Construction of an Electronic Information Display Board

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***Abstract*—This thesis focuses on the construction of an electronic information display board, utilizing the microcontroller 8051 and various integrated circuits (ICs) to develop both hardware and software. The study covers the architecture of 8051, various ICs, and the design of the display system. The author aims to provide a reference for students in the field of information technology and practical applications in real life. The project, however, did not fully address error handling and only achieved basic scrolling text functionality. The hardware design includes the use of an 8*8 LED matrix, ICs such as 62256, 74373, 74LS138, and 74LS154, and the software is developed to control the hardware. The display system is designed to scroll text horizontally, but the project lacks comprehensive error handling mechanisms and only supports basic text scrolling.**

***Index Terms*—microcontroller 8051, LED matrix, ICs, hardware design, software design**

I. Introduction

The rapid development of information technology has led to its widespread application in various fields, including science, economics, society, education, healthcare, and engineering. The microcontroller 8051 simplifies the design and implementation of control applications, making them more accessible and cost-effective. This thesis explores the construction of an electronic information display board, which is widely used in factories, stock exchanges, banks, and stores due to its high information display efficiency and ability to attract attention. The project aims to provide a practical reference for students in information technology and real-life applications. However, the limitations include the lack of error handling mechanisms and the basic functionality of text scrolling. [1]

II. Methods

The study involves a detailed examination of the 8051 microcontroller, including its hardware structure, port functions, memory organization, and external memory. Other components such as ICs 62256, 74373, 74LS138, 74LS154, and LED matrices are also investigated. The hardware and software designs are analyzed, and the system's block diagrams are provided. The hardware design includes the use of an 8*8 LED matrix, ICs such as 62256, 74373, 74LS138, and 74LS154, and the software is developed to control the hardware. The display system is designed to scroll text horizontally, but the project lacks comprehensive error handling mechanisms and only supports basic text scrolling. [1]

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III. Results

The results include a comprehensive understanding of the 8051 microcontroller and its peripheral components. The hardware design for the display system is completed, and the software for controlling the hardware is also developed. However, the project did not fully address error handling, and the display functionality was limited to basic text scrolling. The text scrolling feature is implemented using the 8051 microcontroller and an 8*8 LED matrix, with the text moving horizontally across the screen. The project uses ICs such as 62256, 74373, 74LS138, and 74LS154 to control the LED matrix and other components. The software is developed to control the hardware, but the project lacks comprehensive error handling mechanisms and only supports basic text scrolling. [1]

IV. Discussion

The limitations of the project include the lack of error handling mechanisms and the basic functionality of text scrolling. Future work could include enhancing the hardware to prevent data loss during power outages, improving the software to support more display functions, and expanding the connection capabilities to include wireless communication. The project serves as a valuable reference for students in information technology and practical applications, but it highlights the need for further development to address the limitations. Specifically, the current system only supports basic text scrolling, which can be improved to include more dynamic and interactive display features. Additionally, the hardware design should be modified to include backup power solutions to ensure data integrity during power outages. The project also lacks a robust error handling mechanism, which could be implemented to improve the system's reliability and user experience. [1]

V. Conclusion

The thesis successfully developed the hardware and software for the electronic information display board. However, there are still areas for improvement, such as error handling and expanding the display functionality. The project serves as a valuable reference for students in information technology and practical applications, but it highlights the need for further development to address the limitations. The project did not fully address error handling and only achieved basic scrolling text functionality. Future work could include enhancing the hardware to prevent data loss during power outages, improving

the software to support more display functions, and expanding the connection capabilities to include wireless communication. [1]

References

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