ECT-215 Homework #3 Solution Set

Chapter 14 problems 30-38,44-47

Scoring: 1 point per problem, 13 points total.

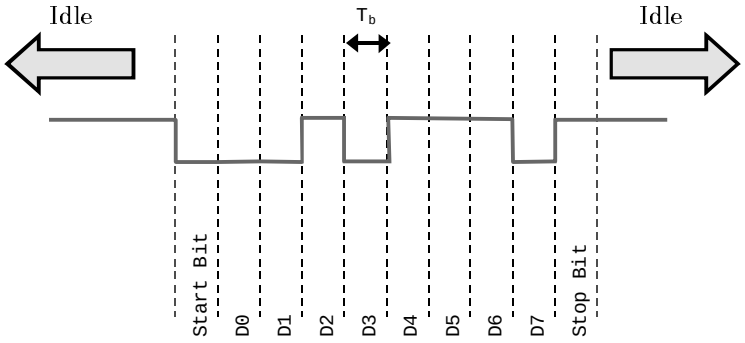
30. *Explain the difference between synchronous and asynchronous data. Which type is used with UARTs?*

    Synchronous data is sent with a clock signal (usually mixed with the data), such that the receiver gets a clock signal with the data. Asynchronous data is sent without a clock, which means that the receiver must generate its own clock signal. This is the type of data used with UARTs.

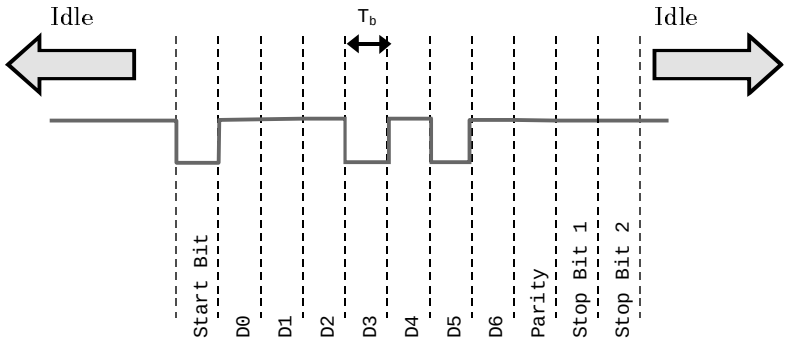
31. *What is the meaning of each of the following shorthand designations?*
    a) 8,N1 ; b) 5,E,1 ; c) 7,O,2 ; d) 6,N,2

    a) 8,N,1 means 8 data bits, No parity, and 1 Stop bit.
    b) 5,E,1 means 5 data bits, Even parity, and 1 Stop bit.
    c) 7,O,2 means 7 data bits, Odd parity, and 2 Stop bits.
    d) 6,N,2 means 6 data bits, No parity, and 2 Stop bits.

32. *Draw the asynchronous character 74H, sent using parameters 8,N,1. Label each part of the character.*



33. *Draw the asynchronous character 57H, sent using parameters 7,E,2. Label each part of the character.*



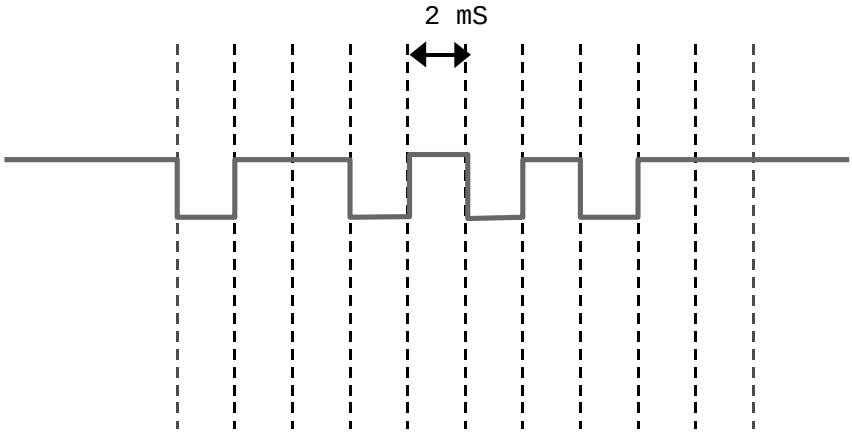


Figure 14-44: An Asynchronous Character for Analysis

34. *Assuming that the parameters are 8,N,1 in figure 14-44 above, determine the hexadecimal data value that is being transmitted.*

