

HIGHER TECHNICAL INSTITUTE

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MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

DATA ACQUISITION SYSTEMS

M/819

IOANNIS IOANNOU

JULY 1998

**HIGHER TECHNICAL INSTITUTE**

**MECHANICAL ENGINEERING  
DEPARTMENT**

**DIPLOMA PROJECT 1997/98**

**SUBJECT: DATA ACQUISITION  
SYSTEMS**

**NAME: IOANNIS IOANNOU**

**CLASS: 3M**

**PROJECT NUMBER: M/819**

HIGHER TECHNICAL INSTITUTE	PROJECT NO. 2905
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## SPECIAL THANKS

First of all I would like to thank God for all the strength he gave me during my studies at the H.T.I.

Moreover, I would like to thank Mr. P. Eleftheriou, my supervisor, for all the help he gave me during my studies and especially during my diploma project.

Finally, I would like to thank my family and everyone else who helped me to accomplish my project.



## Introduction

The purpose of Data Acquisition System (DAS) is to collect data from the outside world and store it ready for processing. Its input is a transducer that incorporates a sensor and the data is normally stored in a computer (PC). The computer is also the controller in the system.

A single data acquisition system can be built around a single PCB card, which is inserted into a PC and in this case the card is called Das-8/PGA. This card is a data acquisition card that has eight analog input channels, which can collect any physical quantity, such as temperature, humidity, length etc, and convert it into an electrical signal. This signal, with the use of the appropriate formulae's, will be converted to a number, which will correspond to the value of the physical quantity measured. This card it can also be used with a card called EXP-16 card, which is a multiplexer. What a multiplexer does is that it takes one analog input channel of the Das-8PGA board and it expands it into 16 different analog input channels. This helps to get more measurements with one channel.

In this project the above two cards will be used to assemble a PC based circuit from which the data needed, temperature and flow rate, will be collected. This data with the use of a pascal program will help to calculate the thermal conductivity,  $K$ , for specimens of materials such as concrete, asbestos etc. This experiment is constitute by a device in which two specimens are placed, one at the left side and one at the right side, and in the middle we have the heating plate and at the two sides two cooling plates, in which cold water is flowing.

The pascal program needs 4 analog input channels of the Das-8/PGA and one EXP-16 to start working. The two Das-8PGA channels will be used to measure the two flow rates needed, the water flow rate which leaves through the cold plates. The other one channel will be expanded to 16 different channels with the use of the multiplexer, and 9 of these channels will be used to measure all the required temperature needed to accomplish the experiment. Finally, the fourth channel will be used to measure the CJC (cold junction compensation) which is done form the EXP-16, which has all the appropriate hardware for this measurement.

In the following sections all the above will be discussed briefly.