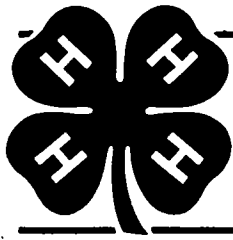


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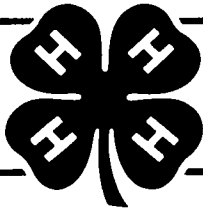
# 4-H COMPUTER PROJECT I: *Learning About Computers*



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Institute of Food and Agricultural Sciences  
University of Florida, Gainesville  
John T. Woeste, Dean for Extension

*The 4-H program is for all young people ages 8 through 18. Members can choose from a wide range of educational activities and have fun while learning. Contact your county 4-H Extension agent to learn how you can participate in the many projects and activities for young people.*

This manual is the product of a project that was supported by a special needs grant from the Extension Service, USDA, Washington, D.C. This revision, following a pilot test by 12 states, has been prepared by University of Kentucky Extension Agricultural Engineer George A. Duncan with the help of University of Kentucky Computer Project Committee members Dennis Goodman, Richard Maurer, Patricia P. Schrader and George Turner. The pilot test draft was prepared by Lee Hays, George A. Duncan and George Turner, with artwork by Ron Hutt, from the original materials prepared by George Duncan, George Turner, Linda Bach, Steve Duncan, Sandy Holland, Bernie Bourbeau, Richard Maurer, David Miles, Jerald Rose and Kathy Wyatt.



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# 4-H Computer Project I:

## *Learning About Computers*

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### **Introduction**

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Welcome to the fascinating world of computers. Computers play an active role in everyone's life. Think about the things you do every day. You will soon realize that computers affect you directly in many ways. Banks, restaurants, department stores, toys, games and even automobiles use computers in some form.

As the field of computers continues to grow, there will be an increased need for people familiar with computer technology. The purpose of this project is to introduce persons with little or no computer experience to the fundamental operations of computers. There are two important points to remember while completing this project. First, there is nothing to fear about computers; computers will not fall apart because of the mistakes you make. Second, it will always take a human to operate a computer.

To begin, let's look at the functions of a computer.

- Perform complex, lengthy arithmetic operations quickly and accurately.
- Provide activities for entertainment and education.
- Remember and retrieve information.
- Make judgements for us by comparing stored facts.
- Sort data into meaningful information and statistics.
- Instantly balance checkbooks or inventory.
- Save businesses and individuals TIME, MONEY and SPACE.

### **What You Will Learn in This Project**

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- The basic parts of a computer and how they function together.
- The important KEYS on a keyboard.
- How to use a microcomputer as a calculator.
- How to run a simple tape or diskette program.
- How to take care of diskettes and cassette tapes.

### **What You Will Do in This Project**

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- Interact with a microcomputer.
- Use the computer as a calculator.
- Run prepared programs.
- Share what you have learned by giving a demonstration.
- Keep a record of your 4-H computer project.

### **Understanding the Microcomputer**

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Small, portable, low-cost computers that are used in the home or for small businesses are called microcomputers. The main features of popular microcomputers used in 4-H computer projects are shown in Figures 1 and 2. There are other similar types and models available.

