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SIMULTANEOUS TWO CHANNEL
DATA ACQUISITION USING
A PERSONAL COMPUTER

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SIMULTANEOUS TWO CHANNEL DATA ACQUISITION
USING A PERSONAL COMPUTER

By

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Project Report

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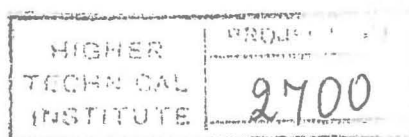
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'In the memory of my missing father, who died
in a road accident in 1988'

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A-2 : DAS1601 Specifications

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A-5 : Tips for better data acquisition (Quality magazine)

A-6 : Data Acquisition Tips (KEITHLEY-MetraByte)

ABSTRACT

‘Simultaneous Two Channel Data Acquisition Using a Personal Computer’

The objective of this project was to assemble a PC based system capable of measuring two channels simultaneously. The system should utilise the DAS1601 plug in board and the SSH4/A module. The application program should be developed using the ViewDac software package.

In the first chapter of the report, the several elements of Data Acquisition Systems are stated and explained, as well as several terms and definitions concerning Data Acquisition technology.

The following two chapters are dealing with the hardware and software provided for this project, giving useful information about their features and capabilities.

Chapter four describes the system developed, giving emphasis on the application program built.

The next chapter consists of user instructions for the program, plus some information, tips and guidance for anyone who would attempt to expand or modify the program.

The last chapter describes the method followed for the verification of the system and presents the results obtained. Of course the results are then discussed, and some conclusions are stated.

At the end of the report there are appendices including the coding of the program, technical specifications and other useful information.

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ABSTRACT

‘Simultaneous Two Channel Data Acquisition Using a Personal Computer’

Project by: Demetris V. Constantinou
Supervised by: Dr. P. Eleftheriou

The objective of this project was to assemble a PC based system capable of measuring two channels simultaneously. The system should utilise the DAS1601 plug in board and the SSH4/A module. The application program should be developed using the ViewDac software package.

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Introduction

The field of Data Acquisition can not be considered as a traditional field of technology like heating, fluid mechanics, strength of materials or electronics, due to its short history. It was firstly added in science terminology not more than two decades ago. At the beginning it was more or less an “alien” and very few people were actually dealing with Data Acquisition, thus it was not considered an accessible field for everyone.

During latest years, the field has rapidly enhanced. The technology has improved in such a rate that it reached the levels of fields with much longer history. Like what happened to personal computers, Data Acquisition systems were at first too expensive and not quite powerful, but ended as cheap as to be affordable for the majority and as powerful as to satisfy even the most complicated requirement.

The simultaneous increase in power and decrease in cost, expanded the horizons, adding more fields of applications. At the beginning, only in extreme applications Data Acquisition was applied due to the high cost. Today Data Acquisition is applicable in a wide range of fields starting

from simple and low budgeted systems up to very sophisticated systems for complicated applications.

The major fields where data Acquisition Systems are introduced include *control systems, research projects, product testing & quality control, process monitoring, etc.*

Practically the job of a Data Acquisition System is to acquire data and provide processing on them, which is achieved through several electronic devices and circuits. The fact that they are based in electronics technology, leads to the conclusion that is a field for electrical and electronics engineers. The truth is that these are the experts on such systems as far as their construction and maintenance are concerned, but these who make use of them are engineers of every kind, especially mechanical, electrical, civil and production engineers. Data acquisition is always utilised in many other fields of science including geology and medicine, as well as in everyday life.

As it was mentioned above, the field of Data Acquisition has recently developed very highly. The capabilities of such systems have dramatically increased and one grate improvement achieved is the simultaneous sampling. By that term is meant that a number of samples can be acquired at exactly the same instant. This achievement is very important in cases that changes in the measured quantities

are so fast that the only way to get true and realistic data from more than one sources, is to acquire simultaneously.

In simple words, the meaning of simultaneous sampling is that one sample is acquired from a source at the exactly identical instant. Therefore, how one action influences a different status can be defined error free, since what actually happened will be monitored by the Data Acquisition System in real time.

Simultaneous Data Acquisition is used quite often lately since it eliminates any influence of time on the reading, that is no delay occurs between the measurement of two sources. Eversince simultaneous sampling was achieved, the percentage error arising in experiments being performed in previous years has dropped to minimum.

Some fields of applications where simultaneous sampling is essential, include *Seismic testing*, *modal analysis*, *acoustics* - measurement of acoustic intensity and energy - , *vibrations* -measurement of the transmissibility of vibrations-, *control systems* and many others.

In general, Data Acquisition and more particularly Simultaneous Sampling has made the life of some scientists much easier during their research, and challenged some others to try to achieve further improvements. Also Data Acquisition provides some enterprises with the capability to run their production lines more reliably under a more

precise control, and increase some parameters like productivity, quality, efficiency, etc., in the benefit of the human life.

PC-Based

In this chapter
the several
relative terms