The Osborne/McGraw-Hill

Guide to IBM[®] PC Communications

David Kruglinski

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Osborne/McGraw-Hill
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A C K N O W L E D G M E N T S

About the Author

David Kruglinski, author of *Data Base Management Systems,* has worked with data bases and communications on both mini- and microcomputers and on timeshare systems for the last seven years. Kruglinski is president of TENON *Software Services, Inc., a Seattle-based dealer and distributor of software for* business applications. He also contracts as a consultant. Kruglinski received his master's degree in Electrical Engineering in 1970.

C O N T E N T S

ONE

AN OVERVIEW OF PC COMMUNICATIONS

For the moment, set aside thoughts of computers, modems, communication programs, and other technicalities. Instead, think about human communication. Before personal computers became available, you had many options in one-way, two-way, and multi-way communication. With one-way communication, you cannot converse with the producer of the information. Examples of one-way communication are

Books
Magazines and newspapers
Records and audio tapes
Videocassettes and videodisks
Broadcast and cable TV
Movies and theater
Radio
Junk mail
Billboards and signs

Two-way communication allows you to initiate a conversation and converse with a second party. Examples of two-way communication are

Mail

Telephone

Telex/telegram

Last, multi-way communication allows you to interact with other members of a group. Face-to-face meetings have been the traditional means, but here are some more recent developments:

Video conferencing

Citizens band radio (CB)

Amateur radio

Notice that most of these communications media are electronic. People have been captivated by "instantaneous" communication ever since Samuel Morse introduced the telegraph in 1844. Each new electronic medium has had profound effects on society. Television became available only after World War II, but a recent news item underscored its importance today: a group of small children were offered the hypothetical choice of living without television or living without their fathers. One third said they'd rather have television.

Philosophers as well as advertising executives have intently studied the media and drawn some interesting conclusions. Marshall McLuhan went so far as to say "the medium is the message." But while media experts are good at analyzing a medium once it becomes popular, they can't predict the success of a new one. That depends on the promoters' aggressiveness and on the consumers' acceptance. In recent times, only the Picturephone and quadraphonic sound have failed to gain acceptance; other new forms of electronic media have been wildly successful. Study what follows and draw your own conclusions.

A New Method of Communicating

It sneaked up on the world without a Samuel Morse or an Alexander Graham Bell. It's here in full force and poised for explosive growth, but the public's perception is molded by a few newspaper stories, an ad showing Senator Howard Baker at a terminal, and a movie about a teenager using a remote computer to play "global thermonuclear war."

What is it? What is this new medium? It doesn't even have a name. **Videotex** is the closest word there is, but there are a few other terms used to describe it,

such as

Computer networking

Data communications

Personal computer communications

Electronic mail

Electronic publishing

On-line database

Information utility

Viewdata

There's just no single word for the whole thing because there are so many different aspects to it.

As you'll see in Chapter 5, **videotex** is generally used to describe home-oriented, local services, usually with color graphics, as provided by newspaper publishers. Some writers apply the same term to one-way systems that use cable TV (more commonly called **teletext** in the United States). Though some of the larger national information utilities such as The Source (described in Chapter 4) refer to themselves as "videotex services," the term *videotex* will not be used to refer to information utilities in this book.

The IBM PC's Role
In Personal Computer Communication

Think about the telephone system for a minute. You know there's a big network with wires on poles, microwave towers, exchanges, and operators. You can use this network to speak to anyone in the world; you can order a pizza, check the time, or arrange a date. Your link with this network is your own telephone, which used to be plain, simple, and owned by the phone company. Now you can buy your own phone with Mickey Mouse ears or an automatic dialer or one that is wireless and operates by remote control.

In the world of computer communication, your IBM PC is equivalent to your telephone. The PC is the instrument that you use to access an international network of computers and a vast store of information. With your phone you dial a friend and talk; with your PC you dial a computer and exchange data.

