to stay on for peripherals. On the other side of the coin it is also just as important to understand your application to know which timers you can disable thus saving more power.

# 6. Attachments