VIDEOTEX/ TELETEXT

Principles & Practices

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For the past four years he has specialized in this area and has consulted, lectured, and authored a series of articles on various aspects of videotex/teletext. He is a member of the Videotex Industry Association.

Preface

We live in a fast-paced and rapidly changing world, a time in which writers try to capture the essence of what is happening with phrases like *The Wired Society, The Third Wave,* and *Megatrends.* Videotex and teletext are the electronic children of this age. By 1995 they will have grown up to be an integral part of our lives. This book is written for the person who wants to learn what videotex and teletext are, how they function, and the impact they will have on how we live and work.

Subjects are introduced in a systematic way. Videotex and teletext are defined and the applications are discussed thoroughly in Chapter 1. Chapters 2 to 4 examine the components of videotex and teletext systems. Each component is described in detail, and its relations to the other components that make up the system are examined. The technology of videotex, with emphasis on the North American standard (NAPLPS), is presented in Chapter 5.

Chapters 6 to 9 outline the commercial aspects of videotex and teletext. The process of planning for and managing a commercial operation is covered in Chapter 6 by tracing the steps that would be followed in a start-up business. Chapter 7 analyzes the economic aspects and reports the findings of a worldwide survey of videotex costs. The important issues of information base content and design and the process of creating and maintaining information are discussed in Chapter 8. Chapter 9 highlights the importance of product information, pricing, and marketing.

Chapter 10 examines a key question in the minds of many individuals: Is our society ready for the changes that will occur because of videotex and teletext? The chapter explores regulatory controls, legal issues, electronic thievery, the possible loss of privacy, and the social implications. Nor will everyone find videotex and teletext pleasurable. A variety of design issues and viewing considerations, described in Chapter 11, will turn people off if not handled properly. The concluding chapter presents a likely scenario for the rest of this century.

Many books and articles on videotex and teletext use terminology, such as bits, bytes, alphamosaics, and alphageometrics, without

explaining what these things are. That is not the case here. Every technical term is explained so anyone can read and understand the material; in fact, a 300-word glossary of videotex and teletext terms is given in Appendix B. However, for the person who wishes to skip the details, a vertical rule has been printed to the left of some sections. The sections so marked contain technical information that may be skipped over without adversely affecting the reader's comprehension of material presented later.

Abbreviations are used freely—NAPLPS, for example—in the hope they will make the reading easier. When that hope has been misplaced, recourse can be had to the list in Appendix A.

Acknowledgments

Many people and organizations assisted me in the creation of this book. Special thanks go to Linda Funk, who deciphered my handwriting and entered the manuscript on the word processor. Mary Lu Reither typed a veritable mountain of letters. Four graduate students—Steve Baggerly, Carl Bridges, Jeff Geyer, and Carol Leitch—spent many hours digging through library material and proofreading drafts. Paula Rowley, the text-processing specialist, contributed her expertise when needed. Bradley University arranged my teaching schedule so I had large blocks of time available and paid for several trips and an infinite number of phone calls that I made to collect information. The staff at the Cullom-Davis library was helpful in locating and obtaining copies of books and articles from throughout the world.

Individuals at the Prestel Headquarters in Great Britain and the Telidon Information Services, Department of Communications, Canada, were extremely helpful. In addition, individuals in the following organizations were gracious enough to lend a helping hand when asked: AT&T Information Systems, American National Standards Institute, American Newspaper Publishers Association, Aregon International, Associated Press, Conference of European Post and Telecommunication Administrations, Association of American Publishers, BBC Television, Cable-Television Advertising Bureau, CBS, Consulting Resources for Management, DIALOG Information Services, Directel Ltd., the Federal Communications Commission, General Telephone Company of Illinois, Hewlett-Packard, IBM, Intelmatique, The International Association of Videotex Information Providers, International Data Corporation, Keycom Electronic Publishing, MATRA Telecommunications, Mullard Limited, The National Cable

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Special thanks are due to Art Greenberg, who introduced me to videotex, and the following individuals who reviewed portions of the manuscript and offered helpful suggestions: Ed Flanagan, Brian Huggins, James Keeran, Richard Neustadt, Carol Risher, Bill Ritter, Ed Sattler, Bob Seidel, Ben Smylie, and Chuck Stoner.

