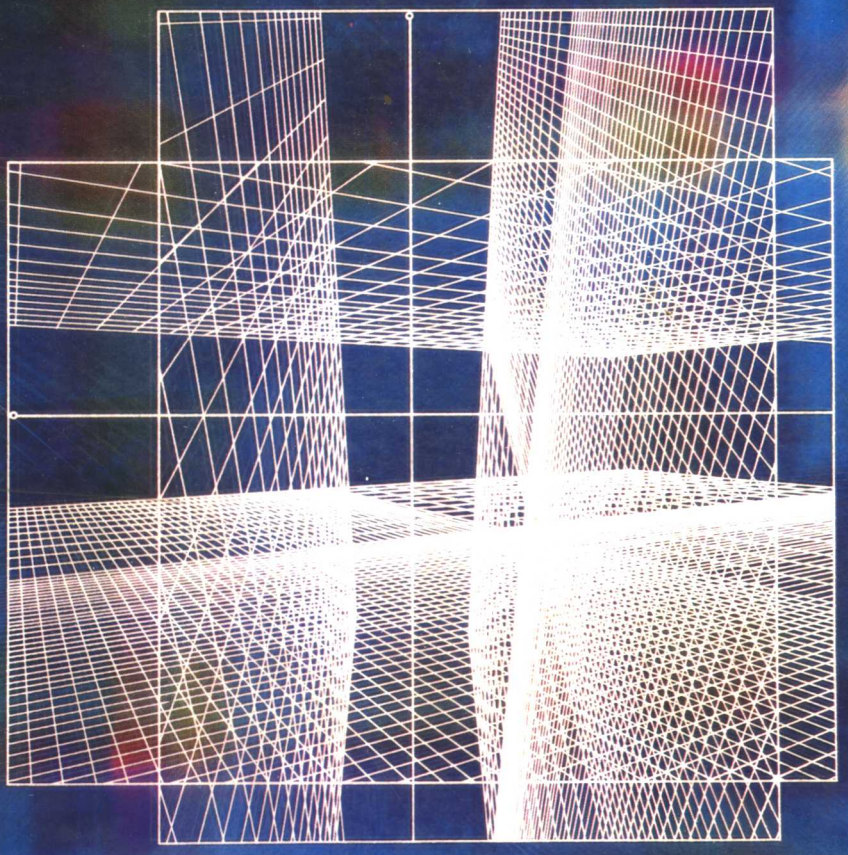
MICROCOMPUTERS:

HARDWARE, SOFTWARE, AND PROGRAMMING



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I wish to dedicate this book to my friends and family of the past, present, and future without whom life would be mere existence.

Preface

One of the most difficult tasks that a student has with learning a new discipline is getting the initial knowledge. This is especially true when it comes to knowledge about computers. Computers are so foreign to the normal person's methods of doing things by pencil and paper that it is exceptionally difficult for some to realize how truly vast the potential of today's computers is. This book was written to help the beginner gain an understanding of this world that will soon envelop everything we know.

There are really two different approaches to the study of microcomputers. One is to study the various aspects of the equipment of the computers (called hardware) while examining some of the major software that the typical business person might need in order to maintain a good working environment. The other method is to study the hardware while learning a little about how to make the machine function using one of the easiest to use programming languages, BASIC. This latter approach is the one taken in this book. I feel that by giving you an understanding of the hardware (both approaches feel this is important) and beginning an exploration into programming, you will gain a feeling for programming and will thus be able to better find the way through any software that might be needed. Besides, without a little knowledge into the way the computer works, how can the business person decide what is needed? It is only by exploring how the computer actually works that you can gain the understanding vital to the type of innovative thinking that leads to new software developments.

This book is broken into basically three informational parts. The hardware of the computer is covered; available equipment and how it can be used is explored. Not only are the common devices covered, but also some of the lesser known but important devices, such as speech synthesizers and digitizer pads. BASIC programming and flowcharting are covered in enough depth to give the student a working knowledge. Advanced programming should only be a matter of continued study with another text. General information and software are covered to give the student a background of terms and languages. Not only BASIC, but assembly language, FORTRAN, COBOL, and Pascal are also covered. The various types of software are covered, and information and guidelines are given on selection.

The chapters on BASIC programming and other information are interwoven. This allows you to apply theory and programming techniques immediately. There is no opportunity to forget one type of material before picking up that topic again.

Remember that this book was not designed to yield an in-depth knowledge of programming. There are already many fine books to do that. (See the bibliography following Appendix B.) Instead, the purpose of this book is to give you some of the necessary basic information that will allow you to make an intelligent purchase of a microcomputer system. And, once you have the system, you will have already laid the groundwork for efficient and intelligent use.

This book is intended for users of all types of machines. References to specific machines are made only to help clarify points. Of course, there are many items that should be checked in the reference manual of your particular microcomputer. Key items are noted in the text where it is deemed appropriate or necessary.

Several techniques are used to help the reader understand and get better use of the material presented. At the beginning of each chapter, a *chapter overview* lists each of the topics to be covered in the chapter. Also, there are several *behavioral objectives* so you will have an idea what information should be gathered from the chapter.

Each new term in the chapter is in boldface. These boldfaced words are defined in the glossary at the end of each chapter. Each new term is clearly defined in words other than those used in the text. This second definition will generally help to clarify the meaning.

At the end of the chapter, four learning techniques are used. The *chapter summary* highlights all the important points covered within. The *glossary* defines each new word covered in the chapter. The *questions to aid understanding* are specially designed questions to help you decide whether the objectives set forth at the beginning of the chapter have been met. Finally, there is a *quick quiz* at the end of each chapter, which consists of 15 true–false questions and 5 multiple choice questions. The answers are given immediately after the quick quiz. The majority of the answers explain why the particular answer is the correct one. This lets you know why the correct answer is so and why the other answers are not proper.

Another feature of this book is the special type of *index*. Not only are page numbers listed, but they are also classified as to whether they are found in the glossary or summary, a figure, or the normal text. This classification should prove to be useful in finding the exact information needed.

I would like to thank many people without whose help and encouragement this book would never have been completed. Specifically I owe a debt of gratitude to the students and staff of McLennan Community College for their patience and guinea-pig-like services. Thanks are due to Robert Putnam, my copy editor, and

Dan Kirklin and his entire staff at Bobbs-Merrill for their devotion to a quality textbook. Special thanks are due to my acquisition editor, Teri Zak, whose encouragement never waned throughout the long struggle of book preparation.

Good luck on your programming.

Ed Coburn

Contents

List of tables and figures

1 Beginning Terms and Concepts

Overview

Chapter 1 introduces the world of microcomputers. In the chapter you will find:

Objectives

After completing Chapter 1 you should be able to:

1. Explain what a bit and byte are and how they are related.
2. Define RAM and ROM and explain the difference.
3. List the three functions of all computers.
4. Explain the significance of the RETURN key.
5. Explain what the BREAK key is and why it is important.
6. Explain what the cursor is and how it is related to the home position and the tab positions.
7. Describe the cassette and diskette storage devices and how they differ.
8. List the two forms of programs and describe each.
9. List the three types of operating systems and briefly describe each.
10. Explain what an assembly language is and why it is important.
11. Describe the four high level languages and list one advantage and disadvantage of each.