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EMBEDDED SYSTEMS 2242 PROJECT PROPOSAL GREENHOUSE AUTOMATION USING PIC16F877 MICROCONTROLLER

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November 21, 2022

Introduction

A greenhouse (also called a glasshouse) is a glass-structured building invented mainly as a shelter for extreme weather conditions[1]. It has been given this name because it warms the area inside the greenhouse the same way the sun warms the Earth[2]. Our project aims to build an autonomous, non-trivial system that controls the greenhouse's internal conditions (humidity, sunlight) and irrigates the plants autonomously when irrigated controls the supply of sunlight to the plants in the house.

The proposal idea

Our main idea will be to build a small embedded system that autonomously makes a way for sunlight to reach the plant, controls the supply of the plant with water, and provides a source for the outside air to reduce the humidity. It is assumed that the plant is in a closed room. The system depends on the readings of different sensors. The readings are read by the microcontroller frequently, and the microcontroller will send output signals to motors and actuators connected to it. The humidity inside the room should be maintained at a certain value, with a 5% tolerance. The system should water the plant every certain amount of time. The temperature, like humidity, should be maintained at a certain range. The system should maintain these conditions for the plant to grow healthy.

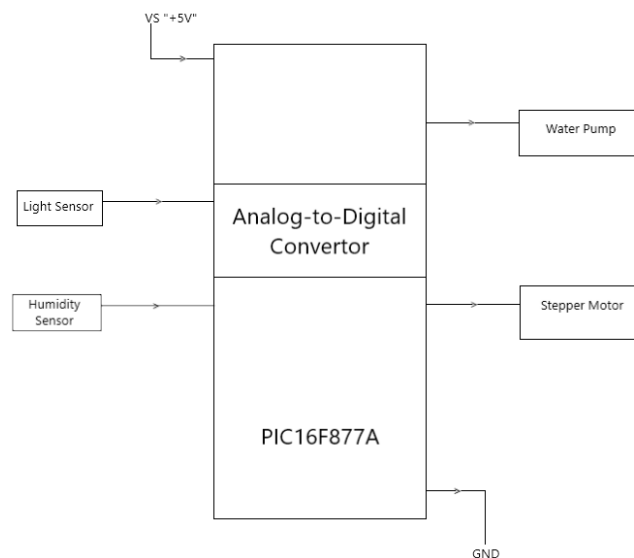


Figure 1: Block Diagram for the Expected System

Components

For this project, we will use the following components to build our model:

- 1 PIC 16F877A Microcontroller (10 JDs)
- 1 Water Pump (12 JDs)
- 1 Humidity and Temperature sensor "DHT20" (10 JDs)

- 1 Rotating actuator “Stepper Motor” (14 JDs)
- 1 Light sensor (5 JDs)
- 1 Analog-to-Digital Converter (10 JDs)
- Resistors (10 Pcs for 0.25 JDs)
- Capacitors (0.15 JDs each)

Total Expected cost: 61.40 JDs for the components, and some fees may be added for extra materials.

References

[1] “Greenhouse” [Online]. Available:

<https://www.britannica.com/topic/greenhouse>

[2] “Why is a greenhouse called a greenhouse?” [Online]. Available:

<https://www.greenhousehunt.com/faq/why-is-greenhouse-called-greenhouse/#:~:text=This%20is%20because%20the%20same,these%20glass%20or%20polycarbonate%20structures.>