

# Microcomputer-Assisted Information Retrieval

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We are rapidly approaching a computer revolution that will put small but fast and powerful computers into the hands of many people at work and at home. Nowhere will this computer revolution—which is unfolding now—have more impact than on information specialists.

Currently, the Chemistry Department Library at Duke University and other libraries here use terminals to access information services. But I believe the power and flexibility of a small computer justifies its extra cost for use in place of a simple terminal. It is already very clear that the desktop computer used in the library, at work, and at home will play a key role in the coming information revolution.

The desktop computer can link libraries with computer networks and information services. Connected to the distant large computer via telephone lines, it is a flexible, modern terminal that allows the searching of distant giant files of information. Offline, this small computer is a powerful tool in its own right. It can do a range of otherwise difficult tasks, including displaying, processing, storing, retrieving, and otherwise managing your information files.

## Information Services

While some librarians might consider some of the information services such as those provided by Lockheed (DIALOG) Information Services, Systems Development Corporation, or BRS as being too expensive, there are other less specialized information services such as The Source or CompuServe that are inexpensive offhours and can provide a wide range of data, including information on business, education, government, news, and science and technology.

But for many purposes, the specialized information services are worth their cost (which may be \$10 or more for ten minutes of search time). They provide a powerful ability to rapidly search through large data files that may contain as many as one or two million records.

For example, through Lockheed Information Services's DIALOG, simple commands typed at the computer are interpreted and acted upon by the distant system. With the commands a search can be carried out using any of a hundred or more indexes (data bases). With experience, using the available DIALOG commands, it is possible to access many of the complex patterns of information contained within the multitude of data bases.

But therein lies a major problem for the end user of the information. A simple print-out, will reveal that some of the information will be useful and some

should be discarded, some will need to be organized for further use, and some filed for later use. It is much quicker and easier to do all of these functions as well as many other things if the information is saved in a personal computer file rather than simply printed on paper.

## **MCAIR**

The microcomputer assisted information retrieval (MCAIR) provides help in obtaining information from the large external computer files, in storing it in personal files, and in processing it for bibliographies, reports, articles, and other purposes. The key idea here is to have a computer at both ends of the data communications chain.

For the information specialist, this provides easy access to the remote computerized data bases and rapid answers to questions. It saves time and costs by automating routine procedures and rapidly downloading information into the microcomputer. There is no need of expensive high speed printers to keep up with a high speed flow of data. Instead, the desired data can be printed offline or saved to disk for later use and further processing.

Or as Benjamin F. Speller and George F. Bowie have demonstrated, successful search strategies can be saved locally and recalled later and then sent for a search update.<sup>1</sup>

It may make sense to even link small or medium-sized libraries through a network of small computers in order to share resources and the time and talents of information specialists.

For the end user, the small computer provides the ability to keep track of individual files of information built up over a period of time and to process it in almost any way desired.

## **Equipment Requirements**

The basic equipment for MCAIR is inexpensive. A first rate professional system can be set up for less than \$5,000. For MCAIR the following equipment is needed: (1) a microcomputer with 48K bytes of memory (RAM), (2) at least two disk drives, and (3) a modem to link the computer with the distant one via telephone.<sup>2</sup>

At Duke we use an Apple II computer equipped with two Apple II disk drives and a Micromodem II™. In addition, we use a Televideo 920C terminal connected to the Apple with a SSM serial interface board for keyboard input and display and a Microsoft softcard for Z-80 CP/M based programs. These last items are optional, but they increase the efficiency and flexibility of the system. The Televideo terminal provides a standard 80 column display and 11 special keys for word processing. The Microsoft softcard allows the use of a range of useful programs that are only available for the Z-80 CP/M Apple II.

## **Communications Software**

A good communications program is needed. We use a program for the Z-80 Apple II produced by Southwest Data Systems called Z-Term to handle communications with all the computer networks and information services.<sup>3</sup>

With Z-Term the telephone number of the user's choice can be selected and the microcomputer will dial and wait for a connection to the larger computer. The Z-Term will also automatically type access codes, passwords, and other information necessary to connect to the external system. Once connected, interactive communication can be made with the larger computer, the desired information obtained, printed, or saved as a text file on disk.

## **Word Processing**

A good word processing program is needed to take full advantage of the microcomputer's ability to edit and rearrange the information received. With a word processor, the user can insert or delete characters, words, lines, or entire sections of text can be inserted or deleted; search for and replace items; or move whole blocks of text from one place to another—all with a few simple keyboard commands.

We use a word processing program for the Z-80 Apple II originally produced by Small Business Applications, Inc., and now under Peachtree Software, called Magic Wand™. The commands are very simple and flexible and can be used effectively with very little experience. The information received can be processed to produce reports, bibliographies, and other documents or for incorporation into a computerized filing system.

Additional uses for the word processor in the library have been described recently by Theodore Hines and other library science faculty at the University of North Carolina at Greensboro.<sup>4</sup> For example, they are using a word processor to help design a new system to help librarians answer reference questions.

## **Data Management**

A file or data base management system is a collection of programs that allows the handling of computerized files of information in a variety of useful ways. A good data base management system is needed to take full advantage of the microcomputer's ability to store information on disk. With the programs, a search through the information can be made to find specific records or individual items within a record, sort the records by name, number, or date, create indexes to the information, and print selected information in a variety of formats.

We currently use The Data Factory™, version 5.0 produced by MicroLab. This data base management system allows the storing of a particular file on two disks. About 10,000-25,000 words can be stored in each file.

## **Control Program**

Everything that has been described so far can be accomplished with existing programs. But using a collection of separate programs greatly increases the difficulty.

We are currently developing a Control Program for the Apple II that will tie the separate programs together into a complete package for MCAIR. A diagram of the Apple II software is shown in Figure 1.

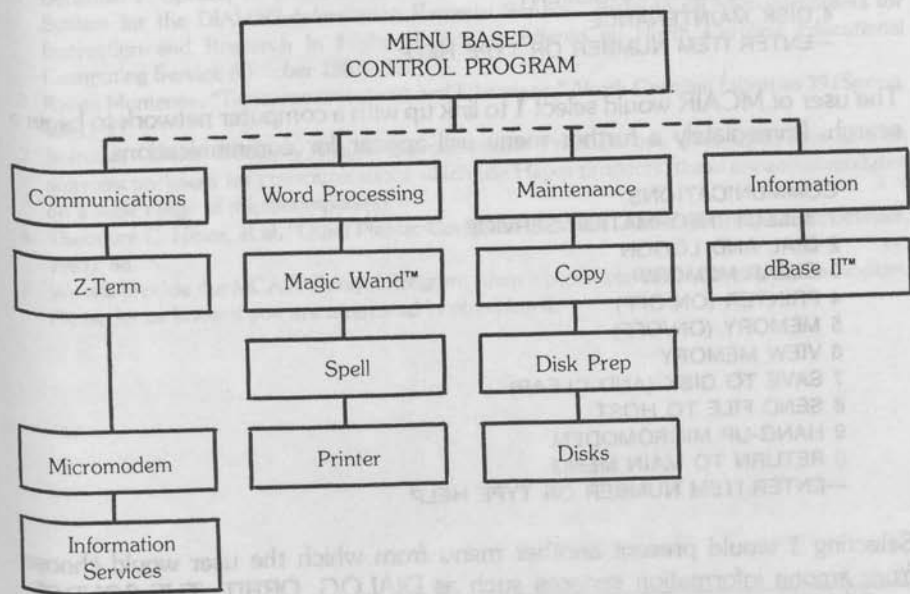


Figure 1. Structure Diagram for the Apple II MCAIR Software

The Control Program will present menu options to the user and accept appropriate choices. It is designed to lead inexperienced individuals through the operations to use the separate programs for MCAIR. There is no need to learn difficult CP/M syntax.<sup>5</sup>

A user of MCAIR will simply have to insert a disk into the first disk drive and turn on the computer. After an informative sign on message, the user will be presented with a list:

- 1 OVERVIEW OF THE SYSTEM
- 2 INSTRUCTIONS
- 3 MAIN MENU
- 4 COMMAND MODE
- ENTER ITEM NUMBER OR TYPE HELP

By choosing number 1 through 4 the user will obtain general information or specific instructions or begin to use the various options in the system. Item 4 (press 4 and then **RETURN**) immediately puts the user into a mode that allows direct typed commands to begin a specific task. Item 3 begins a series of user menus to guide new users through the selections necessary to obtain, display, process, and save data from the information services.

## MAIN MENU

- 1 COMMUNICATIONS
- 2 WORD PROCESSING
- 3 DATA BASE MANAGEMENT
- 4 DISK MAINTENANCE
- ENTER ITEM NUMBER OR TYPE HELP

The user of MCAIR would select 1 to link up with a computer network to begin a search. Immediately a further menu will appear for communications.

- COMMUNICATIONS
- 1 SELECT INFORMATION SERVICE
- 2 DIAL AND LOGON
- 3 CLEAR MEMORY
- 4 PRINTER (ON/OFF)
- 5 MEMORY (ON/OFF)
- 6 VIEW MEMORY
- 7 SAVE TO DISK (AND CLEAR)
- 8 SEND FILE TO HOST
- 9 HANG-UP MICROMODEM
- 0 RETURN TO MAIN MENU
- ENTER ITEM NUMBER OR TYPE HELP

Selecting 1 would present another menu from which the user would choose from among information services such as DIALOG, ORBIT, THE SOURCE, or COMPUSERVE. After a search, selection of 0 would return to the MAIN MENU, from which you can select other word processing, disk maintenance, or data management;

In COMMAND MODE the various tasks perform a series of commands such as COMM, EDIT, PRINT, FILE, QUIT, etc.

## A Look To The Future

The printed word is beginning to pass as the predominant form of information storage and retrieval. Even now bibliographic information is much more quickly and easily exchanged by electronic storage and retrieval. Ultimately, much of what is now printed may be kept in computer files. These electronic words can be stored without once printing them. And they can be sent to almost anywhere.

At present, a major limitation in using electronic storage and retrieval is the slow transmission speeds via telephone lines, which is usually 30 or at best 120 characters per second. But soon there should be widespread use of much higher transmission speeds. Even now in North Carolina plans are being made for a microwave network capable of speeds up to 150,000 characters a second.

The electronic word will not completely replace the printed word, but it will certainly change the shape of libraries. And soon the computer in the library should be as common as the card catalog, microfiche reader, or dictionary.



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#### References

1. Benjamin F. Speller, Jr. and George F. Bowie, III, "Microcomputer Based SEARCH\*SAVE System for the DIALOG Information Retrieval Service." Institute on Microcomputers for Instruction and Research In Higher Education offered by North Carolina Educational Computing Service (October 1981): 11.
2. Karen Momenee, "Telecommunications and Librarians." *North Carolina Libraries* 39 (Spring, 1981): 37.
3. Software Vendor Directory, Hayes Microcomputer Products Inc. gives up-to-date data on software packages for communications which use Hayes products (these are accommodated on a wide range of microcomputers).
4. Theodore C. Hines, et al. "Quiet Please: Computer At Work" *Desktop Computing* (October, 1981): 46.
5. We will provide the MCAIR Control Program when it is completed for the cost of the medium. Please let us know if you are interested in obtaining it.



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