

# Review report of a final thesis

Czech Technical University in Prague

Faculty of Information Technology

**Student:** Denis Titov  
**Reviewer:** Ing. Jiří Buček  
**Thesis title:** Improvement of Contactless Smart Card Emulator in FPGA  
**Branch of the study:** Information Technology

**Date:** 14. 6. 2017

<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 5.</i>
<b>1. Difficulty and other comments on the assignment</b>	<b>1 = extremely challenging assignment, 2 = rather difficult assignment, 3 = assignment of average difficulty, 4 = easier, but still sufficient assignment, 5 = insufficient assignment</b>
<i>Criteria description:</i> Characterize this final thesis in detail and its relationships to previous or current projects. Comment what is difficult about this thesis (in case of a more difficult thesis, you may overlook some shortcomings that you would not in case of an easy assignment, and on the contrary, with an easy assignment those shortcomings should be evaluated more strictly.)	
<i>Comments:</i> The assignment requires studying the technology and a previous implementation, as well as implementing several additional functions of the contactless smart card emulator. The student is required to analyze, design, and implement both software and hardware. This makes the assignment more difficult than an average Bachelor thesis assignment.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 4.</i>
<b>2. Fulfilment of the assignment</b>	<b>1 = assignment fulfilled, 2 = assignment fulfilled with minor objections, 3 = assignment fulfilled with major objections, 4 = assignment not fulfilled</b>
<i>Criteria description:</i> Assess whether the thesis meets the assignment statement. In Comments indicate parts of the assignment that have not been fulfilled, completely or partially, or extensions of the thesis beyond the original assignment. If the assignment was not completely fulfilled, try to assess the importance, impact, and possibly also the reason of the insufficiencies.	
<i>Comments:</i> The assignment was fulfilled to the point of simulation of individual units. No integrated simulation nor hardware testing was done. The microcontroller code was apparently only tested on a PC.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 4.</i>
<b>3. Size of the main written part</b>	<b>1 = meets the criteria, 2 = meets the criteria with minor objections, 3 = meets the criteria with major objections, 4 = does not meet the criteria</b>
<i>Criteria description:</i> Evaluate the adequacy of the extent of the final thesis, considering its content and the size of the written part, i.e. that all parts of the thesis are rich on information and the text does not contain unnecessary parts.	
<i>Comments:</i> The extent of the written part covers all important parts of the work. The Testing chapter could be more thorough, however, even considering the final state of the solution.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
<b>4. Factual and logical level of the thesis</b>	<b>95 (A)</b>
<i>Criteria description:</i> Assess whether the thesis is correct as to the facts or if there are factual errors and inaccuracies. Evaluate further the logical structure of the thesis, links among the chapters, and the comprehensibility of the text for a reader.	
<i>Comments:</i> No major objections to the correctness and logical structure of the thesis.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
<b>5. Formal level of the thesis</b>	<b>90 (A)</b>
<i>Criteria description:</i> Assess the correctness of formalisms used in the thesis, the typographical and linguistic aspects, see Dean's Directive No. 14/2015, Article 3.	
<i>Comments:</i> The thesis is written in clean English, with occasional missing articles and infrequent typographical errors such as missing punctuation. The student used a template intended for double-sided printing but the print is only single sided. This results in redundant empty pages.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
<b>6. Bibliography</b>	<b>85 (B)</b>

*Criteria description:*

Evaluate the student's activity in acquisition and use of studying materials in his thesis. Characterize the choice of the sources. Discuss whether the student used all relevant sources, or whether he tried to solve problems that were already solved. Verify that all elements taken from other sources are properly differentiated from his own results and contributions. Comment if there was a possible violation of the citation ethics and if the bibliographical references are complete and in compliance with citation standards.

*Comments:*

The student acquired relevant sources but his focus was quite narrow. Had he performed a wider research, he could have found some useful inspiration, e.g. from different emulators.

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**7. Evaluation of results, publication outputs and awards**

65 (D)

*Criteria description:*

Comment on the achieved level of major results of the thesis and indicate whether the main results of the thesis extend published state-of-the-art results and/or bring completely new findings. Assess the quality and functionality of hardware or software solutions. Alternatively, evaluate whether the software or source code that was not created by the student himself was used in accordance with the license terms and copyright. Comment on possible publication output or awards related to the thesis.

*Comments:*

The work is not finished, it was tested in simulation of individual units, and thus no practical test was performed in real hardware. The student did not write his name in the source code files, which is unfortunate particularly because he extends previous work.

*Evaluation criterion:*

*No evaluation scale.*

**8. Applicability of the results**

*Criteria description:*

Indicate the potential of using the results of the thesis in practice.

*Comments:*

The results are not ready for the intended usage, because the implementation is incomplete and untested. It can serve as a basis for future work but I would recommend that the FPGA protocol handling be simplified because apparently its complexity required significant effort and that may have contributed to the student's running out of time.

*Evaluation criterion:*

*No evaluation scale.*

**9. Questions for the defence**

*Criteria description:*

Formulate any question(s) that the student should answer to the committee during the defence (use a bullet list).

*Questions:*

Why did you choose SPI as your interface? You seem to justify the choice by the poor performance of UART with a low bitrate of 115200 bps, but UARTs can be set to run on much higher speeds (1 Mbps or more).

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**10. The overall evaluation**

65 (D)

*Criteria description:*

Summarize the parts of the thesis that had major impact on your evaluation. The overall evaluation **does not** have to be the arithmetic mean or any other formula with the values from the previous evaluation criteria 1 to 9.

*Comments:*

The student proved his ability of independent creative work. The assignment required extending an existing solution, and that always brings some risk. In this case, it seems to me that the student focused most of his attention to the FPGA part of the solution and did not offload enough of the protocol handling to the MCU. Designing hardware is always more difficult than software, and, in my opinion, he made the task more complicated than was necessary. Despite my objections to his work, I recommend the work for defense and grade it D (satisfactory).

Signature of the reviewer: