# Animation, Games, and Sound for the Apple II/IIe

Tony Fabbri

PRENTICE–HALL PERSONAL COMPUTING SERIES

# ANIMATION, GAMES, AND SOUND FOR THE APPLE II/IIe

**Tony Fabbri**




**Prentice-Hall, Inc.**
*Englewood Cliffs, New Jersey 07632*

*Library of Congress Cataloging in Publication Data*

FABBRI, TONY.
Animation, games, and sound for the Apple II/IIe.

(Prentice-Hall personal computing series)
Includes index.
1. Computer games. 2. Computer graphics.
3. Apple II (Computer)—Programming. 4. Apple IIe
(Computer)—Programming. I. title. II. Series.
GV1469.2F3 1984 794.8'2 83-23101
ISBN 0-13-037284-6
ISBN 0-13-037276-5 (book & disk)
ISBN 0-13-037292-7 (disk)

Editorial/production supervision and
interior design: Kathryn Gollin Marshak
Cover design: Jeannette Jacobs
Manufacturing buyer: Gordon Osbourne



Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

ISBN 0-13-037284-6 (BK)
ISBN 0-13-037276-5 (BK & DSK)
ISBN 0-13-037292-7 (DSK)

Prentice-Hall International, Inc., *London*
Prentice-Hall of Australia Pty. Limited, *Sydney*
Editora Prentice-Hall do Brasil, Ltda., *Rio de Janeiro*
Prentice-Hall Canada Inc., *Toronto*
Prentice-Hall of India Private Limited, *New Delhi*
Prentice-Hall of Japan, Inc., *Tokyo*
Prentice-Hall of Southeast Asia Pte. Ltd., *Singapore*
Whitehall Books Limited, *Wellington, New Zealand*

# ANIMATION, GAMES, AND SOUND FOR THE APPLE II/IIe

**Prentice-Hall Personal Computing Series**

**Lance A. Leventhal, series editor**

Fabbri, *Animation, Games, and Graphics for the Timex-1000*
Fabbri, *Animation, Games, and Sound for the Apple II/IIe*
Fabbri, *Animation, Games, and Sound for the IBM PC*
Fabbri, *Animation, Games, and Sound for the VIC-20*
Harris & Scofield, *IBM PC Conversion Handbook of BASIC*
Scanlon, *The IBM PC Made Easy*
Schnapp & Stafford, *Computer Graphics for the Timex 1000 and Sinclair ZX-81*

# PREFACE

While many books deal with computers, hardly any are just plain fun to read and use. This book does not explain the insides of computers or describe all possible ways to use them. Rather, it lets the reader do exciting things with the computer and see action unfold on the screen. It assumes no prior knowledge of computers or programming. The reader will learn about computers and enjoy doing it.

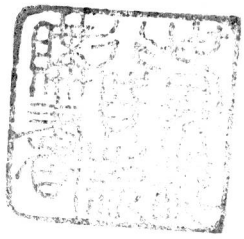
After introducing a few fundamentals, the book slowly leads the beginner through drawing pictures, aliens, spacecrafts, and monsters. Then we introduce sound, and the pictures are able to come to life. Spaceships, airplanes, tanks, and strange creatures can then make noises as they move, turn, fire, blink, and attack. We then introduce the idea of controlling the action from the keyboard. The reader now is able to create simple arcade games.

All the discussions and early programs are short. The reader will find it easy to use the examples to create new games. A significant fringe benefit of this fun is that you will actually be learning the skills needed for practical applications in business, education, engineering, management, and science.

This particular version of the book uses the popular Apple II computer (or a look-alike, such as the Franklin Ace). It assumes at least a 32K system with at least one disk drive. Although some programs use a printer, it is not essential. No special graphics equipment is necessary, since we draw all pictures with ordinary PRINT statements. The reader can simply enter a program and watch the action on the screen.

I hope this book provides many hours of enjoyment for its readers, both as a learning tool and as a reference. I hope it also encourages them to build a comfortable relationship with the computer, and thus free their imaginations for creative work. This is the key to obtaining the greatest benefit from today's amazing personal computers.

Tony Fabbri



# CONTENTS

# 1

# INTRODUCTION

The Apple II is one of the most popular personal computers. Although it is only the size of a typewriter (with a television set perched on top or at the side), it is as powerful as computers of the 1960s that occupied entire rooms and cost hundreds of thousands of dollars. What can you do with an Apple II? Among its many uses are:

1. Word processing (electronic production of letters, reports, and books without erasures, misspellings, and typing errors).
2. Business calculations, such as figuring interest rates, loan payments, rates of return, and cost of capital.
3. Mailing lists (maintaining them and printing sets of labels).
4. Producing club directories, team rosters, indexes, bibliographies, and other collections of information.
5. Handling the accounting, sales records, payroll, and inventory for a small business.
6. Producing tax returns and figuring ways to reduce taxes.
7. Billing for doctors, dentists, attorneys, accountants, and other professionals.
8. Computer-aided instruction from grade school through college, and in special education as well.
9. Creating charts, graphs, slides, and visual aids.
10. Scheduling parts of projects, such as the construction of a building or the development of a new product.
11. Teaching games, such as chess, bridge, and blackjack.
12. Keeping track of client records and accounts for insurance agents, realtors, brokers, salespeople, contractors, and architects.
13. Playing space, adventure, sports, and mathematical games.