People have been connecting to remote computers for years. Business initiated the trend, but hobbyists were there too. Now business use is expanding quickly and home use has just begun. Early computer communication systems involved **terminals** connected to mainframe computers or minicomputers. These terminals were at first printing machines with keyboards. (The most

notable is the Teletype Model 33.) Quieter printing terminals were soon intro-
duced, followed by **video terminals**, which vaguely resembled personal comput-
ers. The **dumb terminals** were nothing more than "glass teletypewriters." They
printed text one line at a time on a TV-like screen. New lines appearing at the
bottom of the screen caused the old text to scroll up, displacing the top line.
Later **smart terminals** were introduced. These terminals accepted commands to
clear the screen, to insert or delete text, to position text on the screen, and to
protect areas of the screen from accidental modification. Neither smart nor
dumb terminals did anything useful unless they were connected to a computer.

The invention of the personal computer made many video terminals obso-
lete. The personal computer could do everything a terminal could do and a lot
more. Today a fully configured IBM PC costs about $3000, while a terminal
costs between $250 and $1000, but that price gap is narrowing quickly. A
stripped-down PCjr costs about $700, and low-priced PC "clones" are appearing.
While an ordinary terminal works with many information utilities, the PC
works better, and it runs word processor programs, electronic spreadsheets, and
all the other software you see advertised in magazines.

Most business-oriented information services still assume you have a tele-
typewriter that simply prints lines of text one after the other. However, there is
a movement to take advantage of the personal computer's intelligence, allowing
the PC and a remote or **host** computer to perform as though they were one big
system. You could maintain a stock portfolio, for instance, on your PC's disk
and then use a special program to automatically dial Dow Jones to get the cur-
rent price quotations for each stock.

The first large-scale commercial home videotex system requires subscribers
to buy a special $900 terminal that attaches to a color TV set. This terminal can
be duplicated by a properly equipped PC. As a PC owner, you can participate in
the videotex revolution as well as connect your computer to the established
information utilities.

Using Your PC
For Information Retrieval

Jacques Vallee has said in his book *Network Revolution: Confession of a Computer
Scientist* (Berkeley: And-Or Press, 1982) that the words and numbers that are
loaded into a computer are data; if someone asks a question about that data, the
answer is information. Other authors such as Alvin Toffler (*The Third Wave*,
New York: William Morrow & Co., 1980) and John Naisbitt (*Megatrends: Ten New
Directions Transforming Our Lives*, New York: Warner Books, 1982) tell us that

we've become an information society with more white-collar knowledge workers than blue-collar manufacturing workers.

Most of the half million subscribers to remote computer services are there for one-way access to information. The technology has already been perfected and forms a billion-dollar industry. It's not off in the future; it's here today. Businesspeople have led the way, often paying $100 per hour to get the information they need. Since businesses' exist to make money, you can bet that their access dollars are well spent.

In an information society, information is a valuable commodity. The more information you have, the better off you are. Consider the case of a real estate agent who subscribes to a centralized multiple-listing service. A computer terminal in the office allows the agent to display a list of all the homes in a given area with certain characteristics. The agent doesn't need to be a computer scientist to use the system; it is a simple matter to obtain, for example, listings of all three-bedroom homes with prices under $70,000. In addition, the agent can compile a list of all the homes that were sold in the last month to compare the selling prices to the asking prices, or a list of homes that have been withdrawn from the market.

The multiple-listing information service is an example of a private information utility that is bought and paid for by a local association of real estate agencies. Only members of the association have access to the information, but the system works just like any other host computer system. A user dials the computer's number and enters a password. A user with a PC at home could access the system as though he or she were in the office.

There is an almost unlimited amount of information available to business and professional people from computer-based information utilities. Often there is a choice between competing services. The following is a list of categories from a typical information utility. The actual information consists of billions of characters stored in over a thousand databases.

