

## EE 308 – Homework 10

Due Apr. 6, 2009

For all problems below assume you are using a MCS12DP256 chip with a 24 MHz bus clock and a 8 MHz oscillator clock.

1. Problem E11.2 of the text: Suppose that the 7-bit address of an I<sup>2</sup>C slave is B'1010110. What is the 8-bit hex write address for this slave? What is the 8-bit hex read address for this slave?
2. Problem E11.3 of the text: Assuming that the HCS12 is running with a 16-MHz bus clock, compute the values to be written into the IBFD register to set the baud rate up to 100 kHz. Use Table 11.6 of the text or Table 3.4 of the HCS12 IIC Block Guide. Repeat for a baud rate of up to 200 kHz.
3. Problem E11.10 of the text (with an added part). The MAX5812 is a DAC with 12-bit resolution and an I<sup>2</sup>C interface. The MAX5812 datasheet can be downloaded from the website <http://www.maxim-ic.com>.
  - (a) What is the 7-bit address of the MAX5812?
  - (b) What is the highest operating frequency of this chip?
  - (c) How many commands are available to this chip?
  - (d) What sequence of bytes would you write to this chip to set the output voltage to 1.0 V? Assume that the chip is powered from a +5 V supply.
4. Write a C function `unsigned char iic_receive(void)` which receives all but the last two bytes of a read sequence three or more bytes long, and returns the character read from the slave device. (See the lecture notes from April 1 for a detailed list of what this function should do.)
5. Write a C function `unsigned char iic_receive_m1(void)` which receives the next to the last byte of a read sequence two or more bytes long, and returns the character read from the slave device. (See the lecture notes from April 1 for a detailed list of what this function should do.)
6. Write a C function `unsigned char iic_receive_last(void)` which receives the last byte of a read sequence two or more bytes long, and returns the character read from the slave device. (See the lecture notes from April 1 for a detailed list of what this function should do.)
7. Write a C function `void iic_swrcv(void)` which switches the I<sup>2</sup>C bus from transmit to receive, and starts the serial clock for the reception of the first byte from the slave.