



**HIGHER TECHNICAL  
INSTITUTE**

**ELECTRICAL ENGINEERING DEPARTMENT  
DIPLOMA PROJECT**

**MICROPROCESSOR CONTROLLED IRRIGATION  
SYSTEM**

**E/1114**

**IOANNOU STELIOS**

**JUNE 1998**

HIGHER TECHNICAL INSTITUTE	PROJECT NO. 2849
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**H.T.I.**  
**(Higher Technical Institute)**

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## **ABSTRACT**

This project deals with the development of a microprocessor controlled irrigation system.

### **The objectives of this project are:**

- 1) To design, construct and test the circuits of an irrigation system and interface them to an existing microcontroller.
- 2) To develop relevant software for the irrigation system.

### **Terms and conditions:**

- 1) The microcontroller to be used will be an 8085 one.
- 2) A number of relevant sensors and actuators will be interfaced to the microcontroller.
- 3) Certain sensors can be simulated by using potentiometers.



## INTRODUCTION

This project presents hardware and software design for an automatic irrigation system.  
(microprocessor controlled irrigation system)

Although this is not a new investigation still, from market research it can be observed that all automatic systems function based on time, date and duration. For example on the 15<sup>th</sup> June, at 18.00 hours water Line 1 for 15 minutes, then Line 2 for 10 minutes etc.

There is not an automatic system which does not depend entirely on human's reliability, that is inserting correct data, and also to save water. For example start watering when the weather conditions permits it, that is when there is not much sunshine and the temperature is about 20°C - 25°C and when the plants need to be watered. Furthermore water the plants as much as they need and be able to detect line leakage on time, thus saving water.

All of the above were achieved with the use of sensors, which were designed, constructed, calibrated and successfully tested.

The interfacing between the sensors, actuators and the microcontroller is done by the use of 8155 IC, whereas the software which controls the system was written in assembly language and the code is saved in a 2kx8 EPROM (2716).

## SUMMARY

The aim of this project was to design and construct an irrigation system which would not waste water.

It is known to everybody, that watering our plants midday, where there is too much sunlight and the temperature is high, there is a waste of water due to evaporation. So it is preferable to water our plant in the afternoons or even during the night where the evaporation is negligible. Moreover there would be a great save in water when watering our plants when they need to be watered and give them as much water as they need. Finally detecting Line Leakage on time would save lots of water too.

So this system, to start watering, the conditions for saving water must first be satisfied.

First of all, the light intensity must be very small and the temperature must be below 20-25°C.

Secondly the plant must ask for water and once watering has started there is also an indication when it receives enough water.

Finally once a fault (Leakage) is detected in a Line the system will not start that line again unless the Fault is fixed.

All these were achieved with the use of sensors, software and a microcontroller to control the system.

For whatever is going on, in the system, the user is notified from some indicators Found on a panel. For everything on the panel there are labels which makes the operation of the whole system much more user friendly.

Everything mentioned above, are the main features and properties of the system. Reading the program Analysis, someone can see in detail more properties of the system, such as safety measures for the pump. Once the water reservoir has finished the pump stops on time before it is damaged.

What follows next, are two Block diagrams. The first one explains the system operation whereas the second one shows the location of every sensor.