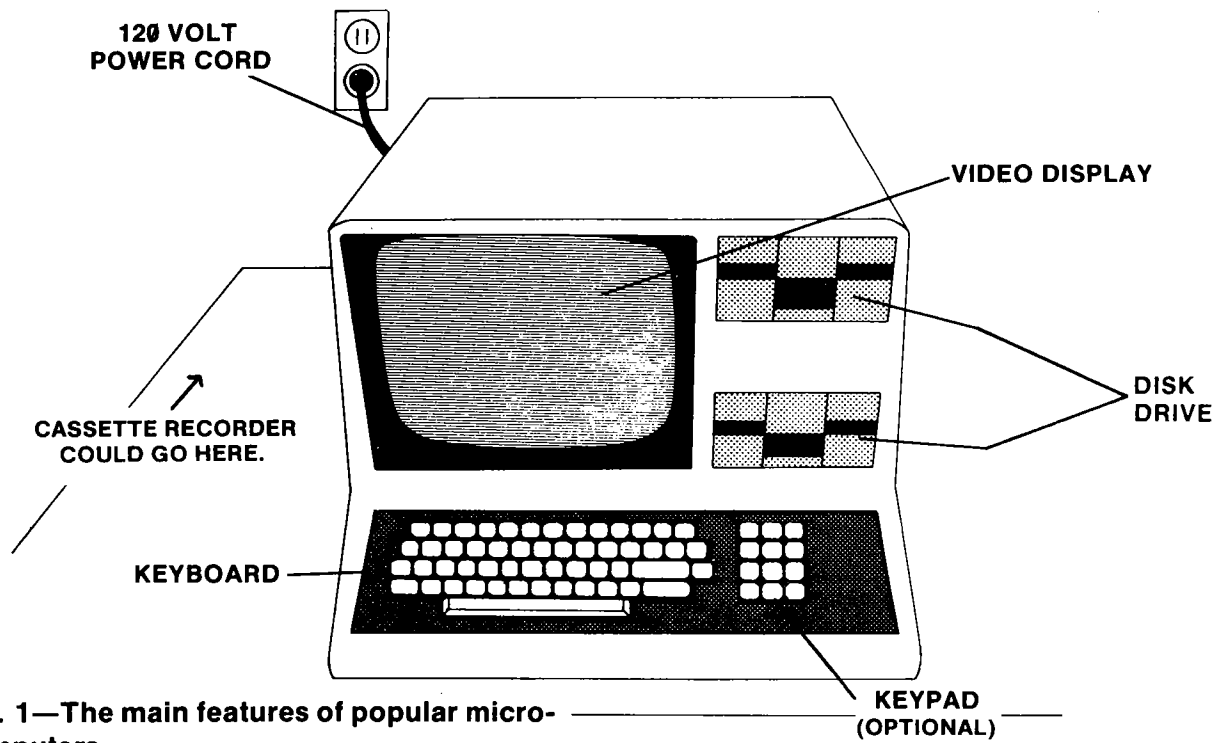


Fig. 1—The main features of popular micro-computers.

Fig. 2—Storage devices for microcomputers include cassette tapes (used with a cassette recorder) and diskettes.

