KHALIFA UNIVERSITY

Module Name: Microprocessor Systems Laboratory
Module Code: ELCE333

Laboratory Experiment No. 5

Experiment Title:

Serial Communication Interface
Pre-lab Report

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Spring 2015

1. Introduction

A serial interface is a communication interface between two digital systems that transmits data as a series of voltage pulses down a wire where "1" is represented by a high logical voltage and a "0" is represented by a low logical voltage. the serial interface encodes the bits of a binary number by their "temporal" location on a wire rather than their "spatial" location within a set of wires. Encoding data bits by their "spatial" location is referred to as a parallel interface and encoding bits by their "temporal" location is referred to as a serial interface. the figure below shows the difference between the 2 interfaces.

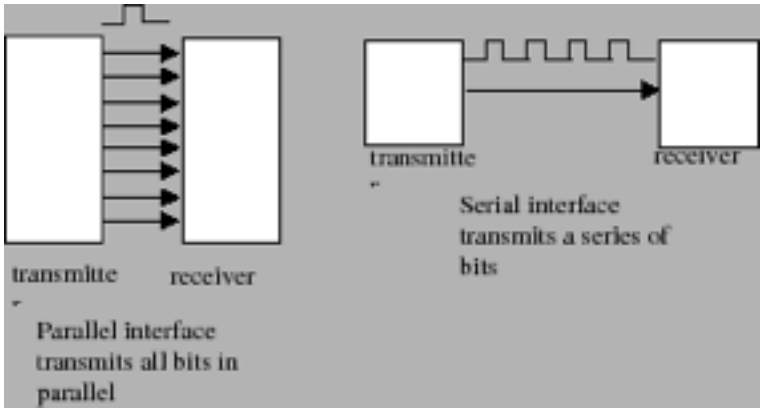

Figure 1: Difference between parallel and serial interfaces

The issue with a serial interface is knowing where the data is on the wire. The answer tlies in creating a protocol. A protocol is an agreement between two parties about how the two parties should behave. A communication protocol is a protocol about how two parties should speak to each other. Serial communication protocols assume that bits are transmitted in series down a single channel.

In an asynchronous serial interface (SCI) data is transmitted inframes. A frame is a complete packet of bits. The frame includes both information and control bits. In asynchronous serial protocols the frame often consists of a single start bit, data bits, parity bits, and sometimes a stop bit. A frame diagram is shown in the figure below. The start bit is used to signal the beginning of a frame and the stop bit signals the end of the frame. The parity bit is a special bit that is used to detect transmission errors.The SCI interface is asynchronous because both devices do not need to synchronize their clocks before communicating. The receiver waits for the start bit and then begins reading the data line at the agreed upon baud rate.

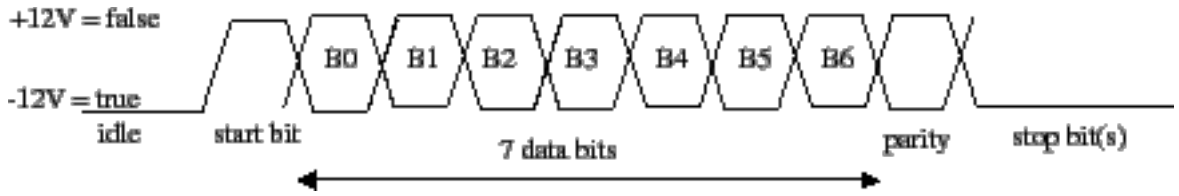

Figure 2: Frame representation

Pre-lab Questions

1. **What is meant by Baud Rate and in what unit is it measured?**

Baud rate is the rate of modulation of a signal or a code used through communication systems. It is the number of symbols per second transferred. Baud rate is measured in Baud (Bd).

2. **Which jumper has to be moved in order for SCI1 to function?**

Jumper J23 should be moved in order for SCI1 to function.

3. **The HCS12 TxD and RxD signals _____ (are, are not) TTL-compatible.**

Are not.

4. **In this lab, what is the role of the MAX233 (MAX232) chip?**

It converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits.

5. **What is the role of TDRE and RDRF? State to which register they belong to.**

For transmitting and recieving data on transmission line. SCI status register 1.