Advertising and marketing	Foundations and grants
Agriculture and nutrition	Industry newsletters
Bibliographies	Law and government
Business and economics	Materials sciences
Chemistry	Medicine and biosciences
Current affairs	Newspapers
Directories	Patents
Education	Science and technology
Energy and environment	Social sciences and humanities

You have the equivalent of the world's largest library available through your PC with a convenience factor unmatched in any library. Everyone knows what it's like to pore through the card catalog and then wander through the stacks looking for a book that has already been checked out. If you use the library, can you compete against someone using computerized information retrieval?

Many information services are geared to businesses willing to spend $50-$100 per hour during regular business hours, but there are services available for the non-business subscriber at a lower cost. A substantial subset of the high-priced services can be used in the evenings and on weekends for about $25 per hour, telecommunications charges included. Off-peak rates are less for the same reason that off-peak long-distance telephone rates are less: the service providers need to utilize expensive equipment 24 hours a day. Here are some examples of $25-per-hour services from the same companies offering high-priced business information in prime time:

$25-per-hour Service

Books in Print   An index of 700,000 books from 12,000 publishers

International Software Database   An index of 11,000 programs

Microcomputer Index   An index of 40 microcomputer publications

Standard & Poor's News   Features about 10,000 publicly held U.S. corporations

ERIC   Education information

Engineering Literature Index   Engineering information

GPO Publications Reference File   Information available from the Government Printing Office

Magazine Index   A list of 438 popular U.S. magazines

Medline   Medical database

Newsearch   1000 articles per day from 5 major newspapers

Complete text of the *Wall Street Journal* and *Barron's*

There is another group of service providers offering more general business and consumer information. Costs are $12-$35 per hour during business hours and $6-$12 per hour at other times. Here are some examples:

$6 - $12-per-hour Service

Quotes on stocks, options, and bonds
Employment opportunities

Legislative reports and analyses
Airline schedules
Hotel, restaurant, and entertainment guides
Weather
Sports scores
Electronic magazines
Feature reports
Health information
Microcomputer newsletters
World Book Encyclopedia

The information utilities providing these services are described in full detail in Chapter 4.

If even $6 per hour puts you off, there are some absolutely free databases set up as electronic yellow pages. Fees are paid by advertisers, and, as you would expect, the information is commercial in nature. However, the system operators do give some information of general interest. In one system you can learn about industrial sites around the world, but you can also find out the cost of living in Afghanistan compared to New York. Another service allows employers to post job openings and job seekers to post resumes. The seekers can scan the openings and the employers can scan the resumes, all with controlled confidentiality. The employers bear most of the cost, but job seekers must pay a nominal connecting charge.

The videotex services offered by the newspaper publisher Knight-Ridder are shaking up the communications industry by providing access to information for $12 per month plus $1 per hour in telephone charges. The orientation is local, but services such as Dow Jones stock market quotes, the *American Academic Encyclopedia* (Danbury, Conn.: Grolier, 1980), late-breaking news, and the J.C. Penney catalog are available. This service now reaches only a few parts of the country, but it could spread quickly.

The dissemination of information by computers is not limited to big electronic publishers. You can start your own information utility, using your PC with a host communication program (see Chapter 6). While the big companies have hundreds of subscribers connected at the same time, you are restricted to one caller at a time. If your subscribers aren't local, they pay long-distance charges.

Using Your PC for Electronic Mail

Information retrieval is an example of one-way communication. The PC also works well with two-way and multi-way communications. **Electronic mail** is a

common form of two-way communication, and business has been using it in a limited way for years. High technology companies like Microsoft successfully use electronic mail for in-house communications. Microsoft employees do not send written memos or make phone calls; they send messages electronically from terminal to terminal. Everyone from secretary to president has a terminal and is fully committed to using it. Suppliers and customers are also tied into the system.

