HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A SOIL HUMIDITY MEASURING
INSTRUMENT

by

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DEDICATED TO MY PARENTS

DEVELOPMENT OF A SOIL HUMIDITY
MEASURING INSTRUMENT

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Project report submitted by
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to

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ABSTRACT

TITLE : SOIL HUMIDITY INSTRUMENT

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The purpose of this project is to design construct and test a soil humidity measuring instrument.

This project also explains the principle of operations of digital meters, digital to analogue converter and analog to digital converter.

Testing of the project was carried out progressively ie. fixing each components (IC'S resistors capacitors etc) and the expected behavior was tested using either the oscilloscope or the multimeter.

INTRODUCTION

By making the soil humidity instruments the main aim of the project was to investigate and explain the operation of digital to analogue converter and the analogue to digital converter.

A/D conversion is a interfacing process used when an analog system must provide inputs to a digital system. (such a computer or for displaying or storage) . A/D conversion can by used by several system for many reasons. For example an analogue voltmeter will display the voltage value through the position of a pointer on a scale .A digital voltmeter will give a more convenient numerical indication on a display panel . An effective way of suppressing noise is to transmit the signal digitally.

Many methods of A/D conversions are available.However in our case the successive approximation A/D converter is used.

In this project we used also an D/A converter which takes the data from the A/D and convert this data into analogue. In order to measure the humidity of the soil we put two leads in the soil.According to our circuit when these leads put on the soil a voltage drop is set up across them. This voltage is amplified and send to the ADC .The ADC convert this voltage into digital . Then a DAC converts this voltage into analog which can be measured with a voltmeter With the help of the graphs we can say if the soil is wet or dry.

As we seen above the soil humidity instrument uses two converters in order to work but it also requires a 555 timer (used as a clock for the ADC) and an op-amp (which amplifies the voltage drop set up across the leads when this put on the soil).