En resa mot Svartåns djupa mörker

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abstract

I. Introduction

The subject of this report is the procedure of designing and producing a step up converter in the form of a printed circuit board. This report will explore the procedures required for developing such a printed circuit board being, choice of components, circuit design, printed circuit board layout, printing the board and testing of the board but also the difficulties and and was was learned throughout the project. The goal of the project was to successfully produce a step up converter using the tools at hand. But also to get the understanding of some of the difficulties one can encounter in the process. jdhfuhdjhdjdfh

Explain the subject. What was i studying? Why was this topic important to investigate? What did we know about the topic before I did this study? How will this study dvance new knowledge or new ways of understanding?

- Generally known information about the topic
- Prior studies' historical context to your research
- Your hypothesijks and overview of the results
- How the article is organized

A. State of the Art

The latest and most sophisticated or advanced stage of a technology or science. State of the art if the foundation for determining the methid and methodlogy.

B. Hypothesis

In scienc, a hypothesis is an idea or explanation that you then tesr through study and experimentation. Outside science, a theory or quess can also be called a hypothesis

C. Research questions

A research question guides and centers your research. It should be clear and focusd, as well as synthesize multiple sources to present your unque argument. RQ should be furmulat

II. Hardware

A note on replicability: Although the hardware-related equipment used in this paper could be considered of a level of sophistication unreachable or undesirable, a much more rudementary set-up would suffice. For testing purposes, a simple PWM-signal generating device such as a function generator, or even simpler, an Arduino UNO [2] could be used. Since the circuit is designed to run on 5V DC, even an ad hoc power supply comprised of a cut-off USB-cord plugged into a wall-adpater for phone chargers, or an unused USB-port, could make due. As for measuring, any old multimeter would do.

- The NI MyDAQ is a simplistic and small all-in-one solution providing all the necessary power and measuring capabilities used in this paper. It provides a steady 5V output for power, a flexible, software-controlled signal generator and a multimeter capable of measuring 60V[3]. Far more than our predicted output, and far beyond what our capacitor would be physically able to produce.
- The Voltera Printer was used to realize the circuit for testing purposes[4]. It is a desktop-sized device designed for rapid PCB-prototyping, allowing for a short idea-to-test pipeline, similar to what FFF 3D-printing technology has done for mechanical applications design.

III. Software

Accompaning the earlier note on replicability, a similar description of suitable software substitutes will be provided, since the software choices relies heavily on the hardware used. The only crucial software, if a setup similar to what was described above was to be used, would be the IDE used to program the Arduino board. One option is the official Arduino IDE, available as a web-based editor and as a desktop application[6].

- Multisim[5], by National Instruments, was used to design and simulate the circuit, a software based environment allows for fast and easy experimentation, which is convenient in electronics design due to its trial-and-error nature.
- Ultiboard is another peice of software by National Instruments, with out-of-the-box integration with Multisim. It was used to design the actual PCB using the already-designed circuit from Multisim.
- Voltera for Windows 64-bit was used to interact with the Voltera printer.

IV. Method

A. Problem formulation

ja det verkar som att problemformuleringen ska vara här *The problm formulation is defined upon hypothesis to define the problem or problems for the thesis How will you test the*

hypothesis? What methods will be used from the knowledge learned in state of the art?

The PCB was tested using the National Instruments *myDAQ*, by imposing a square wave with following characteristics:

- Constant 5V amplitude.
- Constant 2.5V positive offset.
- Variable frequency $100Hz - 10kHz$
- Variable duty-cycle $10\% - 90\%$

and then measuring the output

V. Results

What are the results your method have given?

VI. Conclusion

Have you provn or disproven the hypothesis? If not, why?

VII. Discussion

References

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[6] Arduino IDE, arduino.cc: https://www.arduino.cc/en/Main/Software