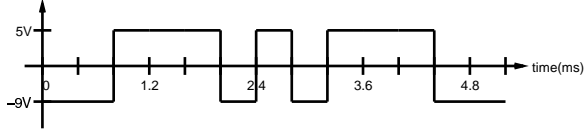# Assignment 4 - Serial and Parallel Interfaces

due Wednesday, March 11

Question 1

The figure below shows a plot of voltage versus time of the signal on the TxD pin of an RS-232 serial interface while one character is transmitted.

Answer the following questions:

(a) Are the voltage levels valid for an RS-232 interface?

(b) What is the (approximate) baud rate?

(c) Assume parity bits are not being used. How many data bits were transmitted?

(d) What character was transmitted?

Question 2

You are trying to connect a computer to a machine tool that uses a 25-pin serial interface. The machine tool does not respond to commands and you suspect there is something wrong with the serial interface. You measure the voltages on various pins of the serial interface on both devices. On the computer you measure 12 volts on the CTS pin. On the machine tool you measure -4 volts on pin 3. What is likely to be the problem? Explain your reasoning. How could you resolve this problem?

Question 3

A computer's parallel printer interface is implemented using a 1-byte output port at address 0x17D, a 1-byte status port at address 0x174 and an 1-byte control port at address 0x180. The status of the BUSY signal can be read from the least significant bit of the status port (1=busy, 0=not busy). The other bits of the status port have unknown values. The STROBE signal can be controlled by setting the bit 4 of the control port (1=high, 0=low). The other bits of the control port have no effect.

Write a C function, `void cprint(char c)` that waits until the printer is not busy, writes c to the data port, sets the strobe signal low and then sets it high again. Use the same `speek()` and `spoke()` functions used in the lab.

Write another C function, `void sprint(char s[])`, that prints the string s on the printer.