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Antone (Joe) F. Alber

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Chapter

1

An Introduction to Videotex

Nothing else in the world ...
is so powerful as an idea
whose time has come.
VICTOR HUGO (1802–1885)
on the future of man

Our civilization is undergoing more change in a shorter period than at any time in history. The fuel for these changes has been information. The store of recorded knowledge has more than doubled since the late 1970s and is expected to continue doubling at an increasing rate.

A natural outgrowth of the information revolution is an increasingly technically sophisticated society. Evidence of this sophistication is all around us. It has fostered such developments as space exploration, the implantation of artificial hearts, new forms of high-speed communication, and the compaction of electronic circuitry in what has become known as the chip.

As technology advances, society is often strained to keep pace. Beliefs many of us share and norms that guide our conduct are bent and reshaped. The inevitability of space travel is accepted; organ implantation becomes routine; the satellite-receiving dish at the local Holiday Inn or in our neighbor's backyard ceases to generate awe; and many of us embrace the marvels of microcircuitry by acquiring a personal computer.

Our willingness to embrace a new idea is an evolutionary process. First a need for the change must be perceived. The change may be necessary to save a life, or perhaps it helps to satisfy an insatiable curiosity, or it may provide a way to spend our leisure time more productively.

Second, the proposed change must be attainable. The infrastructure must exist to enable the technology to function properly. The Apollo mission to the moon was not developed in isolation. It was an

outgrowth of several decades of rocket experiments and the Mercury and Gemini manned space programs. In a similar fashion, the microcomputer is another step in the progression of computer technology whose time has come. The first large-scale computer, called ENIAC, was built for the Army during World War II. It weighed 30 tons, required 1500 square feet of floor space, and cost $400,000 to build in 1945. Its 18,000 vacuum tubes consumed 150 kW (kilowatts) of electricity in order to do 5000 calculations per second. Vacuum tubes were replaced by transistors in the mid-1950s. In the 1960s monolithic integrated circuits were introduced, only to be succeeded in the following decade by large-scale integration of electronic circuits. Only after these developments had occurred was it possible to build a microcomputer. The MITS Altair 8800 spawned the microcomputer revolution. First built in early 1975 by using an Intel 8080 chip, its initial buyers were computer hobbyists. Because of its simplicity and the ready availability of parts, it was soon copied; and in 1977 several electronics manufacturers, led by Commodore, Heath Company, and Radio Shack, legitimized the market by introducing products.

Lastly, the change must be affordable. As technology has evolved, the computer price/performance ratio has improved to the point where many people can justify a microcomputer based strictly on its entertainment value. In 1954 the cost of performing 100,000 multiplications was estimated to be $1.26, but in 1978 the cost had fallen to less than one cent! The cost to store 1 million characters in 1979 was only 0.006 as much as in 1964.

However, it wasn't the price alone which created a $4 billion microcomputer industry in just 8 short years; rather, it was the combination of an identifiable need, a proven technology, and an affordable product. Society is about to witness another innovation, called videotex, whose time has come. All the essential parts exist, and all that must be done is to assemble them properly.

The Two Forms of Videotex

Videotex may appear in two distinct forms referred to generically as interactive videotex and broadcast videotex.

Interactive Videotex

Interactive videotex is a two-way system in which users can access a remotely located computer from their homes, businesses, or present locations and display information retrieved from the computer on a modified TV set or a specially designed visual display unit (Figure 1-1).

The computer may range in size from a large mainframe costing several million dollars to a small microcomputer system. The two-way flow of information between the user and the computer occurs most often over the public telephone system, although coaxial cable and optical fiber also are being used. If a telephone is being used a

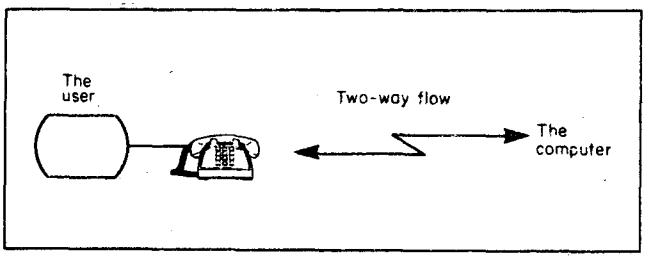

Figure 1-1. Interactive videotex system.

device called a modem is attached or built into the receiver. A considerably more detailed discussion of the components of an interactive videotex system is presented in Chapters 2 and 3.

