ECE 238 – Spring 2006
Lab 8

Overview

For Lab 8, you have to implement a "two-function calculator with special operations." The due date for this lab is the last day of classes. The requirements for this Lab are the following:

- You must create a block diagram of the system prior to implementation, showing all functional parts and their connections, and have it approved by your T.A.
- After your project has been implemented, you must demonstrate it to your T.A.
- After your project has been successfully designed, implemented, and approved, write a 2-3 page report (single space, 1" margins, 12pt font) with figures that includes information on:
  - Your design approach
  - Your block diagram
  - Your implementation procedure (along with any problems you encountered)
  - Your conclusions, reviewing your work on the project and noting how you might approach it differently in the future.

If you have any questions about these requirements, contact at any of the T.A.

Specifications

Consider the system showed in Figure 1.

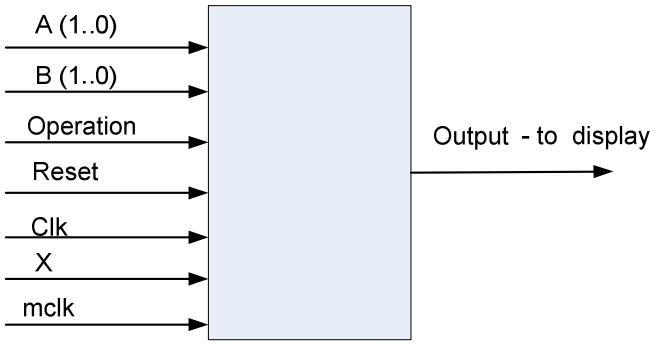

Figure 1. Block diagram of the system.

The system must accept 2 parallel two-bit input numbers **A** and **B**. These numbers are multiplied when **Operation** = 1, and added when **Operation** = 0. Let **R** be the result of this operation. Then, the system has to count forward cyclically from 0 to 99 in steps of **R**, synchronously with the system clock **Clk**. This clock will be implemented as we implemented in Lab 5 (using a button of the XCR board). The digits of the counter have to be displayed on the two-digit display. The counter stops if the serial sequence **X** =

1011 is entered, and restarts if a second sequence **X=**1011 is detected. The input **mclk** is the clock of the XCR board, and it will be just used to connect to the display controller as done in Lab7 (see Lecture notes Lab 7, page 4, Figure 3). But, you need to keep in mind that the system clock (which will be used for the sequence detector and the counter) is the input **clk**. The **Reset** input is used as usual: when it is 1, the counter and the sequence detector are reset. Extra credit will be considered for creative add-ons to the system (A and B serially input, adjustable X sequences, etc).

You have to turn in the report of Lab 8 along with the docs of the seven regular Labs in a notebook formatted as specified in the "ECE 238 Lab Notebook Format" doc (posted in the web page).