

UNCC, Department of Electrical and Computer Engineering
ECGR4101/5101/6090, Fall 2004, Homework #6, Due: 10/13/04, at the beginning of class (20 points)

You will need to refer to the M16C/20/60 Software Manual, the M16C26 Hardware Manual and M16C C Language Programming Manual to complete this assignment. They are available online through the Documentation contained in the SKP16C26 directories link on the course home page.

0. How long did this homework take you? (1 point)
1. Read the Russell Massey article “Introduction to Interrupts.” In four lines of correct English, summarize Mr. Massey’s article. (3 points)
2. What is the output code (in decimal) of a 5-bit ADC with $V_{in}=7V$, $V_{+ref}=10 V$, $V_{-ref}=0 V$? (2 points)
3. What is the output code (in decimal) of an 8-bit ADC with $V_{in}=3.2V$, $V_{+ref}=5 V$, $V_{-ref}= 1.5 V$? (2 points)
4. What is the maximum quantization error for an 8 bit ADC with $V_{+ref}=10 V$, $V_{-ref}=0 V$? (2 points)

For the following question you may wish to refer to the AD Converter section of the MCU data sheet (M16C26 Hardware Manual).NOTE: on page 153, there are typographical errors describing the conversion speed of the ADC. f_{AD} is the input clock to the ADC clock divider, which creates the ϕ_{AD} clock for the actual conversion. The text on page 162 clarifies how long each conversion takes.

5. Write C code to configure the ADC to sample channel AN4 in one-shot mode using 10-bit conversion, and then start a conversion. Assume that the MCU clock is 20 MHz and the conversion should use the sample-and-hold and take 19.8 microseconds to complete. Use the bit names as defined in sfr262.h (which are similar to the names defined in the MCU Hardware Manual). Be sure to set the appropriate pin as an input. (10 points) Start with:

```
#include “sfr262.h”
```