Interactive videotex is often referred to as simply videotex or viewdata. The term "videotex" alone may lead to confusion because operators of one-way systems will occasionally use the same term to describe their system. "Viewdata" is also a popular term which originated in England. In some instances the name of a particular technology or national program may be used. For example, the Canadian government calls its nationally focused videotex effort Telidon. And Telidon encompasses both broadcast and interactive videotex.

The name of a particular service is also sometimes cited. The British service is called Prestel, the French service Teletel, and the Japanese service CAPTAIN. In each instance the systems are different in design and operation. To prevent any confusion in this book the term "interactive videotex" will be used when necessary to identify systems with a two-way capability. The reader is referred to the extensive glossary of videotex terms in Appendix B for clarification of these and other names.

Broadcast Videotex, Alias Teletext

"Broadcast videotex" refers to any broadcasting system which displays selected frames of information as they are being continuously recycled by the originator of the signal (Figure 1-2). The broadcast

videotex signal is generated with the aid of a computer. The information is prepared and stored digitally and is usually broadcast as a portion of the regular TV signal. The one-way nature of the flow requires the signal being broadcast to be repeated at regular intervals. The time it takes to transmit the information depends on the

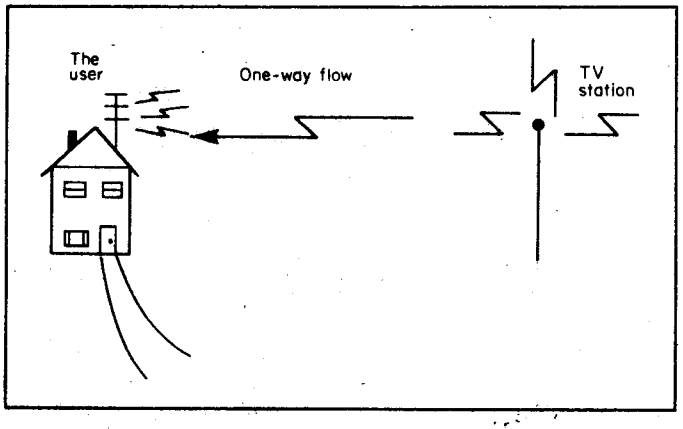

Figure 1-2. Broadcast videotex system.

quantity of information being sent and how much of the signal is used to carry it. In some instances an entire TV channel is used. In addition to piggybacking it with the regular TV programming over the airwaves, the information may be transmitted by cable, radio, microwave, or satellite. A more detailed discussion of broadcast videotex is presented in Chapter 4.

The term "teletext" is often substituted for the clumsier expression "broadcast videotex." This practice is followed throughout the book. The reader should make careful note of the spelling of teletext to avoid confusing it with *teletex*, a new form of the telex message service that is being implemented worldwide.

General Applications

Videotex applications may be grouped into six classes: information retrieval, commercial transactions, electronic messaging, educational services and personal transactions, computations and gaming, and teleservices. Interactive videotex can support all six classes. Teletext is less flexible and cannot support applications that require a two-way flow of information.

Information Retrieval

Information retrieval or electronic publishing, as it is sometimes called, may take several forms. The most popular are local, national, and international news; weather reporting; air, bus, and train schedules; financial market data; and consumer-based information.

Plate 1-1 shows a set of four TV screens, or what in videotex are referred to as frames of information, from EXTRAVISION, the CBS teletext service. The index frame shows the major categories of information that are available and the number that should be entered by the viewer to retrieve the first frame in that category. For example, the news can be retrieved by entering a 1 with the keypad or keyboard that interacts with the TV set.

Three examples of frames containing news are shown in Plate 1-1. Note the use of color to focus the viewer's attention and the limited amount of information that is contained in each frame. Yet the first two frames containing news are relatively full. In the one entitled News Update there are 80 words and numbers and a total of 372 characters including punctuation. If the blank spaces between words are counted, the total exceeds 450. This is equivalent to 2 1/2 in (inches) of newsprint in a typical paper and reflects a capacity limitation per frame. The story is continued on another frame, which can be retrieved simply by pressing the button labeled "next" on the keypad.

The information across the top shows the number and title of the frame and sometimes the source of the information. Since the information is being broadcast as part of a TV signal, there is no charge for viewing it. However, on an interactive service in which a charge could be levied, the price is normally shown at the top also. Note that the News Update frame contains an advertisement on the bottom. This is a common way for the electronic publisher to recoup the cost of providing the teletext service.