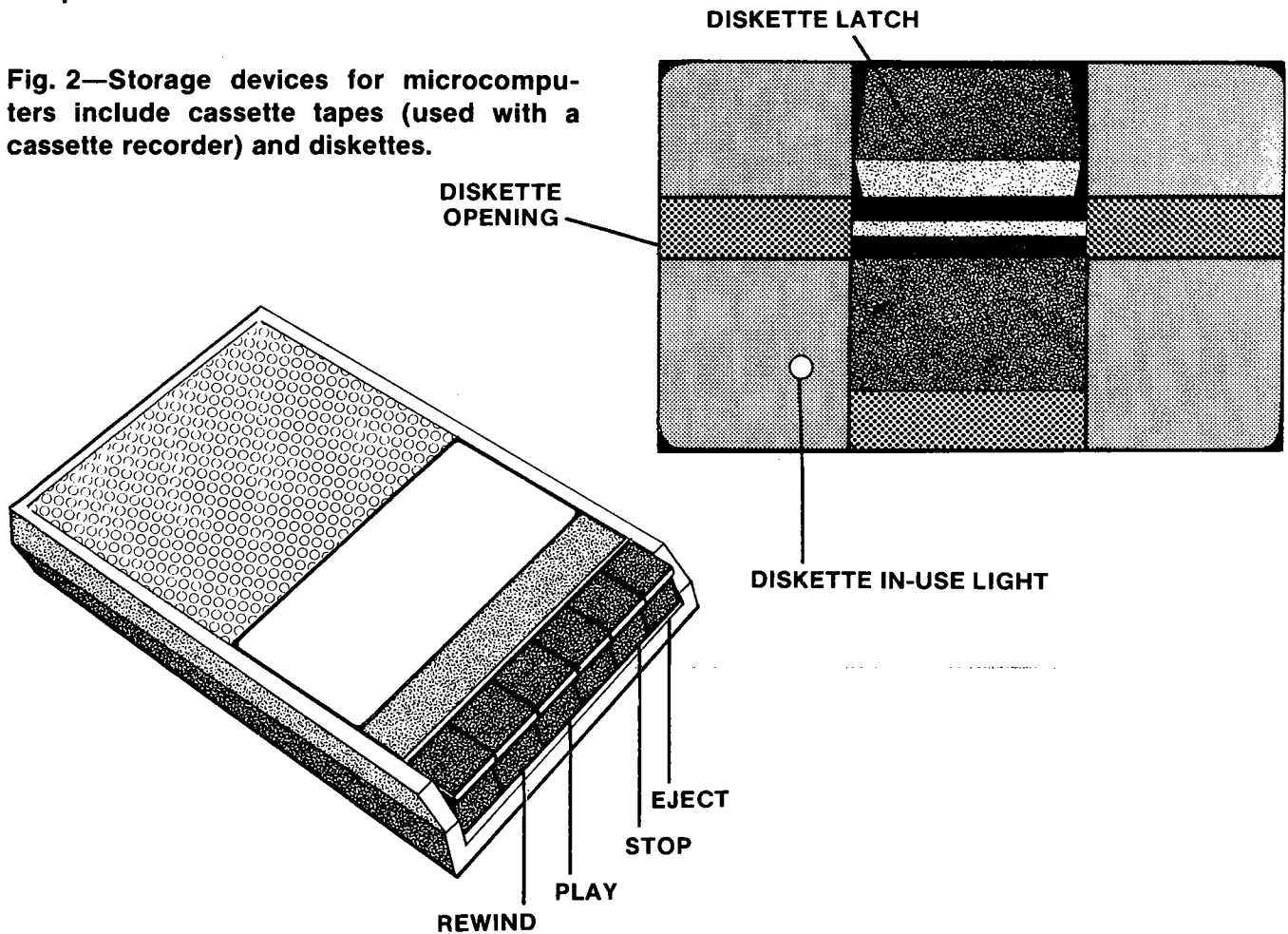


Figure 3 shows the parts of a micro-computer and how information is sent from one part to another. Study the figure closely. Understanding these parts is basic to understanding computers. Later in this project you will be asked to identify and label these parts.

