

What's new in this lab:

VHDL	Assert, report, severity.
RTL	Serial communication, serial-to-parallel, and parallel to serial.

Exercise

- Download lab8_1.qar from ftp://ele.uri.edu/outgoing/jcl/306/lab8_1.qar.
- Restore, and compile the project. Program the DE2 board.
- This exercise gives you a RS232 interface (rs232.vhd). Also, the scan_code from the keyboard is converted to ASCII code before sending it out via RS232. The translation is done using "k2a.mif" lookup table. Note that only most common keys are translated.
- Connect a RS232 (serial) cable between DE2 board and the Linux PC. In a Linux terminal, type "minicom" to enter the minicom program. Use "CTRL-A" follow by an "A" to enter the menu mode. Press "P" to enter the parameter selection menu. Make sure the settings are: 115200 8N1, where 115200 is the speed and 8N1 means 8-bit, no-parity and 1 stop bit.
- Press any key at the minicom window will send the ASCII code to your DE2 board. It will show up at Hex1 and Hex0. Verify the code with the ASCII table. There are two small LEDs near the DE2's RS232 port: one for transmit and one for receive.
- Press any key on the PS/2 keyboard on DE2, the character will show up on the minicom terminal. The scan_code is translated to ASCII and will show up in Hex5 and Hex4.
- To exit minicom, press "CTRL-A Q".

Assignment (Talk)

- Create a simple two-way text communication machine similar to the "talk" program on Linux.
- Use the character display VGA interface from the assignment of lab7, except now the screen is split into upper and lower parts: for the local host and remote guest, respectively. A separating line is needed. The local host will type in the text message in the lower part of the screen, while the remote guest's message will be received from RS232 port.
- Just like in Lab 7, scrolling is supported.
- You should first test your design by connecting to the Linux PC and use the minicom program as in the exercise. To complete this assignment, you must demonstrate that the two-way text communication is established between two DE2 boards (two copies of your design or between designs from two different groups).

Lab 8 Report:

Title page: Lab title, section number, your name, student ID and email address.

The body of your report should include a one paragraph introduction. Descriptions of your experiences from the exercise parts which associated with the items required below. The following required items should be embedded with the text explanation not aggregated at the end of your report. Approaches and thinking behind your solution to the assignment. Lesson learned from this lab.

From the Exercise:

1. Examine “k2a.mif” and explain why only seven bits are used from the 8-bit scan_code?
2. Describe a method so you can generate both upper and lower case alphabets in ASCII. You do not need to implement this, just a paragraph clearly explain your idea.

From the Assignment:

3. Algorithm or flowchart.
4. VHDL listing.

Also, send the followings to TA:

1. Lab8_2.qar (or talk.qar; from assignment)