**ECE 3544: Digital Design I**

Project 4 Validation Sheet Student’s Name

GTA Validation Instructions:

Program the FPGA on the DE1-SoC Nano board with the student’s implementation of the stopwatch system. When the programming has successfully completed, perform the set of tests described in the table below. For each case, indicate whether or not the student’ design demonstrates the behavior described.

|  |  |
| --- | --- |
| Procedure and *Expected Result* | Correct Operation  (**Yes** or **No**) |
| Press and release KEY3. *The Mode Indicator should show a steady, upper-case S. The stopwatch should read 0000.* |  |
| Press and release KEY1. *The Mode Indicator should show a flashing, upper-case S, flashing at about 2 Hz. The stopwatch should start counting as a decimal time counter.* |  |
| Using a clock that can count seconds, use the clock to measure ten seconds from when KEY1 was released in the previous step. At the end of ten seconds, press and release KEY0 to stop the timer. **Is the timer reasonably accurate?** |  |
| Press and release KEY1. *The Mode Indicator should show a flashing, upper-case S. The stopwatch should continue counting from its previous value.* |  |
| Press and release KEY1. *The Mode Indicator should show a flashing, upper case S. The stopwatch should hold the value of when KEY1 was released for about 5 seconds, and then go back to counting at the proper time of that value plus 5 seconds.* |  |
| Press and release KEY2. *The Mode Indicator should show a flashing, upper case L. The stopwatch should continue counting with no interruption.* |  |
| Press and release KEY1. *The Mode Indicator should show a flashing, upper case L. The stopwatch should hold the value of when KEY1 was released for about 5 seconds, and then go back to counting at the proper time of that value plus 5 seconds.* |  |
| Using a clock that can count seconds, use the clock to measure 30 seconds from when KEY1 was released in the previous step. At the end of 30 seconds, press and release KEY1. *The Mode Indicator should show a flashing, upper case L. The stopwatch should hold a value of about 30 seconds for about 5 seconds, and then go back to counting at the proper time.* |  |
| Press and release KEY2. *The Mode Indicator should show a flashing, upper-case S. The stopwatch should continue counting with no interruption.* |  |
| Allow the stopwatch to continue running so that more than 1 minute elapses since the beginning of the test. *The stopwatch should roll-over at 1 minute from the value 0599 (0 minutes 59.9 seconds) to 1000 (1 minute 00.0 seconds).* |  |
| Press and release KEY0. *The Mode Indicator should show a steady, upper-case S. The stopwatch should halt counting.* |  |
| Press and release KEY0 again. *The Mode Indicator should show a steady, upper-case S. The stopwatch should read 0000.* |  |
| Press and release KEY2. *The Mode Indicator should show a steady, upper-case L. The stopwatch should read 0000.* |  |