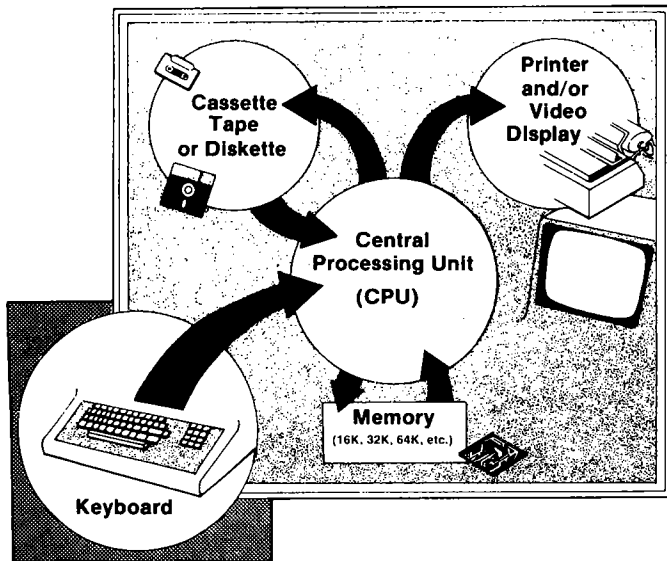


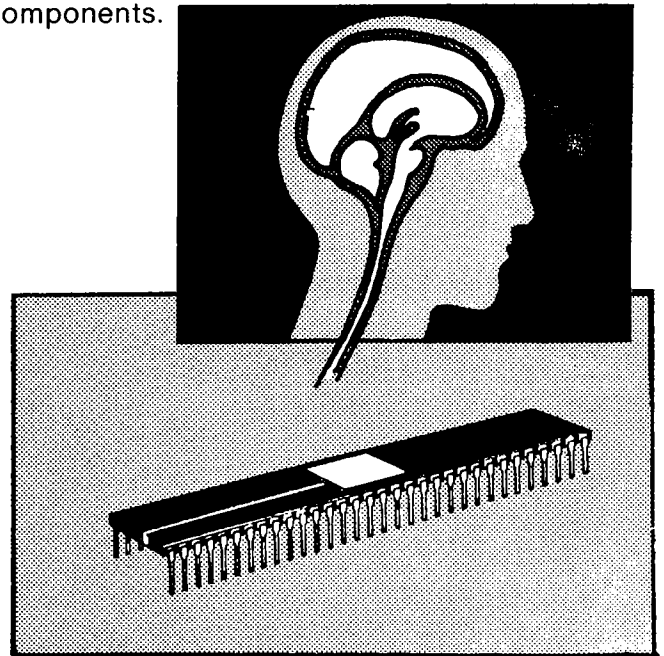
Fig. 3.—The flow of information from one part of a microcomputer to another.

### Components of a Computer

As shown in Figure 3 the basic components of the microcomputer include the central processing unit (CPU), memory, keyboard, video display, printer, and tape or diskette storage. These are typical of all computer systems. However, the larger the computer, the larger the devices and greater the number of keyboard, video, printer and storage devices that are connected to the central processing unit.

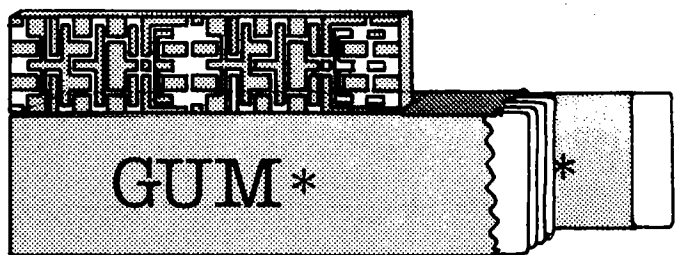
### Central Processing Unit (CPU)

The CPU is the “brain” of the computer. In microcomputers, the CPU is a complex integrated circuit called a microprocessor. It is located on the main control circuit board and receives, manipulates, and directs electrical signals to all the other computer components.