Electronic publishing is being investigated by print publishers in the United States and around the world because of economic need. In 1981 thirteen newspapers in this country suspended publication, and seven of them ceased to exist. The remaining papers merged or converted to a weekly format. In 1982 the fatalities read like a Who's Who of publishing: the *Philadelphia Bulletin*, the *Minneapolis Star*, the *Cleveland Press*, and the *Buffalo Courier-Express* succumbed to rising costs and increasing competition for advertising dollars. In 1983 there was a net loss of 14 daily newspapers.

The cost of publishing has been increasing steadily for several decades and will continue to increase unless alternative means of production and distribution are found. Computerized text editing and

automated pagination are a couple of the changes being implemented to reduce production costs, but they don't directly affect distribution (Alber, 1983).

Distribution for a publisher involves both the presentation of the product on the medium and the physical movement to the reader. Traditionally, paper has been the medium and the internal-combus-

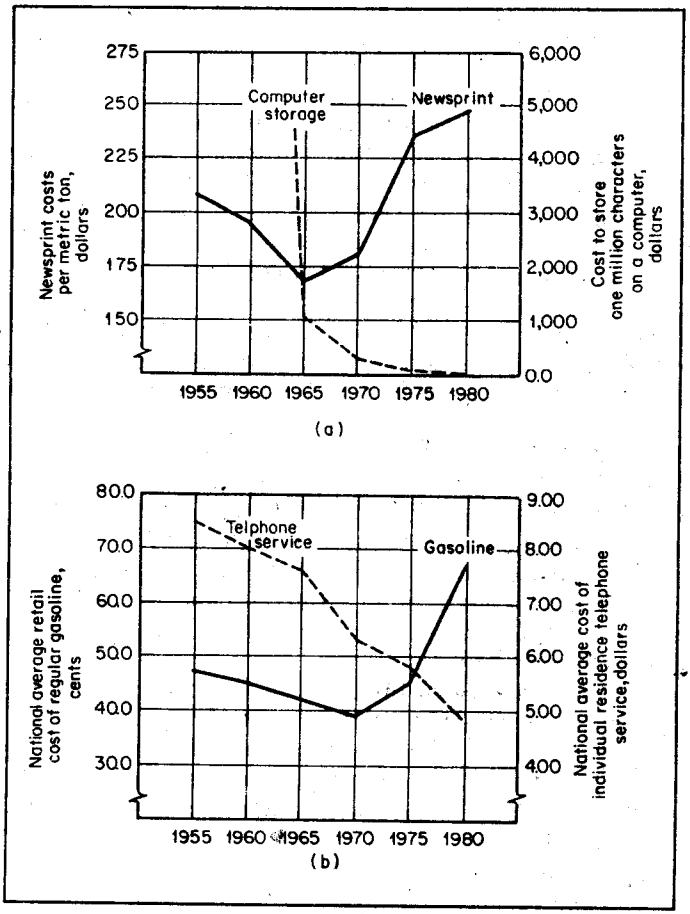

Figure 1-3. Information storage: (*a*) a comparison of the trend in costs between newsprint and computer disk storage and (*b*) a comparison of the trend in costs between gasoline and telephone service. All costs are expressed in constant 1972 dollars by using GNP price deflators; 1972 = 100.

tion engine has been the mover. In 1980, newspapers consumed 7.8 million tons of newsprint and drove 30 million miles a week to distribute their product.

The trends in the costs of newsprint and gasoline in the 25-year period between 1955 and 1980, shown in Figure 1-3, illustrate why publishers are seeking alternatives. The corresponding trends in the storage and distribution of information electronically also are shown. The breakup of the American Telephone and Telegraph Company (AT&T) and periodic surpluses of gasoline may alter the differentials shown in these graphs from time to time, but they will not reverse the long-term trend.

In addition to increasing costs, the publishing industry is facing competition from aggressive competitors for advertiser dollars and subscriber time. In terms of media these include cable and over-the-air TV, radio, outdoor advertising, and direct mail. In terms of organizations it includes companies like AT&T, IBM, Honeywell, and Cox Cable. All of these companies are actively involved in the videotex industry, and there are dozens more like them.

All of these forces are competing for a relatively constant level of advertising dollars and consumer time. A gain by one means a loss for the rest (Alber, 1983). Fortunately, the infrastructure exists within many publishing organizations to make the transition from the traditional print media to the electronic media. This is because once a publisher has encoded information in a digital form to permit word processing and photocomposition, it is also available for electronic distribution. The missing element in the United States is an electronic delivery mechanism such as videotex. Once it is in place, publishers will be in an excellent position to utilize it to their economic and competitive advantage.