14. Keeping track of stocks, bonds, real estate, and other investments. The Apple II can even obtain the latest financial news over the telephone.
15. Designing circuits, buildings, bridges, vehicles, and mechanisms.

These are only a few of the Apple II's many applications. Thousands of people use Apple IIs every day in the arts, business, education, engineering, finance, government, and science, as well as for recreation.

## COMPONENTS OF AN APPLE II

The Apple II (see Figure 1-1) consists of three distinct pieces of equipment (we call these, collectively, the *hardware*):

1. The computer itself, a box with a sloping front that has keys like those of a typewriter.
2. A modified television set (called a *monitor*) with an on/off switch and knobs to adjust contrast and brightness.
3. One or two small boxes with rectangular slits in the front. These are the *disk drives*.

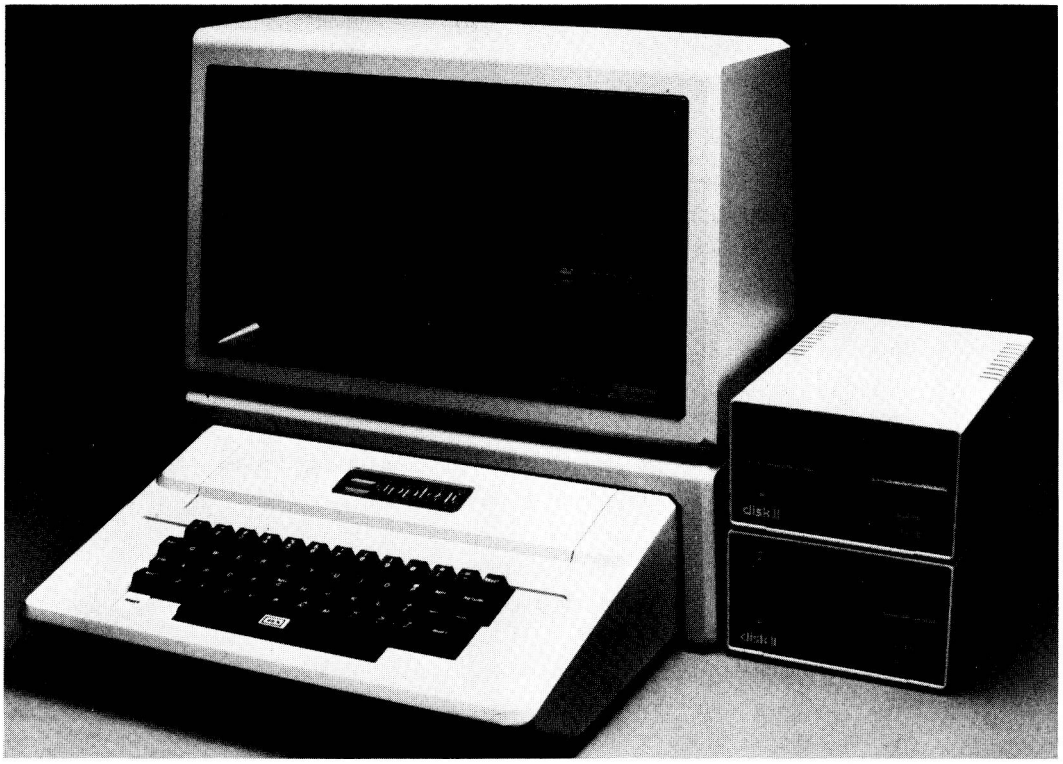


**Figure 1-1** Photograph of Apple II Computer System (Photo compliments of Apple Computer, Inc.)

## THE COMPUTER

First, let us discuss the computer. The on/off switch is located in the back; it is placed out of the way since you seldom want to turn the computer on and off. The keys that resemble those of a typewriter are used to enter data and instructions. What happened to the typing mechanism? Well, the Apple II uses the television or video display instead.

The small box with a rectangular slit in the front is a disk drive. This is like a record player, except that it plays thin, flexible disks (hence the name *floppy disk*). The disks used with the Apple II are 5 ¼″ in diameter and are called diskettes, minidisks, or minifloppies. We will call them *diskettes*.

