Homework 11

ANALYSIS AND DESIGN QUESTIONS

Section 10.1

10.1 Refer to Figure 10–37 to answer the following questions.

(a) What is the data rate in bits per second for this waveform?

(b) What is the character rate, assuming 7 data bits, 1 start bit, 1 stop bit, and no parity?

(c) What ASCII character is being sent?

10.2 The following questions refer to the serial receiver program shown in Figure 10–38 and flowcharted in Figure 10–4; the hardware is as shown in Figure 10–2.

(a) Give an example of the code that could be used for the BIT_0 procedure.

(b) What is the purpose of the code in lines 5–7?

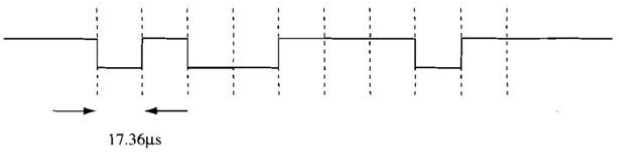

Figure 10–37.
Figure for Analysis and Design Question 10.1.

```
     SERIAL_RCVR    PROC     NEAR

1    wait_high      call     bit_0
2                   jz       wait_high

3    wait_low       call     bit_0
4                   jnz      wait_low

5                   call     half_delay
6                   call     bit_0
7                   jnz      wait_high

8                   mov      cx,8

9    form_byte      call     full_delay
10                  in       al,0
11                  ror      al,1
12                  loop     form_byte

13                  call     full_delay
14                  call     bit_0
15                  jz       error
16                  stosb

     SERIAL_RCVR    ENDP
```

Figure 10–38.
Figure for Analysis and Design Question 10.2.

(c) Register _____ holds the number of data bits to be received.

(d) As each data bit is input, it is moved from register AL bit _____ into _____.

(e) What is the purpose of the code in lines 13–15?

(f) Which instruction actually saves the data in memory?

(g) The procedure returns control to the calling program after _____ byte(s) has (have) been input.

10.3 Assume a 1K (1024 byte) file is to be transmitted serially at 9600 bps. Calculate the total time required and the effective character rate using:

(a) Asynchronous serial with 8 data bits, 1 start bit, and 1 stop bit.

Homework 11 answers

Analysis and Design Questions

10.1 (a) 57,600 bps; (b) 57,600/9 = 6400 char/s; (c) Number 9 (39H)

10.2 (a)
```
in   al,0    ;Read data (in line 10 data port is shown to be 0)
test al,1    ;Check bit 0
ret          ;Return with flags set
```
(b) Check for a false start bit (i.e. start bit not low)
(c) CX (8 data bits to be received)
(d) 0, CF
(e) Check for a framing error (i.e. stop bit not high)
(f) STOSB
(g) one

10.3 (a) 9600 bps/10 bits/char = 960 char/s.
Total time = (1024 bytes) / (960 bytes/s) = 1.067s