An excellent example of a consumer-based information package marketed for the home is the Electronic Gourmet by Home Management Systems, Inc. The Electronic Gourmet consists of five main information bases: recipe, menu, wine, wine reference, and chef's reference. The purpose of the system is to provide information to help the user manage typical household functions.

A description of the recipe system illustrates how this is accomplished. A user, upon selecting the recipe system, is provided four options. These are a general description of how the recipe system works or the ability to select a recipe by number, name, or characteristic. The last option is the most interesting one.

Characteristics have been identified for each recipe progressing from general features such as whether the meal is to be for breakfast, brunch, and so forth, to very specific features such as the type of

sauce desired. The system guides the user through the characteristics from general to specific until a recipe is selected.

At this point one of three options may be elected. If a printed copy is desired and the user has a printer, the copy is produced immediately. Otherwise, the operator of the service is notified through the electronic messaging facility to mail a copy. Second, the meal planner may request a list of wines that complement the recipe selected, and third, the planner may be informed of advertisers offering coupons or other forms of promotion involving ingredients of the recipe.

Commercial Transactions

Commercial transactions in videotex can be classified broadly as electronic banking and electronic shopping. Electronic banking enables subscribers to pay recurring bills and perform other financial transactions away from the financial institution. Electronic shopping permits subscribers to order goods or services without venturing from their homes or places of business.

Electronic banking. Electronic banking is an interactive service that permits a subscriber to perform fiscal transactions without physically going to a financial institution. Another term frequently used is "home banking," but it ignores the fact that businesses, as well as residential customers, may choose to use a videotex service for banking purposes. Telebanking is another popular term. *Tele* means "far off" or "at a distance"; but when used with banking, it leaves the impression that a telephone is used and that is often not the case. Plate 1-2 illustrates some of the options available to a subscriber. A particular choice is selected by keying in the appropriate number.

Interactive videotex enables financial institutions to serve their customers in a variety of new and exciting ways.

Account information—balances. Balances of checking accounts, savings accounts, installment loans, mortgage loans, certificates of deposit, and credit card changes can be shown.

Account information—transactions. Customers can be shown listings of their most recent series of transactions by account type.

Interest rates. Current interest rates are shown for all forms of interest-bearing accounts handled by the institution. The terms for each type of account also are shown.

Funds transfers. Customers are able to transfer funds among accounts at their institution and to accounts held by other participating financial institutions including brokerage firms.

Portfolio analysis. Customers with loans, trusts, money market deposits, certificates of deposit, and other accounts with suspense dates may review the status and upcoming time-triggered events in their portfolio.

Personal budgeting. Account balances, outputs from a portfolio analysis provided by the institution, and projected sources and uses of funds input by the customer permit personal budgeting.

Bill paying. Customers can direct their bank to pay utility and charge card bills, as well as any bills that are presented to them through the bank or that are entered into the system by them.

Services. Information may be requested about exchange rates, times of operation, locations of branches, and holidays observed. Checks and deposit slips can be ordered and sent to the customers directly; statements can be requested; stop payments can be issued; funds can be transferred among accounts; and travelers checks can be obtained.

Many individuals will find electronic banking a trouble-free and convenient way of managing their personal banking. It can be used by each customer to record regular payments made throughout the year to assist in budgeting and provide a current and accurate indication of personal worth. In a properly run system the fraud and security problems associated with making regular payments occur less frequently than with spontaneous payments. Payment is made only to previously specified individuals or organizations, and exogenous factors such as lost or stolen mail are avoided.

A variety of forces at work in the marketplace are encouraging financial institutions to get involved. Consumers are demanding increased convenience and more services. The traditional forms of meeting this demand are longer operating hours and more branch locations, but these are becoming prohibitively costly. Investments in brick and mortar and the people to manage them create significant costs that require a considerable volume of business activity to make the costs justifiable.

As costs go up, revenues may decrease as interest rate policies change and new competitors enter the financial arena. The Depository Institutions Deregulation and Monetary Control Act of 1980 sets into motion a 6-year phaseout of Regulation Q that has put a ceiling on the interest rates that financial institutions can pay on deposits. Financial institutions, particularly banks, will be forced to offer competitive interest rates in order to attract deposits. For example, at Chemical Bank, one of the world's largest financial institutions, a