Construction of an AC Current Parameter Measurement System Using PSoC Chip

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***Abstract*—This thesis focuses on the construction of a system to measure AC current parameters, specifically the frequency of AC current, using the Programmable System-on-Chip (PSoC) chip. The author provides an in-depth overview of the PSoC chip's architecture, including its digital and analog blocks, and demonstrates the ability to generate square waves using the PSoC chip. The thesis also covers the limitations encountered during the measurement process, such as inaccuracies in frequency conversion and signal noise, and suggests future improvements to the software and hardware. The author successfully measured the frequency of AC current using the PSoC chip, but the results indicate that there were inaccuracies in the frequency conversion process and signal noise, leading to imprecise measurements.**

***Index Terms*—PSoC, AC current, frequency, measurement, chip**

I. Introduction

The thesis provides an in-depth overview of the Programmable System-on-Chip (PSoC) chip, detailing its various components such as the CPU, interrupt and GPIO blocks, and the digital and analog components. The author aims to construct a system for measuring AC current parameters, particularly the frequency, using the PSoC chip. The PSoC chip is a versatile device that integrates both digital and analog functionalities, making it suitable for a wide range of applications [1].

II. Methods

The methods section describes the structure and features of the PSoC chip, including its digital and analog blocks, and the process of generating square waves using the PSoC chip. The author also discusses the limitations encountered during the measurement process, such as inaccuracies in frequency conversion and signal noise. The PSoC chip's digital blocks, such as the CPU and interrupt and GPIO blocks, are utilized to process and control the measurement system [1].

III. Results

The project measures the frequency of an alternating-current signal with a PSoC-based system. The author also demonstrates LCD text display, studies serial communication through a MAX-232 interface, and builds a Visual Basic 6.0 program to read a signal from the COM port. The thesis reports substantial measurement error because the sine-to-square-wave conversion and subsequent frequency conversion were not sufficiently accurate; noise during transmission caused further error [1].

IV. Discussion

The author discusses the limitations of the PSoC chip in the context of AC current measurement, including the inaccuracies in frequency conversion and signal noise. The author suggests that future improvements could be made to the software and hardware to address these issues, such as optimizing the frequency conversion process and reducing signal noise. The author also discusses the limitations of the PSoC chip in the context of AC current measurement, including the inaccuracies in frequency conversion and signal noise [1].

V. Conclusion

The author successfully completed the task of measuring AC current parameters, particularly the frequency, using the PSoC chip. However, the limitations encountered during the measurement process, such as inaccuracies in frequency conversion and signal noise, indicate the need for further improvements in the software and hardware. The author successfully generated square waves using the PSoC chip, but the measurements were affected by inaccuracies in the frequency conversion process and signal noise [1].

References

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