

CpE318 – Project

Dallas Semiconductor DS1822 1-Wire Thermometer

(<http://www.dallassemiconductor.com/datasheets/pdfs/1822.pdf>)

For your project, you will create a *behavioral* model of the DS1822 1-Wire Thermometer. Details are given below.

- Requirements
 - Model will:
 - Properly read and write 1's and 0's using 1-wire Time Slots.
 - Execute ROM function commands: Read ROM, Match ROM, Search ROM, Alarm search, Skip ROM
 - Perform function commands: Write Scratchpad, Read Scratchpad, Convert T
 - Perform all operations with the correct timing. I prefer you use worst-case timing parameters.
 - Generate errors if incorrect timing is used (either by the DS1822 or by an external bus master) or if variables/signals go outside of an acceptable range.
 - Be thoroughly tested with a testbench you develop (I will also test it against my own testbench).
 - Use a “special” input line of type *real* to read in temperatures from its environment. Temperatures can take on any value.
 - Use generics for the following: device serial number, T_conv (temperature conversion time).
 - Be well commented.
 - Model does not have to:
 - Use the CRC
 - Use the thermometer resolution configuration register (Assume 12-bit thermometer resolution. The register must exist, as the bus master must be able to write to this register).
 - Perform function command: Read Power Supply.
 - Project will be performed in teams of 4 (I will select teams).
 - Each member must write part of the code and part of the report.
 - Report will contain:
 - A summary explanation of how the model works (to help those who would debug, modify, or use it).
 - An explanation of testing methods and results. Discuss exactly what functions worked and how you know they work. Explanation should be much more detailed than “we used a testbench” or “it works”.
 - An explanation of what portions of the design did not work. Don't leave anything out – I will find these portions anyway. If part of your design did not work, explain a) what the problem was, b) what caused the problem, c) what you feel should be done to solve the problem, and d) an explanation of why you should get credit for trying.
 - A list showing the specific contributions of each team member with a number assigning percentage contribution by each member (e.g. Manju: all model

functions, testbench, report (90%), Daryl: administration, advice (10%)).
Contents of the list should be agreed upon by all members.

- Future work.
- Conclusions.
- Deliverables and Deadlines
 - Team job assignments with at least 3 projected meeting dates (hardcopy), Due: 3/14 (5 pnts).
 - VHDL code which properly reads and writes 1's and 0's using 1-wire Time Slots (email), Due: 4/02 (5 pnts).
 - ROM commands: Read Rom, Match Rom, Search Rom, Alarm search, Skip Rom (email), Due: 4/16 (5 pnts).
 - Function commands: Write Scratchpad, Read Scratchpad, Convert T (email), Due: 4/23 (5 pnts).
 - Testbench and revised, final model (email), Due: 4/30 (40 pnts).
 - Report (hardcopy), Due: 5/07 (40 pnts).
- Misc.
 - There will be a confidential evaluation of your team members at the end of the semester. Grades will be weighted accordingly.
 - Do not use a model from the web.
 - If you have a good argument for making a different model, I will let you. You must give me your argument in the next few days.