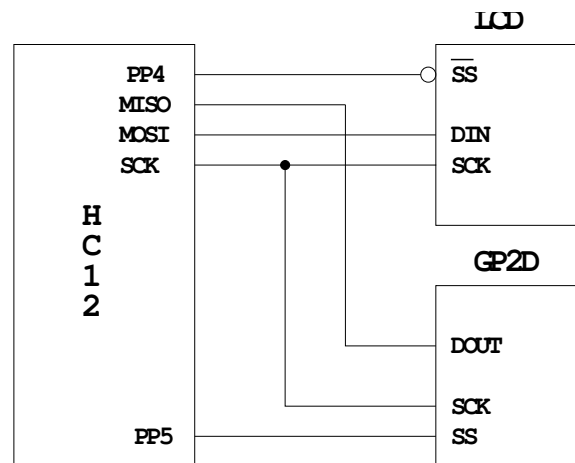
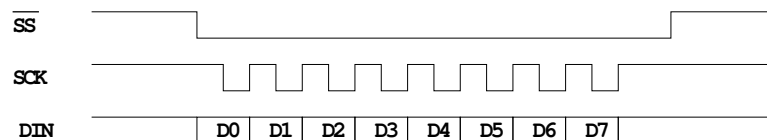


EE 308
Homework 10
Due April 3, 2006

1. How do you set up the HC12 to use the SPI in the following mode. Write some C code to do this.
 - HC12 is the master
 - No interrupts
 - SCK idle low, data valid on rising edge of SCK
 - LSB is sent first
 - SCK frequency is 250 kHz
2. Explain how the SPIF (SPI Flag) is set. Also, explain how to clear this flag.
3. A 9S12 is being used to communicate with two devices over SPI0. The devices are connected as shown below:

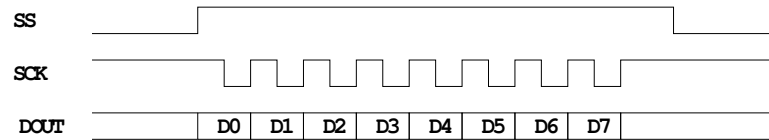


Each byte you write to the LCD chip is displayed on an LCD display. The following shows how to write to the LCD chip over the SPI:



Maximum SCK = 500 kHz

The GP2D device is a distance sensor. When the HC12 reads from the GP2D chip, the GP2D sends it a byte which tells it how far it is from an object (such as a wall). The GP2D sends a 0x00 when it is almost touching the object. It sends a 0xFF when it is 2 feet (or more) from the object. The following shows how to read from the GP2D chip over the SPI:



Maximum SCK = 250 kHz

- (a) How do you set up the HC12 to communicate with the LCD and the GP2D? Explain what values you need to write to which registers. Be sure to set the correct clock phase and polarity.
 - (b) Write some C code to set up the HC12 to communicate with the LCD chip and the GP2D chip – i.e., write C code to implement (1).
 - (c) Write some C code to read the distance from the GP2D. Make sure the LCD chip is deselected while you are doing this.
 - (d) Write some C code to send the sequence "Hello" to the LCD chip. Make sure the GP2D is deselected while you are doing this.
4. Look at the data sheet for the [DS 1302](#) Real Time Clock. Determine how to talk to the DS 1302 over the SPI.
 - (a) What SPI clock rate should you use?
 - (b) What clock polarity and phase?
 - (c) Should you use most significant bit first or least significant bit first?
 - (d) Should you use normal (unidirectional) mode or bidirectional mode?
 - (e) How many bytes are sent to write a new value to one register of the DS 1302 – one byte, two bytes, or four bytes?
 5. Assume the DS 1302 is connected to a 9S12 using SPI0.
 - (a) Write some C code to set up the SPI to talk to the DS 1302.
 - (b) Write some C code to set the hours register of the DS 1302 to 12.
 - (c) Write some C code to read the hours register from the DS 1302.