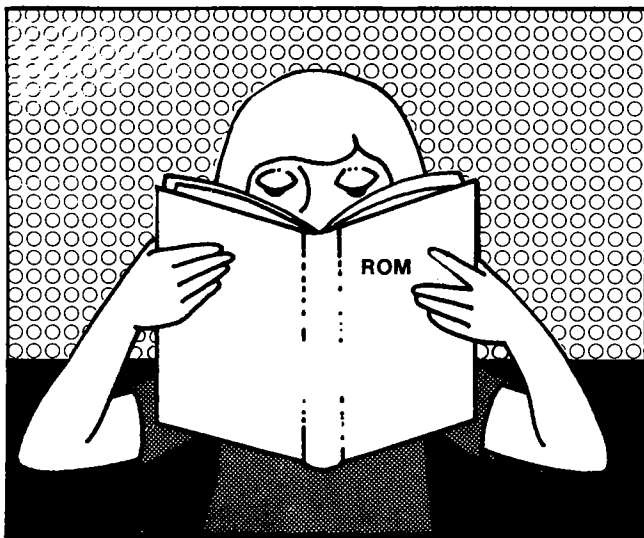


### Memory

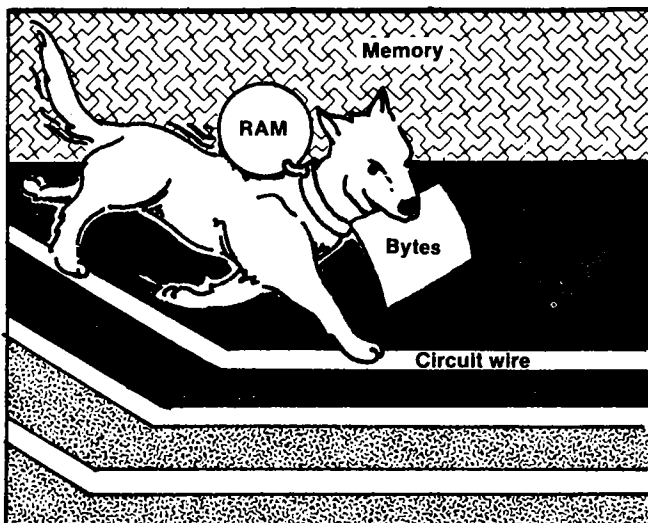
In order for the CPU to perform useful work, a computer must have the ability to store information (or data). The ability to store data internally or within the computer is known as MEMORY. The memory section of the computer is composed of solid-state devices. One “chip” about ½ x 1 inch in size and ¼-inch thick with 16 to 32 terminal connections can act as a “memory” for 2K to 64K bytes. (Look up K and bytes in the glossary on page 17). That’s equivalent to a short written report in a package smaller than a five-stick package of chewing gum. Newer memory devices will have 10 to 100 times more capacity in the same space.



Memory can be ROM or RAM. ROM is Read-Only-Memory. The CPU can only ask for what's stored in ROM. You cannot change the data in ROM. Special instruments, equipment and well trained people have permanently "stored" information in the ROM of your computer. The BASIC language instructions and many other operating procedures are often stored in the ROM. (Look up BASIC in the glossary on page 17.) About 12K of space is required for the BASIC language storage in many small computers.

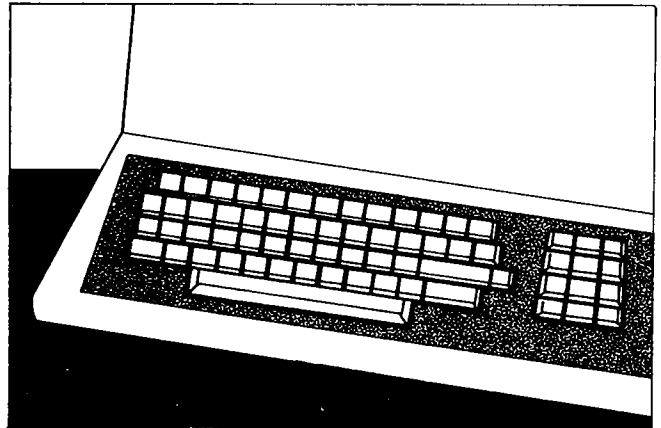


RAM is Random-Access-Memory. This is the memory that can be used to store information you type into the computer and "randomly" recall. That is, any byte of the memory is available for both storage and recall at any time. RAM is generally the add-on type (16K, 32K, 48K, etc., sizes).



## Keyboard

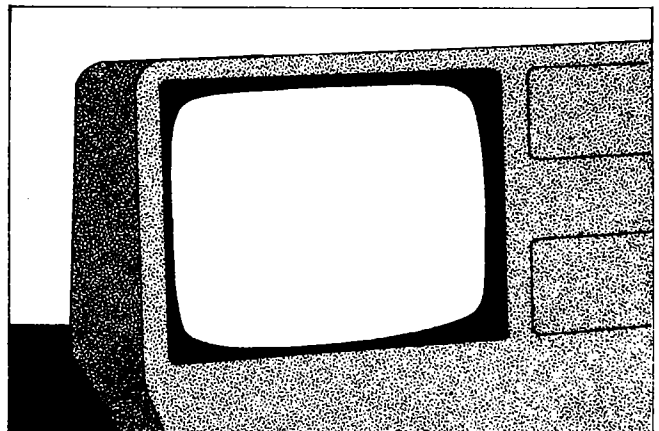
You will use the keyboard to communicate with the computer. The keyboard serves the functions of letting the operator select and construct instructions to enter into the computer and to type information and data for desired programs.



