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DEVICES**

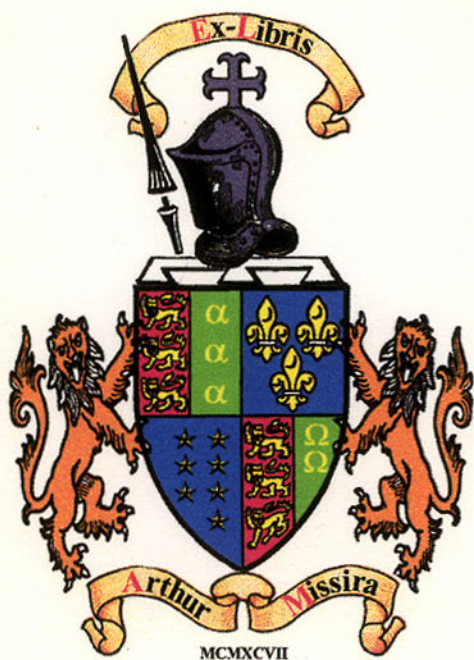
Burton  
Dexter

**microprocessor systems handbook**

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D. P. Burton and A. L. Dexter

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# **microprocessor systems handbook**

BY

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## PREFACE

The intent of this book is to provide a concise explanation of microprocessor hardware, the interaction of hardware and software, and the interfacing of microprocessors with A/D and D/A converters.

It is intended as an introduction to microprocessors and as a companion to basic learning efforts employing specific devices, for which it will provide the enhancement of a generalized conceptual framework. It should be useful to engineers who require a succinct explanation of microprocessors, the related terminology, and techniques for interfacing them with the "real world," as well as to students, technicians, and scientists of all persuasions. It assumes that the reader has some knowledge of digital-system building blocks, such as counters, registers, and adders, as well as an elementary knowledge of memory circuits.

Though there are many texts that deal with the details of specific hardware and software, the need has been felt for a text providing an emphasis on systems aspects, rather than detailed circuit design, and on the broad understanding of "principles" – and the variety of ways they can be embodied.

The book was intentionally written without dwelling at length on the characteristics of any particular microprocessor, in order to make it easier to explain optional configurations and to provide necessary background for assessment and comparison of different architectures. It should be useful regardless of the type of computer the reader is using. The final chapter, for example, covers five applications, of ascending complexity, each using a different microprocessor.

The first six chapters discuss the operation of a simple microcomputer, memory addressing, input-output operations and hardware interconnection with the microprocessor, internal architecture, and memories. The last three chapters deal with A/D and D/A converters, the techniques for interfacing them to the microprocessor, and – as noted above – some examples of microprocessor applications.

The book began as a series of lecture notes written for undergraduate courses in 1976/77 at the National Institute of Higher Education (N.I.H.E.), Limerick, and Trinity College at the

University of Dublin, in Ireland. It was edited by Dr. Peter Beevor, of the University of Dublin, and graphics are by Joe Delaney

For the publication of this book by Analog Devices, the authors acknowledge the assistance of Heinrich Krabbe, Managing Director of Analog Devices B.V. - Ray Stata, President of Analog Devices, Inc. - and Dan Sheingold, Technical Handbooks Editor.

Limerick, 1 September 1977

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## INTRODUCTION BY ANALOG DEVICES

Analog Devices, Inc., is a leading worldwide supplier of precision electronic products for use within industrial automation, process-control, medical, test-instrumentation, and avionics markets. Representative products include computer interface components (A/D and D/A converters), signal-conditioning components, and conversion instruments and systems.

Perhaps the two most important accomplishments of the low-cost microprocessor have been to vastly increase the amount of digital-processing power available to the world, and, at the same time, to disperse (rather than centralize) this power in untold numbers of new applications in systems, instruments, data processing peripherals, and personal devices for consumer, government, industrial, and service markets.

It has been estimated that some 35 percent of all microprocessor applications will involve interfacing with "real-world" (i.e., analog) data for measurement and control. Since this is exactly where Analog Devices "lives," the proper understanding by our customers — both present and prospective — of microprocessors and their application is a matter of great importance to us.

We have found this book most helpful in rounding out our own education about microprocessors, and we commend it to those who have found our products and publications helpful in the past, as well as to those with whom we expect to become acquainted in the future.

