

Solutions to Assignment 3

Question 1

- (a) The voltage levels for an RS-232 interface must be greater than +3V or less than -3 V, so the voltages shown are valid.
- (b) If only one character was transmitted, the period must be the smallest interval shown or 0.2 ms for a bit rate of about 5000 bps (probably 4800 bps).
- (c) The first positive bit is a start bit. This is followed by 7 or 8 data bits. Since the 8th data bit in the character is positive, it cannot be a stop bit. Eight data bits must have been sent.
- (d) The bit values are received from LS to MS bit. In this order they are: 0100 1010. In MS to LS bit order they are 0101 0010 which is hex 0x52 which is the letter R.

```
#define CONTROL 0x181
#define BUSY    0x80
#define STROBE  0x08

/* Write c to parallel printer port. */

void cprint(char c)
{
    /* wait until printer not busy */
    while ( speak(STATUS) & BUSY ) ;

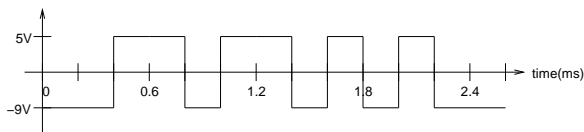
    /* put character on data lines */
    spoke ( DATA, c ) ;

    /* short pulse on the strobe line */
    spoke ( CONTROL, 0 ) ;
    spoke ( CONTROL, STROBE ) ;
}

/* Print string s on printer. */
```

Question 2

If the DSR pin on the computer measures 7 volts it must be an output. If TxD reads 0 (an invalid RS-232 level) it must be an input. Since DSR is an output and TxD is an input for a DCE, the computer must be wired up as a DCE. For similar reasons the other computer must also be wired up as a DCE. The solution would be to use a “null modem” to exchange the pins assigned to the handshaking and data signals. A basic null modem would connect the signals as follows:



Question 3

```
#define DATA    0x180
#define STATUS   0x181
```