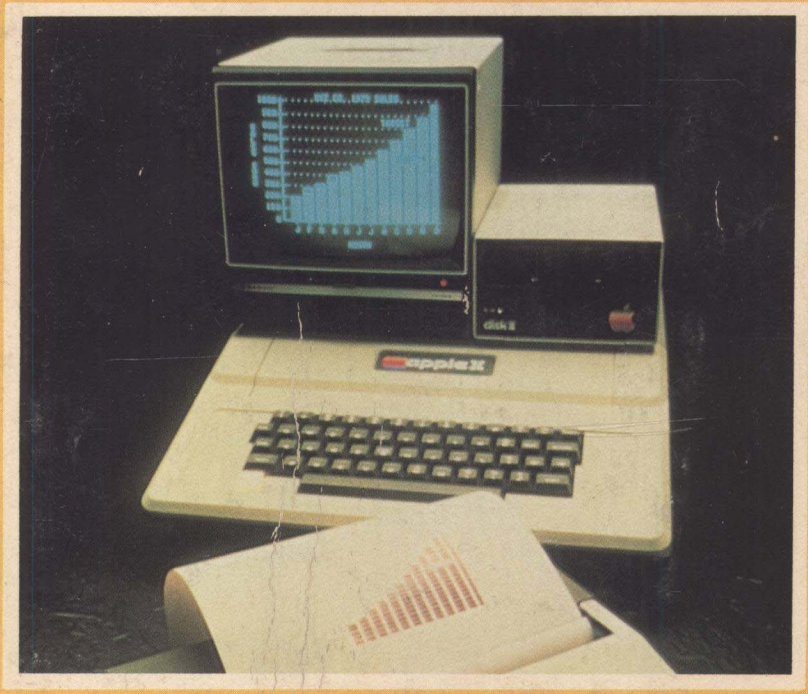
USER'S GUIDE TO THE APPLE II



Michael P. Antonovich

User's Guide To The Apple II®

by

Michael P. Antonovich

This book is dedicated to my wife Susan Marie. Without her help and encouragement, this book may never have been finished. I also wish to thank her for typing the rough drafts and proof-reading assistance.

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CHAPTER 1.
INTRODUCTION

Let us suppose that you have just purchased an APPLE II computer. Perhaps you also spent months analyzing the reports from various magazines before making your choice. Maybe the salesman immediately sold you on the APPLE's capabilities, or maybe you were impressed with what a friend was doing with his APPLE. In any case, if you have purchased an APPLE II, you now have a very sophisticated and powerful piece of electronic equipment sitting in your living room, which is capable of a wide variety of activities ranging from games to scientific analysis. Your only problem now is, "How do I use it???"

Unfortunately, you cannot merely ask the APPLE a question and expect to get an answer. You must provide the computer with all of the data that it will need in order to solve the problem. Besides this data, you must tell the computer EVERY STEP needed to perform any activity. That is why computers need software. **Software** is the program or the sequence of commands which tell the computer what to do, how to do it, and when to do it. Without software, the computer is an expensive piece of electronic junk, or at least a very large paper weight. That is worth repeating. Without well written and documented software, the computer is an expensive piece of electronic junk.

Man is not one of the more efficient animals on this planet. In fact, man is often ranked quite low, even lower than many animals which are becoming extinct. What has allowed man to develop to his current state is his ability to use tools--from the simple stick tools and fire of pre-historic man to the current use of computers. That's right. Computers are the "tools" that are propelling us into the 21st Century. It has always been the combination of tools with man that has made man better, and, hopefully, it will also be so with computers.

The purpose of this book is to provide the reader with enough information to knowledgeably use his APPLE. We will cover the following:

- Assembling the APPLE II.
- Running purchased software.
- Writing customized software in BASIC.

We will also discuss background information about the APPLE as well as how it works, so that the inspired among you may be led to greater heights.

Before getting started, you might be interested in a bit of APPLE history, as well as a brief overview of how the APPLE is being used today.

The APPLE Computer Corporation

Hobby computers first appeared in the early 1970's. However, one had to be an electronics wizard to be able to take all of the parts comprising the hobby computer kit and assemble them, correctly!! Most home computers did not use a home television for output and had to be programmed in machine language which is relatively more difficult than programming in BASIC. Generally, the only people who bought these early computers and actually got them working were electronic hobbyists. Thus, the name, hobby computer, became a standard label for these small computers.

The APPLE I was created by Steven Jobs and Stephen Wozniak in a garage in Los Altos, California in 1976. Only 200 APPLE I's were manufactured and these were sold for $666.66. The APPLE I consisted only of a simple printed circuit board without a case, keyboard, or monitor. Their early success with the APPLE I convinced Steven Jobs and Stephen Wozniak that a huge market existed for small computers.

In June of 1977, the APPLE II was introduced as the first fully assembled computer that could be taken home, uncrated, and plugged in. At the time, many of APPLE's capabilities could not

be utilized, for the hardware did not yet exist. For example, the APPLE II has eight slots in its rear into which peripheral devices can be plugged (more will be said about this later). However, at that time, not one peripheral existed to be plugged in.

The real advantage of the APPLE II at the time was that the APPLE II had its own power supply, memory, graphics and color generator, sound, and typewriter keyboard in one self-contained cabinet. Also, programming was performed in BASIC, rather than in the more difficult assembly or machine language. Thus, more people would be able to use the APPLE II.

