EECS150 SPRING 2006 PROJECT
WIRELESS TRON
FINAL PROJECT REPORT

1.0 REPORT DESCRIPTION

The final report is a technical description of the device that you have designed and
built for your project.

The main purposes of documentation are:
1. Allow users to understand and operate your device.
2. Help your fellow engineers to understand your design so it can be
   upgraded, improved, and maintained.

Your goal should be to ensure that your design will be useful even if you are no
longer around to explain its function. Without adequate documentation, many great
designs are sent to the scrap heap.

In writing your report, give the most emphasis to the Chipcon transceiver
controller and Tron game engine and communications, since they are the heart of the
project. Make sure to leave time for editing, typing, and proof-reading; nothing is more
annoying than trying to read documentation that has not been proof-read.

2.0 REPORT OUTLINE

Create a report that adequately documents your project design. Your report should
closely follow the outline specified below.

You report, excluding the cover page and table of contents, should total no
more than 6 pages of text and 12 pages of text and diagrams combined. You may
include diagrams within the text or on separate pages at the end. While Microsoft Visio
is available on the lab computers for drawing the diagrams, neatly hand drawn diagrams
are acceptable.

1. Cover Page
2. Table of Contents
3. Abstract
   a. Approximately 1 paragraph.
   b. Your abstract should be about your project.
   c. Describe your design, not the project requirements.
4. Overview (~1 page)
   a. System level block diagram.
      i. You may not use our diagrams.
      ii. You must show more detail than our diagrams.
   b. Brief Description of the major sub-modules.
i. Keep this part short.
ii. Do not repeat the assignment specification.
iii. Add details about how you changed or added to the assignment specifications, if applicable.

5. System Description
   a. For each subsystem (checkpoint), do the following:
      i. Briefly describe the theory of operation.
      ii. Describe how you accomplished the task. If you modularized the checkpoint, describe how and why. Keep the description of the first two checkpoints short!
      iii. Create system block diagrams to support your description.
       1. Use hierarchy where it exists, especially for checkpoint 3 and 4.
       2. Create bubble and arc diagrams for FSMs.
       3. You may not use our diagrams. You must show more detail than our diagrams.
       4. If you did well on your design reviews, they can be an excellent starting point. The end product will be very similar to the diagrams you were expected to draw for design review.
      iv. Summarize design tradeoffs. You may not have much to say about checkpoints 1 and 2; this is okay.
       1. Did you have to sacrifice any features to make it work?
       2. What did you change as a result of debugging?
       3. What would you design differently next time?
       4. Did you solve the problem in an especially interesting or creative way?
   b. There are 4 subsystems:
      i. N64 Controller
      ii. Video
      iii. Chipcon RF Transceiver
      iv. Game Engine, VideoRAM, Communication Protocol

6. Extra Credit
   a. For each extra credit feature, do the following:
      i. Briefly describe the feature.
      ii. Briefly describe how you implemented the feature.
      iii. Create a high-level block diagram of your design of the feature. Leave out the diagram if the feature’s design is trivial and the diagram won’t add to the clarity of the description.
   b. If you implemented the original protocol, include its description in the “System Description” section, not here!
   c. Each description should be very short. You’ll probably be able to fit 2-4 extra credit feature descriptions on one page, depending on how complex the implementation is.

7. References
   a. Note any source files that are not your own.
i. Give a brief description of its function.
ii. Include diagrams if the code is crucial to your project and the code is complicated.
   1. We know how fpga_top.v, register.v, and counter.v works, so don’t provide much detail on these modules.
   2. Be more detailed when describing SpiFIFO, SPI, and CharROM. We understand that SPI is a black box, so you do not know details about its internals.

b. Cite where you obtained any code or ideas that we did not provide you as part of the checkpoint. Make sure to give credit to significant ideas that other groups contributed to your project.

8. Conclusion (<1 page)
   a. Summary of main features.
   b. Problems encountered.
   c. What would you do differently next time?

9. Suggestions (1 paragraph)
   a. What was too difficult?
   b. What should we have done differently? Discuss both the lab and project portions.
   c. Add any additional comments here.

For the overview section, try to give a “breadth before depth” introduction to your project. Your readers need to get a general picture of your system before they can understand the details. Describe the user visible features; save the detailed inner workings for the system description section. You should have a general block diagram in this section. Try not to duplicate our description of the assignment too much; we already know what we assigned you. Also, do not use our block diagrams.

The detailed system description can start with functional and input/output specifications. Exploit any hierarchy or modularization of the system to make the description easier to understand. Support the descriptions with the block diagrams, FSMs, and timing diagrams and refer to these as figures. Don’t bother going into the details of very simple modules, especially the ones we provide you. Do give detailed descriptions and figures for the Chipcon CC2420 controller and the Tron game engine, including gameplay and communications.

For the conclusion, summarize the key design features. What will the reader need to be careful about if they were to attempt to duplicate or modify your design? And what are possible improvements that can be made to the design?

3.0 HINTS
1. Type this report. Do not hand write it
   a. Diagrams and figures are an exception. Hand drawn diagrams are okay as long as they are neat!
2. Use standard letter sized paper throughout the report.
3. Minimum 12pt font, single spaced with 1 inch margins. Print everything double sided, including the title page and table of contents! You should hand in no more than \((12 + 2)/2 = 7\) sheet of paper.
4. Page Limit
   a. The cover page and the table of contents are not included in the page limit.
   b. The text portion of report should not exceed 6 pages. The entire report
      should not exceed 12 pages.
5. Make sure the copy you hand in is easily readable.
6. Include block diagrams, bubble and arc diagrams, timing diagrams, state
   diagrams, and tables as appropriate and on or as near as possible to the page in
   which they are referenced.
   a. Do not include any Verilog in your report.
7. Put titles on all figures and diagrams.
8. Put some thought into this report.
   a. Poor documentation will degrade the perceived quality of your work.
   b. This report is worth 15% of your project grade!
9. BE CONCISE! Plan ahead so that you don’t exceed the page limit.

4.0 SUBMISSION

Reports are due Friday, May 5, 2006 at 2:10P in the homework box. DO NOT
HAND IN PRINTED VERILOG. You and your partner must also separately submit
partner evaluations to the homework box. Do not staple the evaluations to the project
report.

Also submit an electronic copy of your report (but not the evaluation) to your
group folder that can be found by following the “checkin” link, which is the same folder
that you submitted your project to. The electronic copy need not be complete; it may be
missing diagrams and anything else hand-drawn.

We will base your grade on the paper copy of your report. We will not accept any
late reports, no exceptions.
EECS150 SPRING 2006 PROJECT
WIRELESS TRON
PARTNER EVALUATION

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Please indicate the percentage of work both you and your partner did. **You of you must EACH submit a copy of this form.**

If you partner did not put in their fair share of work, this is your last chance to tell us. We will investigate the matter if you believe that you did more than your fair share of the project. Please be honest.

Percentage of work done by partner: ______

I felt that this was unfair: YES NO
# EECS150 Spring 2006 Project

## Wireless Tron

### Partner Evaluation

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