That is all you can see of the computer. The electrical parts are inside the cabinet and are organized much like the nervous system of a person. There is:

1. A brain, generally called the *central processing unit,* or CPU.
2. Memory. Its only notable feature is that it forgets everything when you turn the power off. That's why you don't want to turn the power off very often. When you quit for the day, you save anything you might need on a diskette.
3. Connections to the outside world, generally called *interfaces*. These are like the body's nerves and muscles, which provide information to the brain and translate its commands into actions.

## VIDEO DISPLAY

The monitor or video display is like a television set except that it shows computer output rather than television programs. The screen can hold 24 lines of 40 symbols or *characters*. We can think of this as a grid (see Figure 1-2), consisting of 24 lines or rows and 40 columns. We shall refer to the rows as #1 through #24 (from top to bottom, with #1 at the top), and to the columns as #1 through #40 (from left to right). This arrangement will seem upside-down if you are used to drawing on graph paper. You should make copies of the grid in Figure 1-2, since we will use it to draw things and position them on the screen.

Having results printed on a screen rather than on paper may seem strange at first. It is nice because it is much easier to change or erase things on a screen than on paper. In fact, if you work with a screen for a while, using a printer will seem like writing with a nonerasable pen. But there's a problem with the screen: you don't get a permanent record (or *hard copy*) of your work. What if you want to see something you did an hour ago or yesterday? Besides, you can't send someone your screen in an envelope. So it's still nice to have a printer. We will explain how to use a printer, but we won't spend much time on it.

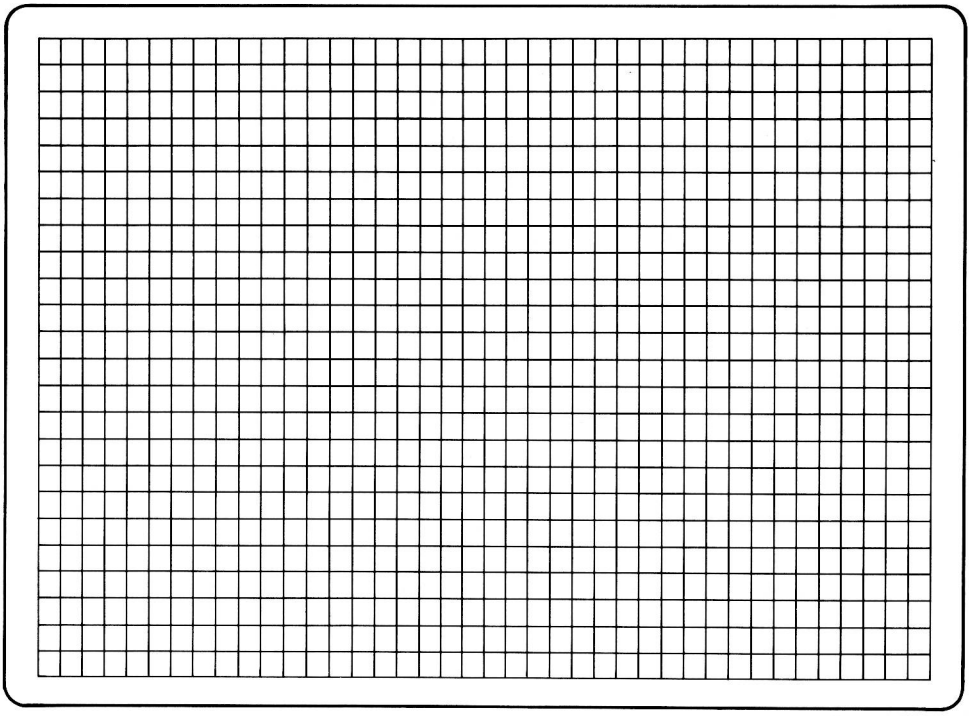


**Figure 1-2** Screen Layout

## KEYBOARD

The keyboard (see Figure 1-3) resembles that of a portable typewriter. However, it differs from that of a typewriter in the following ways:

1. No lower-case (small) letters. The Apple II prints all letters as capitals.
2. No lock for the SHIFT keys. These keys are used to type upper-case symbols (the upper markings on keys that show two characters). You must press a SHIFT key each time you want an upper-case symbol; the best approach is to hold SHIFT down while you press the other key.
3. The RETURN key (at the far right) not only concludes a line but also enters it into the computer. Thus it acts more like an ENTER key than like a carriage return. In fact, if you type a line that is more than 40 characters long, the Apple will automatically continue it on the next line of the screen. This is still a single line as far as the computer is concerned; you must end it by pressing RETURN.
4. Two arrow keys, one pointing left and the other right, just below RETURN. These are the backspace and forward keys. They let you move the *cursor* (the blinking object that indicates where you are working) right or left. If you backspace, be sure to move to the end of the line before pressing RETURN; the computer saves the line only up to where the cursor is.