



Case Study Report

Group Name:	Intelligent Power Control in Air Conditioning with 8086 Logic	Date Submitted:	December 6, 2023
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I. Introduction

Efficient energy consumption is a paramount concern in today's world, and one area where optimization can significantly impact power usage is air conditioning units. Our project aims to enhance the power efficiency of air conditioning systems by integrating our proposed technological solution. Through the integration of the 8086 microprocessor and a suite of carefully selected components, our solution seeks to intelligently regulate temperature settings while incorporating a scheduled activation feature. This innovation not only addresses the issue of the potential overworking of air conditioning units but also contributes to a more sustainable and cost-effective use of energy.

II. Background

Modern air conditioning units, while essential for maintaining indoor comfort, often operate without a fine-tuned consideration for power consumption. This can lead to unnecessary energy usage and increased utility costs. Furthermore, some systems lack the capability of supporting multiple thermostats and varying AC models in terms of monitoring voltage at an AC's minimum voltage power source. Our project recognizes this challenge and proposes a solution that leverages the capabilities of the 8086 microprocessor to optimize the operation of air conditioning units.

II. Evaluation of the Case

Scheduler

Current State: The system's scheduling system is functional but still has bugs such as random stops and crashes during certain conditions.

Compatibility with Varying AC Systems

Current State: The system can work with either 220V AC or 120V AC. This is adjustable by changing certain parameters within the system.

LCD Display

Current State: The system's display, which contains information for the temperature reader, faulty voltage detection, and timer is nearly fully functional. A few bugs such as incorrect characters displaying and crashes remain an issue but will be solvable..

Toggle Air Conditioners (On or Off)

Current State: The buttons used to toggle the simulated air conditioners on or off seem to be fully functional, and may require further testing.

Faulty Voltage Detection

Current State: With the implementation of a comparator circuit, the detection of faulty voltage seems to be working accordingly, and may require further testing.

III. Proposed Solution/Changes

The main idea behind our proposed solution is to improve the power efficiency of air conditioning units. We achieve this by directly embedding the desired temperature parameters into the 8086 assembly code, which helps the unit maintain the preset temperature more efficiently. Moreover, our system comes with a scheduling feature that enables the unit to turn on at specific intervals, like every 8 hours, which helps to optimize power consumption during periods of lower demand. This comprehensive approach not only enhances the overall efficiency of air conditioning units but also promotes a more sustainable and eco-friendly energy usage model. The system is also able to support varying types of AC systems such and supports three thermostats. It is capable of reading voltage inputs via the ADC to decide whether or not to turn off the air conditioning unit. If the minimum voltage requirement is satisfied, then the 8086 will allow the air conditioning unit to turn back on.

IV. Conclusion

In conclusion, the project strives to offer a practical and effective solution for optimizing the power efficiency of air conditioning units. Through the integration of the 8086 microprocessor and carefully selected components, it directly addresses the challenge of inefficient energy consumption in air conditioning systems. By incorporating precise temperature regulation and a scheduling feature, our solution not only enhances overall efficiency but also contributes to sustainable and cost-effective energy usage.

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