Norwood, Mass. U.S.A.  
1 September 1977

*Ray Stata*

*"Is féarr bheith déanach ná ró dhéanach".*

*Sean-Fhocal*

**(It is better late than very late.)**

**Old Irish Proverb**

# TABLE OF CONTENTS

Preface	i
Contents	v

## CHAPTER ONE: OPERATION OF A SIMPLE MICROCOMPUTER 1-19

Basic Instruction Cycle, Arithmetic and Logical Instructions, Memory Reference Instructions, Jump Instructions, Input-Output Instructions, Elementary Example of a Microcomputer Program, Use of the Index Register, Instruction Notation Methods

## CHAPTER TWO: MEMORY ADDRESSING 21-48

Arithmetic and Logical Instructions, Arithmetic Flags, Direct, Indirect and Immediate Addressing, Refinements to Memory Addressing Modes, Relative Addressing, Classical Structure of the Op-Code for Memory Reference Instructions, Memory Reference Instructions for Microprocessors, Register Addressing, Paging, On-Chip Register Addressing, Building-up Sophisticated Memory Reference Instructions, Jump and Conditional Jump Instructions, Conditional Jump Instructions, Reducing the Number of Bytes in a Jump Instruction, Subroutines, Multiple Address Machines

## CHAPTER THREE: INPUT-OUTPUT OPERATIONS 49-72

Program Controlled I/O, Interrupt Controlled I/O, Real-Time Operation, Example of I/O using a Real-Time Clock, Interrupt Servicing in a Multiple Interrupt System, Maintaining Program Continuity during Multiple Interrupt Service, Direct-Memory-Access I/O

## CHAPTER FOUR: BUS STRUCTURES AND HARDWARE INTERCONNECTION WITH THE MICROPROCESSOR 73-92

Basic Types of Bus Structures, Bus Control Signals, Typical Bus Systems, Interconnecting Several Sources of Information

to the Same Bus, Interconnecting Several Acceptors of Information to the Same Bus, The Three-State Bus, The Memory/Bus Interface, Input-Output/Bus Interfaces

**CHAPTER FIVE: INTERNAL ARCHITECTURE OF MICROPROCESSORS** 93-106

The Internal Elements of a Microprocessor Circuit, A Bit-Slice Central Processing Element, A Basic Microprogram Control Unit, Enhancements to the Microprogram Control Unit, Pipelining, A Simple Example of a Microprogrammed Processor, Multi-Chip Microprocessors

**CHAPTER SIX: MEMORIES** 107-135

Semiconductor Memories, The Basic Read/Write Memory Cell, Organisation of Serial-Access Read/Write Memory Arrays, Random-Access Read/Write Memories, Content-Addressable Read/Write Memory, User or Field-Programmable Read/Write Memory, Read-Mostly Memory, The Programmable-Logic Array, Uses of Memory in a Microprocessor System, The use of Static RAM in a Volatile Read/Write Memory System, The Use of Dynamic RAM in a Non-Volatile Read/Write Memory System

**CHAPTER SEVEN: A/D AND D/A CONVERSION METHODS** 137-150

Digital-to-Analog Conversion Using Resistive Networks, Digital-to-Analog Converting Using Pulse-Width Modulation, Tracking A/D Converters, Successive-Approximations A/D Converters, Dual-Slope Integrating-Type A/D Converters, Other types of Integrating A/D Converters, Multi-Comparator Ladder, D/A Converters Using Microcomputers, A/D Converters Using Microcomputers

**CHAPTER EIGHT: USING A/D AND D/A CONVERTERS WITH MICROCOMPUTERS** 151-166

Digital-to-Analog Circuits and the Microcomputer Interface, Multiple-Byte Parallel Data Transfers, Fast A/D Converters and the Microcomputer Interface, Slow A/D Converters

and the Microcomputer Interface, Making A/D Converters  
Appear as Memory, Analog Circuits in a Digital Environment,  
Future Trends in Converters

CHAPTER NINE: APPLICATIONS OF  
MICROPROCESSORS

167-194

Star Drum Printer Interface (Intel 8080), An Intelligent Lamp-Dimmer for Studio Lighting (National SC/MP), An Optically Isolated Three-Term Controller (National SC/MP), A Digital Controller for a Domestic Heating System (Intel 4040), An Intelligent Instrument for Measuring Peripheral Blood Flowrates (Motorola 6800), The Buy or Make Decision

APPENDIX: Bibliography

viii-xi

Index

xii-xix