The APPLE II has continued to be very successful. It currently controls a major share of the microcomputer market. APPLE's can be found in homes, businesses, schools, and factories all over the world. APPLE's were even at the Knoxville World's Fair. The applications to which the APPLE has been put are even more diverse than the locations where APPLE's can be found. APPLE's are used to educate children, monitor vacant buildings for security, perform word processing tasks, operate laboratory equipment, check the current Wall Street stock prices, and even talk to dolphins. Of course, some of the best games found inside or outside of arcades are found on the APPLE computer. APPLE computers are being creatively used by musicians such as Todd Rundgren. APPLE's also control the video games at the Sesame Street Amusement Park. Finally, computers are beginning to move work into the home. In the future, more and more workers will turn on their computer and put in an eight hour day for a company--without ever leaving their homes.

Today, APPLE Computer, Inc. has its main headquarters located in Cupertino, California. APPLE is actively traded in the Over-the-Counter market. APPLE has manufacturing facilities world-wide.

APPLE II's Come In Three Flavors

There are currently three types of APPLE's on the market:

- APPLE II
- APPLE II PLUS
- APPLE III

A new APPLE, which has been code named LISA, is expected to be introduced sometime in 1983. Meanwhile, an upgraded APPLE II may also be released in 1983.

The APPLE II is an integer machine. That means that the APPLE II can only work with integer numbers such as 5, 100, and 5437. Integers do not have decimal portions. Numbers such as 1.07, 53.62, and 0.5 have no meaning to the APPLE II. The use of integers allows the machine to work faster, but it does limit the APPLE II's applications to non-financial, non-scientific tasks such as word processing, education, and games. The integer machine also limits the range of numbers that it can process, to the range -32676 to +32767. In addition, several of the Integer BASIC commands differ from the floating point versions of the same commands. These differences will be covered in more detail later in future chapters as the commands affected are discussed.

The most popular APPLE is the APPLE II PLUS. The APPLE II PLUS is a floating point machine. That means that the APPLE II PLUS can work with floating point numbers such as 1.07, 53.62, and 0.5, as well as working with integers such as 5, 100, and 5437. Calculations on the APPLE II PLUS are slightly slower due to the use of floating point numbers, but the range of applications opens tremendously when floating point numbers can be used.

Externally, the APPLE II and the APPLE II PLUS have identical appearances, except for the nameplate on the front of the APPLE above the keyboard. Both machines use a 6502 microprocessor. The 6502 can address a maximum of 64K of memory. Both the APPLE II and the APPLE II PLUS have a base unit price of approximately $1500.

The APPLE III is a different machine internally and externally from both APPLE II models. The APPLE III uses a 6502A processor. The 6502A allows the computer to address twice as much memory (128K) as the 6502, as well as to operate faster. The APPLE III includes enhanced graphics capabilities, a built-in disk unit, built-in printer interfaces, a numeric keypad for fast entry of numbers, and many other features. The APPLE III will not be discussed in further detail in this book.

The Rest of This Book

The remainder of this book will provide all of the information necessary to start using your APPLE II computer. An ample number of illustrations and examples have been provided to aid in your understanding of the APPLE. Most of these examples have been kept generalized, but they can form the basis of more sophisticated applications. This book has been broken into 'byte-size' chunks. Be sure that you thoroughly understand the concepts in any given chapter before proceeding to the following chapter.

CHAPTER 2.
PLUGGING IN YOUR APPLE

Equipment

Now that you have brought home your boxed APPLE, the first thing you might ask yourself is, "Is my engineering degree up to date so that I can assemble it? Do I have enough solder? Will this be as difficult as assembling that bicycle last Christmas?"

Wait a minute--the APPLE is not a kit! It is already assembled. When you remove the APPLE from its crate, you should have found an accessory box with manuals, a power cord, a cable to connect the APPLE to a tape recorder, and a few cassette tapes or disks. If you do not have these items, check with the dealer from whom you purchased the APPLE.

In addition to the above items, you will also need the following items:

- Game paddles and/or a joystick (if you plan to play games with your APPLE).
- A tape recorder with cables and/or a disk drive with a disk controller card.
- A color or black and white TV with an 'RF Modulator' and cables or a monitor with a cable having RCA plugs.

TV Connection

An ordinary home color or black and white TV can be used to display your APPLE's video display. However, since the APPLE can produce colors, you might prefer to use a color TV. Colors are often used in games and graphics, where the grey tones of a black and white TV can sometimes be indistinguishable. Your

family color television will do fine as long as the other members of your family do not mind giving up their favorite television show while you use your APPLE.

If you are using a TV, you will need an RF modulator in order to display the APPLE's output on the screen. Many types of RF modulators are currently available on the market. Almost all of them will work well. However, the instructions on connecting the modulator to the TV may vary. Modulators should come with instructions on hook-up included. When purchasing a modulator, be sure that you also purchase the connecting cable to the TV. Most modulators can remain connected to the TV when the APPLE is not in use, without disturbing normal television reception.

Monitor Connection

If you have some additional money left over after buying your APPLE ($200 to $1200), you may want to consider purchasing a green phosphorus or an RGB monitor. These are manufactured by companies such as NEC, AMDEK, TECO, SANYO, and ZENITH. True monitors have clearer output than TV sets, and thus, are easier on the eyes. In addition, most true monitors will allow a display of up to 80 characters per line due to their higher resolution. Be sure that your monitor is a 'true' monitor. If a monitor can also function as a television, it is not a true monitor, and you may as well use your TV.

To connect a monitor, only a cable with an RCA plug on one end and the proper plug for the monitor input on the other end is needed. Plug the RCA end of the cable into the APPLE's VIDEO OUT jack located on the rear of the APPLE. The cable's other end should plug into the monitor's VIDEO INPUT. That was simple, wasn't it?

One last point, before the APPLE can output an 80 column display, you will need some additional hardware. An eighty column card such as the Videx Videoterm or Doublevision is necessary. These sell in the range of $300 to $350.