ECE 260

Laboratory 6

Spring 2012

Rock/Paper/Scissors

Preliminary:

You and your lab partner have finished up early and you decide to pass the rest of the lab time by wiring up a digital game to play. You decide on ROCK – PAPER – SCISSORS since it is a two player game with simple rules. Each player selects one of the three objects and then they present their choices simultaneously. The winner is decided by the following rules: rock breaks scissors for the win, scissors cut paper for the win and paper wraps the rock for the win. If both players choose the same item, then it is a tie and they play the round again.

Design Spec:

The players will each make their selections using three of the logic switches of the CADET workstation. The winner (W1 or W2) will be indicated by illuminating one of two LED indicators , a tie (TIE) will be indicated by illuminating a third LED and if either player makes an illegal entry (either no selection or multiple selections) then a fourth LED (ERR) will be illuminated. The results will be enabled by one of the blue SPDT momentary push button switch which will be activated (pressed) after the two players have made their selection.

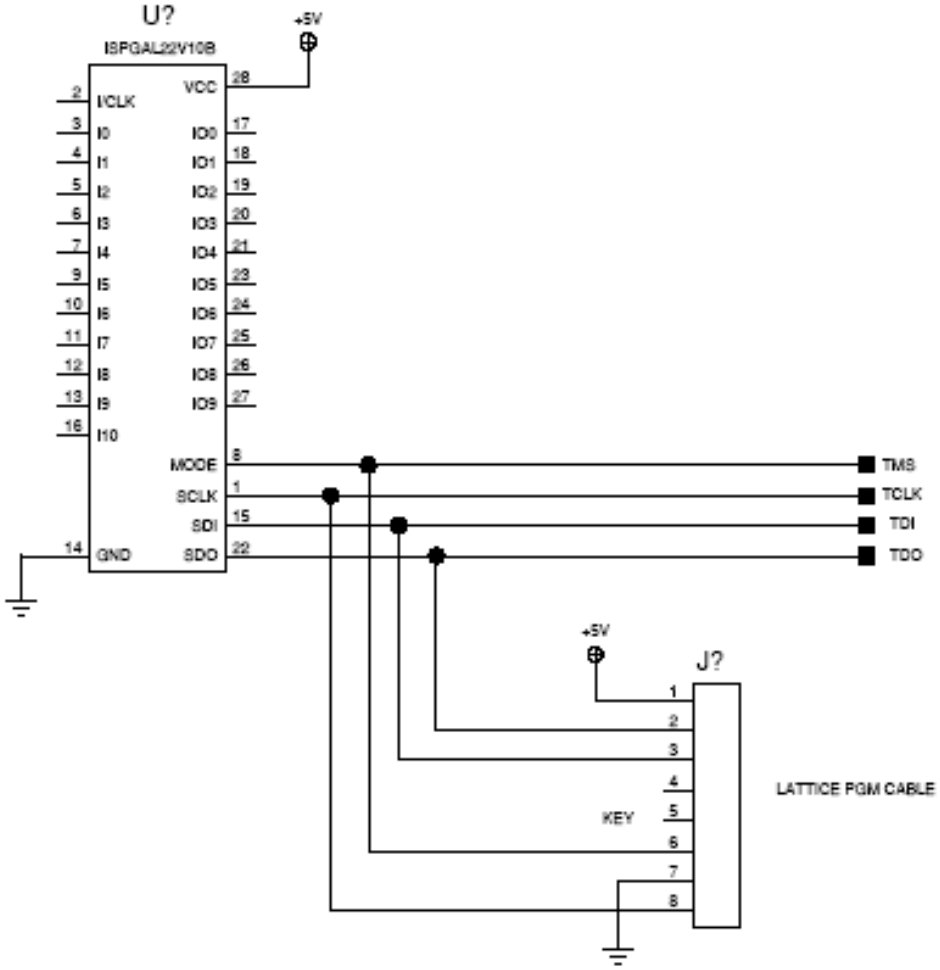
You will implement your design using a PLD, specifically an ispGAL22V10. Refer to Lab 5 for information about using ispLever to generate the fuse file to be programmed into the PLD.

PRELAB:

1. Prior to your lab session, design the logic of the game using a truth table and or Boolean equations.
2. Generate an ABEL source file that implements your design. Use good formatting techniques so that your design is understandable to the casual observer.
3. Create a schematic diagram showing how you are going to attach the PLD to the CADET and to the programming connector Note:use ABEL to generate the .

PROCEDURE:

1. In ispLever, create a new project and then compile the ABEL source file you generated for the pre-lab.
2. After you get a successful compilation of your design, then use the ispGAL22V10 pinout diagram to finish the schematic you started for the prelab showing how the whole circuit is to be wired.
3. Breadboard the circuit from the schematic you completed for Step 2 above.
4. Attach power to the proto board. Make sure the power supply is attached to +5VDC and all of the voltage selector switches are set to 5V.
5. Program the JED output file into the PLD.
6. Verify that your design works properly – correct any errors in your source file and then repeat Steps 2 – 5.
7. Try your working circuit numerous times using all possible combinations of legal and illegal entries. Does the correct LED illuminate every time you try it?
8. Demonstrate your working circuit to one of the TA's or to the instructor.


U?
ISPGAL22V10B
+5V
VCC
28
2
ICLK
3
I0
4
I1
5
I2
6
I3
7
I4
9
I5
10
I6
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I7
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I9
16
I10
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GND
17
IO0
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IO1
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IO5
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IO6
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IO7
26
IO8
27
IO9
MODE
8
SCLK
1
SDI
15
SDO
22
TMS
TCLK
TDI
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1
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LATTICE PGM CABLE