Zybo Board USB Terminal

Leonardo Aviles, *tue51778@temple.edu*

# INTRODUCTION

I

n the Zybo Board USB Terminal lab the task was to convert different letters from a lower case to upper case and vice versa. For each letter the ASCII value was used, in this case the value was an 8-bit number. In order to input the data a program called Tera Term Pro, which would be used as a terminal program in order to input the different characters. A Digilent Pmod was connected to the Zybo board, which allowed the transmission and sending of the data. The clock of the modules rcvr and txmit was 16 times 9600 b/sec. This same clock was used for changing the letter.

The specifications of the project are as follows.

* When a upper case letter is entered the output displayed on the terminal should be lower case
* When a lower case letter is entered the output is a upper case.
* When any other character is entered the character will not change.

In addition to complete the project, the following new module was implemented.

* “Change Letter” in this module the code would check the value if the character was upper case, lower or a non-letter value and change the “TDIN”s value according to the case.
* The modules rcvr, txtmit, zybousbuart, and clock were already implemented and code for this project.

# DISCUSSION

## Top Module: “zybousbuart”

This module acted as the controller module sending the output and input data to their respective modules.

## Changing Letter: “changeletter.v”

In this module the ‘tdin’ is sent and if the 5th bit was a 1 the code would invert the bit which would cause the case change. While if the 5th bit was a 0 the 5th bit would then become a 1. In order to send the data back a wire was made called ‘newTDIN’ which contained the binary value of the changed letter.

## Transmit Data “txmit” and Receive Data “rcvr”

The ‘rcvr’ module was used in order to receive the data from the Tera Term program and store the value into a reg called rbr. While the ‘txmit’ was used in order to check if the value was ready to be transmitted or received.

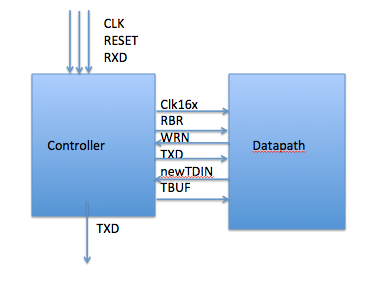
1. *“Genusbuart”:*

In this module, which was written, in the same file as the main contained the code needed to send and check if the data was properly placed from ‘rbr’ to ‘tdin’ and would send the data to the ‘txmit’.

# Conclusion

The project was partially successfully implemented into the zybo board. For this project the code allowed the user to enter different letters and change the case depending on the original case, while still allowing the non-letter characters to be left alone. One area of concern was when entering a non-letter character the program would not display the value on the terminal program. In order to try to compensate with this problem a if statement was used to filter out when the change case should be used. This ended up not working and would skip the ‘if’ statements and will not change the character at all.

1. Appendix

*Figure 1: Shows the controller and data path and the different signals and data received*