Construction of a Real-Time Clock and Centennial Calendar System

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***Abstract*—This thesis details the construction of a real-time clock and centennial calendar system using the PIC16F877A microcontroller and the DS12C887 real-time clock. The project involved understanding the functions of the microcontroller and real-time clock, programming in the CCS language, and designing the circuit using Altium Designer. The final product successfully met the thesis requirements, incorporating an LCD display for time and date information. The system was tested and confirmed to function correctly, providing a practical application of real-time clock technology. The work serves as a foundation for further exploration of microcontroller applications and the design of more complex systems.**

***Index Terms*—Real-time clock, Centennial calendar, Microcontroller, PIC16F877A, Real-time clock (RTC), LCD**

I. Introduction

The thesis introduces the construction of a real-time clock and centennial calendar system, focusing on the use of the PIC16F877A microcontroller and the DS12C887 real-time clock. The project aims to provide a practical application of real-time clock technology and explore its potential for larger and more practical systems in the future. The system was developed to meet the specific requirements of the thesis, including the integration of an LCD display for time and date information. The work is intended to serve as a stepping stone for future research and development in microcontroller applications [1]. Published articles on the methods and subject of this project provide context for this English summary [2], [3], [4].

II. Methods

The methods section describes the use of the PIC16F877A microcontroller, including its various components such as the ADC, timers, and serial communication interfaces. The system also incorporates an LCD display and a real-time clock (RTC) DS12C887. The project utilized the CCS programming language and Altium Designer for circuit design. The PIC16F877A microcontroller was chosen for its robustness and flexibility, while the DS12C887 RTC provided accurate timekeeping capabilities. The LCD display was integrated to provide a user-friendly interface for displaying the time and date. The system was designed and implemented using Altium Designer, which allowed for precise circuit layout and component placement [1].

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III. Results

The final product, a real-time clock and centennial calendar system, was successfully developed and met the requirements of the thesis. The system was tested and confirmed to function correctly, providing accurate time and date information. The implementation included the use of the CCS programming language to write the necessary code for the microcontroller. The system was tested under various conditions, including power fluctuations and temperature changes, to ensure its reliability. The LCD display was tested to ensure it could accurately display the time and date in a readable format. The system was found to be functional and met the thesis requirements, although no specific performance metrics were provided [1].

IV. Discussion

The system developed in this thesis serves as a practical application of real-time clock technology. It provides a foundation for further exploration of microcontroller applications and the design of more complex systems. The use of the PIC16F877A microcontroller and the DS12C887 RTC demonstrated the feasibility of integrating these components to create a functional real-time clock and calendar system. The project highlights the importance of careful design and testing to ensure the system's reliability and accuracy. Future work could focus on improving the system's performance and expanding its functionality to include additional features such as alarms or weather updates [1].

V. Conclusion

The thesis successfully completed the development of a real-time clock and centennial calendar system using the PIC16F877A microcontroller and the DS12C887 real-time clock. The system was tested and confirmed to meet the requirements of the thesis, providing accurate time and date information. The work serves as a practical example of microcontroller application and sets the stage for further research and development in this area. The limitations of the project include the lack of specific performance metrics and the need for further testing under more varied conditions [1].

References

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