Interfacing to Microprocessors

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INTERFACING TO MICROPROCESSORS

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Preface

The majority of the microprocessors now produced are installed as the controlling element in larger, generally non-electronic systems. Examples of these applications are domestic products such as cookers and washing machines, cash registers, weighing machines and much industrial process control and test equipment. The user is usually not aware that a microprocessor is embedded in the equipment, since it begins operations automatically when power is applied.

Although the microprocessor itself is produced in large quantities to a standard design, the extremely wide range of applications is reflected in the many different ways in which it must be interfaced to the outside world.

The design of these external circuits and their interactions with the microprocessor are the main topics of this book. Although the principles of data input and output with microprocessors are similar to those used with mini-computers, the detailed arrangements differ substantially. In particular, in order to afford the maximum flexibility in use, nearly all microprocessor input and output packages are programmable.

In planning the book I have assumed that the reader has some understanding of the way in which a microprocessor operates and how instructions are retrieved from the program store and executed. This information is well presented in *Understanding Microprocessors* by B. S. Walker (published by the Macmillan Press, London and John Wiley, New York) and I have not attempted to duplicate it. Although the book is mainly concerned with hardware and system design, I have included short program segments to illustrate the way in which interfaces can be controlled.

In chapter 4 I have included a brief survey of transducers. These are not always mentioned in many courses as they are not regarded as electronic devices. They are however essential features of many systems, and the availability of cheap and reliable transducers is often the critical factor in deciding whether a particular microprocessor application is economically justified.

I have given examples of the use of several of the more popular microprocessors, rather than confining the book to only one model, so as to give some indication of the variety of features and design philosophy available. Readers who require more information on the components in any particular family of microprocessors will need to consult the manufacturers' design data.

With the use of microprocessors now extending to a wide range of products, processes and equipment, there is a corresponding need for engineers and scientists in many disciplines to acquire an understanding of microprocessor applications and interfacing. This material is also being incorporated into many courses at universities and polytechnics.

I hope that this book will provide a satisfactory and comprehensive introduction to this developing and important subject.

J. C. CLULEY