Companies with offices nationwide can use the services of one of the big information utilities for a public or private electronic mail system. There are nearly a dozen firms competing for the business. This area is expanding rapidly with some companies providing printed mail delivery service to addressees without terminals. Delivery is via courier service (fast and expensive) or by U.S. mail (usually providing next-day service for a $2 charge). A link to and from telex machines is also provided.

How does electronic mail work? Think of the mailbox outside your house. When you hear the letter carrier deliver the mail, you check the box, collecting and reading any mail. Outgoing mail may be placed in the box for the carrier to pick up or it may be dropped in a mailbox. Now imagine an electronic mailbox in a central computer. You've signed up with an electronic mail company, and you've received an account number that defines your mailbox. If somebody, knowing your account number, sends you a message, the text of the message is deposited in your mailbox where it stays until you remove it. You're free to connect, or log in, to the central computer anytime to check your mail. If you have messages waiting, you can display them on the screen, print them on your printer, or save them on your PC's disk.

Sending mail is the same. You must know the addressee's account number, just as you must know the street address for regular mail. Many systems allow you to send the same message to a number of people. Billing is either by connect time at the usual information utility rates ($8 an hour and up) or by the message ($1 for 7500 characters).

Why use electronic mail? Remember the last phone call you made. Was the person there? Did you leave a message? Did the person return the call when you weren't available? You get the idea. Letters have their disadvantages too. First they are handwritten, typed, or word processed. Then they must be folded, stuffed in addressed envelopes, stamped, and mailed. They are delivered several days later, and finally they are opened and distributed to the recipients.

Electronic mail would work very well if everyone had a terminal. However, only 6 percent of office workers now have terminals, and far fewer homes are so equipped. Telecommunications companies recognize electronic mail as a huge market and are investing millions to promote the service. MCI has taken the

initiative, but everyone is waiting for AT&T to make its move. Even the U.S. Postal Service has made an attempt, but politics may prevent its success.

As of the start of 1984, all of the various electronic mail services are not interconnected; you as a Source subscriber can't send a message to a Compu-Serve subscriber unless you also have a CompuServe password. It's only a matter of time before these systems are interconnected in the way, for example, ITT's and Western Union's telex services are linked. An international committee is already defining the standards to enable this to happen.

Using Your PC for Conferencing

Electronic mail is easy to understand; it's much like phone calls and letters, only it's more efficient. **Computer conferencing,** on the other hand, is something new. It allows a group of people anywhere in the world to exchange ideas. Maybe all the conference members are connected at the same time, but more often they are not. A computer conference can go on for hours, days, or even years with each person's cumulative contribution always available to the group.

One trend identified by John Naisbitt in *Megatrends* is **networking.** Naisbitt is speaking not in the computer sense, but in the human sense. Naisbitt defines networking as people talking to one another, sharing ideas, information, and resources. As hierarchies break down both inside and outside of business, new horizontal structures are taking their place. Quality circles are replacing the supervisor-worker relationships, and many professional workers report to more than one supervisor. More and more decisions are reached by consensus. Before computer conferencing, networking was supported by face-to-face meetings or perhaps by an occasional video conference. Computer conferencing fits in very well with the concept of networking and is starting to catch on.

Citizens band radio is an example of networking at a very local level. People used CBs to discuss immediate problems such as the whereabouts of the next speed trap. The fad has died down but not out, possibly because of the randomness of participation. It did show that many classes of people were willing to exchange ideas with a group of peers, given a convenient and low-cost medium.

The most widespread use of computer conferencing is found in local **computer bulletin boards** (CBBs). These are single microcomputers, often Apple IIs and IBM PCs, that are equipped with communications paraphernalia and special programs. They are operated by computer clubs, computer stores, or individuals. Other computer owners can call in to scan messages or leave their own messages.

Because so many personal computers are owned by hobbyists, many conferences are microcomputer-oriented. Messages like "How do I get PC Talk to work

at 450 bps?" or "Does anyone have a FORTRAN compiler to trade for a C compiler?" are fairly common. There are also a few sexually explicit CBBs around, presumably broken down into preference categories. So far there haven't been many CBBs devoted to other subjects like social work and gardening. When the social workers and gardeners get PCs, this will change.

