

## IT327 Lab 10

### ASCII; TTL; RZ; NRZ

#### Objective:

To gain practice predicting and measuring the bits on ASCII characters with an oscilloscope and converting the bits to hexadecimal, and to understand the different line coding methods using TIMS.

#### Procedure:

Be sure to take plenty of pictures and include them in your write-up with an appropriate caption.

Label all graphs and describe what you are doing. Make sure that your lab would be repeatable if someone else were to do the lab using your write-up.

1. Set up the workstation and become familiar with the oscilloscope and the terminals, which will send the ASCII values to the scope.
2. Look on the Internet or another source and find an ASCII table, which tells what characters have which hexadecimal values. Now choose 5 different ASCII values and write down the binary sequence. Now write the value down from LSB to MSB.

	ASCII Character	MSB	LSB	Inverted LSB with <b>Start, Parity</b> and <b>Stop</b>
Ex	1	<u>0</u> <u>1</u> <u>1</u> <u>0</u> <u>0</u> <u>0</u> <u>1</u>	<u>1</u> <u>0</u> <u>0</u> <u>0</u> <u>1</u> <u>1</u> <u>0</u>	<u>1</u> <u>0</u> <u>1</u> <u>1</u> <u>1</u> <u>0</u> <u>0</u> <u>1</u> <b>P</b> <u>0</u>
1		--- --	--- --	<u>1</u> --- -- --- <u>0</u>
2		--- --	--- --	<u>1</u> --- -- --- <u>0</u>
3		--- --	--- --	<u>1</u> --- -- --- <u>0</u>
4		--- --	--- --	<u>1</u> --- -- --- <u>0</u>
5		--- --	--- --	<u>1</u> --- -- --- <u>0</u>

3. Connect the terminal to the oscilloscope (Pins 2 and 7), and take a picture of the waveform and include it in your write-up. Identify on the picture, the start, stop, parity, and the bits used to describe the ASCII character in your logbook.
4. Use the following instructions to encode a signal using various methods of encoding using a TIMS:
  1. Connect the 8.33 kHz sample clock from *Master Signals* to Master Clock ("M. CLK") of the *Line Encoder*.
  2. Connect the bit clock ("B. CLK") of the *Line Encoder* to the clock of the *Sequence Generator*.
  3. Use the "X" (red) output of the *Sequence Generator* and connect it to the DATA in of the *Line Encoder*.
  4. Connect the Sync of the *Sequence Generator* to externally trigger the oscilloscope.
  5. Hook-up on Channel 1, look at your original bit sequence (Plug into the back of the connection "X" or "DATA")
  6. Connect Channel 2 to the various encoding methods on the *Line Encoder*: NRZ-L, NRZ-M, UNI-RZ, and BIP-RZ and compare it to the sequence on Ch1.
  7. Take a picture of the oscilloscope display of the coding methods along with your original signal.

**Results and Conclusion:** In addition to the follow questions, add your own conclusion as instructed in the syllabus:

#### ASCII:

How are the bits different on the oscilloscope different than those that you looked up for each ASCII character?

Is the parity even or odd? How do you know?

What was the Baud Rate (bits/second)? Hint: use the time on the oscilloscope and the number of bits per square. Show your work.

#### TIMS:

What is the pattern for the different line encodings (Hint see pages 44-45 and the chart on 46 in Volume D1 of the TIMS manual or the pdf link on the Lab website)?