## Video Display

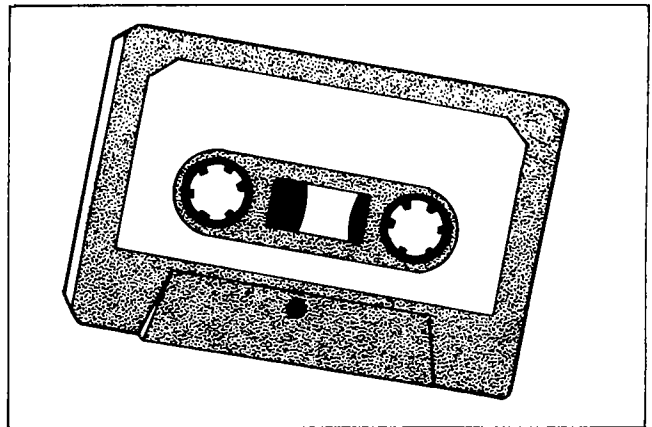
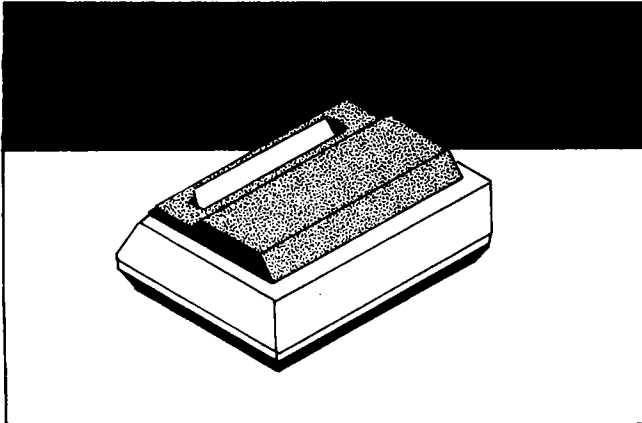
The video display is the direct opposite of the keyboard for it is the computer's means of "communicating" to the operator. The video display is a cathode ray tube (CRT) just like a black and white television that gives a visual display of the computer's output.

With special small electronic adapters and converters, any TV set can serve as a video display for the computer, but the quality is not as good as regular television viewing.



## Printer

In order to have permanent records of computer output, you must have a printer. With the video display, the computer output is visible only as long as you keep it on the screen. With a printer you can have a permanent printed copy of the computer output. Many types of printers are available. Some electric typewriters can be adapted and connected to a computer.



Cassette tapes used for digital computer data must be much better quality than the tapes used for music reproduction. Data are stored on a cassette tape at 500 to 1,500 bits of data each second. (Look up "bit" in your glossary on page 17.) Even the smallest flaw in the tape could produce a useless tape since the loss of only one bit would produce inaccurate information. The cassette tapes used with computers should be rated as "digital" quality.

To use a cassette tape with a microcomputer you must load the cassette into a tape recorder and the recorder must be connected to the computer. You will need to study the manual for the computer you will be using for instructions on how to use the cassette tape. Correct usage is absolutely vital to your success with the computer.

## Storage Systems

Many microcomputers use magnetic storage media for permanent external storage of data, programs and various types of files. There are a variety of different storage devices, but for this project you will be using either a cassette tape or a diskette.

### Cassette Tapes

Cassette tapes are an economical method for the microcomputer to store information. These tapes have magnetic impulses that the computer is able to interpret. If you were to listen to the tape it would sound like "static" or a high-pitched tone but the computer can interpret this "static."