    The data being transmitted is { $1010\ 1011_2$ } $AB

35. *What is the data rate in bps and the character rate in CPS for the character above?*

$$bps = \frac{1}{T_b} = \frac{1}{2mS} = \underline{\underline{500bps}}$$

$$CPS = \frac{1}{T_C} = \frac{1}{(10bits/char)(2ms/bit)} = \underline{\underline{50CPS}}$$

36. *What is the function of a UART?*

    A UARTs function is to convert parallel data to serial for transmission, and to convert received serial data back into parallel form.

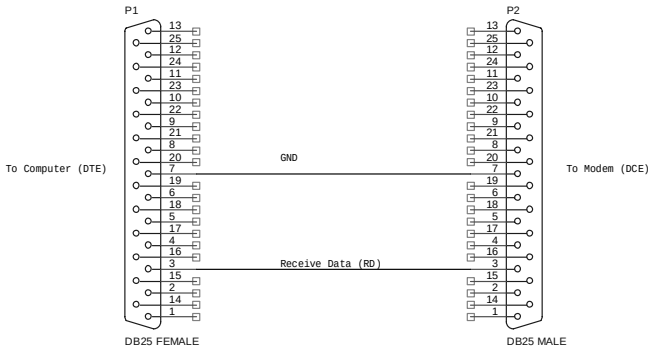
37. *List the four major sections of the HD6402 UART, explaining the purpose of each one.*

    1. Control: Sets receive and transmit parameters.
    2. Transmitter: Converts parallel input to serial output.
    3. Receiver: Converts serial back into parallel.
    4. Status: Monitors and reports internal UART conditions

38. *What control inputs and clock frequency are needed to set the HD6402 UART as follows: 19,200 bps; 8,O,2.*

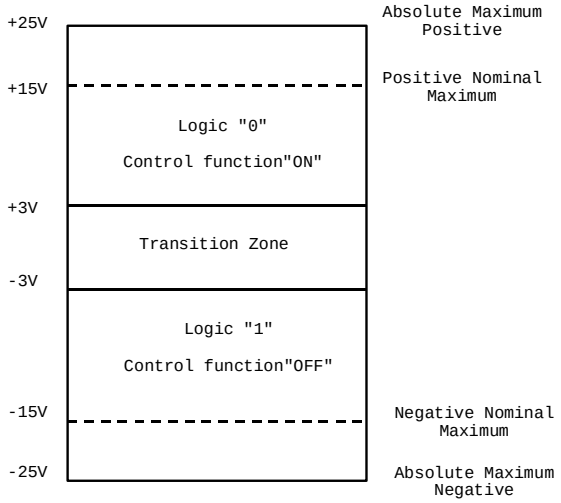
SBS = 1 *(Selects 1 stop bit)*; PI=0 *(Enables Parity);* EPE=0; *(Selects Odd parity);* CLS1=1,CLS2=1 (Selects 8 data bits); $f_{TRC/RRC}$ = (16)(19.2K)=<u>307.2KHz</u>

44. *Draw the circuit diagram of a two-wire RS232 interface that will allow a computer to receive data from a peripheral device.*



The circuit shown uses the receive data line as the active signal. The only other requirement is the signal ground!

45. *Draw a diagram showing the voltage levels for the RS232 interface.*



[Figure 14-37]

46. *What is the absolute maximum voltage that can be placed on any RS232 pin without causing damage?*

The absolute maximum value is +/- <u>25 Volts</u>.

47. *List the seven layers of the OSI model, and describe the function of each.*

1. Physical: Physical data transport (modems, UARTs, etc.)
2. Data Link: Device drivers & low-level (frame) error detection
3. Network: Datagram (packet) addressing
4. Transport: Maintenance of reliable end-to-end connection
5. Session: Division of long messages into datagrams; location of hosts by name.
6. Presentation: Transformation of data for application layer
7. Application: Communication with application software; provides API.