Computer conferencing didn't start on CBBs. It started on a large government computer network in the late 1960s. Murray Turoff, co-author of the classic book *Network Nation: Human Communication Via Computer* (Reading, Mass.: Addison-Wesley, 1978), applied the concept to the administration of the 1971 wage-price freeze. What emerged was a centralized information exchange that enabled the Office of Emergency Preparedness to answer questions from thousands of callers per day. The experimental OEP system evolved into a powerful computer conferencing system called EIES, which is still on-line today. EIES and other similar systems are more sophisticated and more structured than CBBs, and they run on large mainframe computers that allow many people to use the system simultaneously. These high-powered conferencing systems have developed a following among the computer intelligentsia who enjoy suspending time and space.

If you want to start your own computer conference, one option you have is to dedicate a PC to the task, either 24 hours a day or on some fixed schedule. This works well for local networks such as clubs or service organizations. A computer bulletin board can be as public or private as necessary. Alternatively, you can start a conference on EIES or another information utility. Here's an idea for you: if enough members of your family have PCs, you can set up a permanent family conference as an alternative to the photocopied Christmas newsletter.

Other Uses for PC Communication

Information retrieval, electronic mail, and computer conferencing are the mainline PC communication applications, but they are by no means the only ones. Edison thought his phonograph would be used for relaying telegraph messages. Maybe the ultimate use of PC communication hasn't been thought of yet, but there's no shortage of ideas in the meantime.

Transaction processing is a growing area for PC communications. You can use your PC not only to get stock quotes, but also to actually buy and sell stocks through a discount brokerage house. After your PC looks up the airline schedules and lists, for example, the schedule of all of the flights to Phoenix, you can make a reservation through a designated travel agent. If your bank is connected to an information service, you can make balance inquiries, transfer funds

between accounts, and pay bills electronically. You can even buy merchandise such as televisions and calculators from electronic "stores," charging everything to your credit card.

This method of doing business is bound to catch on because it saves money. No highly paid operators are necessary to enter data into the computer; you do it yourself. A warehouse with a computer terminal is cheaper to operate than a department store in a shopping mall. Don't look for a cash-dispensing computer peripheral yet; you'll still have to leave home for the actual stuff.

Teaching is another profession that will be substantially affected by computers. Computer-aided instruction (CAI) has been around for years, but it has been unsuccessful because of its high cost and technical problems. The PC is changing that. Several education services based on the PC have appeared. Lessons are **downloaded** (transferred) over the phone from a remote computer into the student's own machine. The student can then work on his or her own machine, contacting instructors through the network when assistance is needed. The PC's graphics are used for digitized pictures and special effects. The computer relieves students of the fear of embarrassment, but the key to the system's success is the availability of a human instructor to answer questions and monitor progress. One side effect is that youngsters adapt to the keyboard and display as a normal means of communication.

Entertainment is also available over the wires. The information utilities allow you to run game programs, but using games that run on the PC directly may be cheaper. Some of the remote games let you play against unseen human opponents nationwide. You'll never know, though, if your opponent is really human or simply someone's programmed PC. One new enterprise permits the downloading of games into a special cartridge for a fee comparable to the cost of a regular game cartridge.

Finally, the PC can earn its keep by doubling as a terminal to a local mainframe or minicomputer. Programs transform the PC into any number of popular terminals such as the DEC VT-100 or the IBM 3270 series. PCs can also talk directly to other PCs, to Apples, and to other machines either locally or over phone lines in order to exchange data and programs.

Some Classification and Terminology

PC communication neatly falls into two categories: **asynchronous** and **synchronous**. These are technical-sounding terms, but you need to learn them. The categories have nothing to do with the content of the communication, but rather with the medium. It's like AM and FM radio.