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TWO-WAY INTERACTIVE CABLE TELEVISION SERVICES:
Prospects and Problems

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by

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ABSTRACT

Cable television originally developed as a distributor of commercial television programs. In addition to transmitting programs downstream to the subscriber, a coaxial cable can carry information back upstream from subscribers to the headend of the system. This ability makes the system interactive.

Cable system operators who are interested in entering major urban markets not currently served by CATV face serious problems. In such urban markets over-the-air television reception is often good and enough programs are available so that viewers are not likely to perceive any serious deficiency in entertainment alternatives. Under such circumstances, how may the cable operator attract subscribers and build penetration among television viewers? Among other alternatives, the offering of two-way interactive cable services has been suggested as a means of securing a "competitive edge" that may help build both cable penetration and system revenues. It is the purpose of this paper to analyze this proposal from the cable system operator's point of view.

Accordingly, possible two-way services are discussed and those offering the greatest revenue-producing promise are identified. While two-way cable television is not yet being offered commercially, several demonstration projects have been conducted or are now under way. These are designed to uncover technical problems and to get information on costs. Such demonstrations are reviewed and analyzed.

In addition, several firms have taken initial steps that might be regarded as preparing the way for eventual development of two-way electronic shopping--a two-way service that is believed to have favorable revenue-producing possibilities. The characteristics of the shopping services offered and the results of these experiments are summarized.

Finally, this paper presents the predictions of experts as to when various two-way services are likely to be introduced and how large the potential markets for such services are expected to be by the year 1990. These forecasts suggest that the largest potential markets are likely to be for (1) educational services, (2) business conducted in the home, (3) shopping facilitation, (4) entertainment, (5) general information access, and (6) person-to-person communication.

BACKGROUND

This article was prepared as a part of a continuing research program dealing with (1) the implications of the growth of cable television for marketing and advertising, and (2) the marketing problems of CATV operators. The project is supported by the Sebastian S. Kresge Research Fund.

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TWO-WAY INTERACTIVE CABLE TELEVISION SERVICES: Prospects and Problems

Cable television originally developed as a distributor of commercial television programs to viewers located in areas remote from television stations or where geographical obstacles interfered with the reception of television signals. In addition to transmitting programs downstream to the subscriber, a coaxial cable can carry information back upstream from subscribers to the headend of the system. The ability to do this has encouraged operators of CATV systems to consider the possibility of offering a wide variety of two-way interactive cable services that have potential appeal to consumers, institutions, and businesses.

This capability has also captured the imagination of educators and doctors who are interested in the potential of two-way interactive cable television as a communication system that may extend and/or supplement present educational and health care services. Local and state government officials also see two-way interactive cable as a means of fostering communication with constituents concerning problems of vital interest to the community or state.

This paper examines the promise of two-way interactive television services from the standpoint of cable system operators who are developing marketing strategy aimed at profitable penetration of those major urban television markets where CATV is currently not available.

Special problems are encountered in entering such urban markets where over-the-air television reception is often good and enough programs are available over the three networks, independent stations, and

educational channels so that viewers are not likely to perceive any serious deficiency in entertainment alternatives. Under such circumstances, how may the cable operator attract subscribers and build penetration among television viewers? Among other alternatives, the offering of two-way interactive cable services is being considered as a means of securing a competitive edge that may build both cable penetration and revenue.

Possible Services¹

An extensive list of interactive services that could be provided by cable was compiled by Walter S. Baer in November 1971 (see Exhibit 1). This list has not been sorted as to economic feasibility or social usefulness, but it suggests the wide range of possibilities from which cable operators might choose. Among the services for individuals, the following have been mentioned as being worthy of serious consideration in the short run:

- Subscription television
- Remote shopping; catalog displays
- Fire and burglar alarm monitoring
- Ticket sales
- Banking services
- Interactive instructional programs
- Employment, health care, housing, welfare, and other social service information.

¹The technical aspects of this discussion are adapted from Walter S. Baer, Interactive Television: Prospects for Two-Way Services on Cable (Santa Monica, Calif.: The Rand Corporation, Nov. 1971) Secs. I, II, and III.

Table 1

SOME PROPOSED INTERACTIVE SERVICES FOR CABLE TELEVISION*

Interactive instructional programs	Television ratings	Computer data exchange
Fire and burglar alarm monitoring	Utility meter readings	Teleconferencing
Interactive TV games	Control of utility services	Surveillance of public areas
Quiz shows	Opinion polling	Fired detection
Subscription television	Market research surveys	Pollution monitoring
Remote shopping	Computer data exchange	Traffic control
Special interest group conversations	Business transactions	Fingerprint and photograph identification
Electronic mail delivery	Credit checks	Civil defense communications
Electronic delivery of newspapers and periodicals	Signature and photo identification	Area transmitters/receivers for mobile radio
Computer time sharing	Facsimile services	Classroom instructional television
Videophone	Report distribution	Education extension classes
Catalog displays	Industrial security	Televising municipal meetings and hearings
Stock market quotations	Production monitoring	Direct response on local issues
Transportation schedules	Industrial training	Automatic vehicle identification
Reservation services	Teleconferencing	Community relations programming
Ticket sales	Corporate news ticker	Safety programs
Banking services		Various information retrieval services
Inquiries from various directories		Education for the handicapped
Local auction sales and swap shops		Drug and alcohol abuse programs
Direct opinion response on local issues		
Electronic voting		
Subscriber originated programming		
Interactive vocational counseling		
Local ombudsman		
Employment, health care, housing, welfare, and other social service information		
Library reference and other information-retrieval services		
Dial-up video and audio libraries		

*These services are not all likely to be economically feasible on cable television networks. Some may not even be socially desirable. They have been compiled from various reports, FCC filings, corporate brochures and advertising materials.

Source: Walter S. Baer, Interactive Television: Prospects for Two-Way Services on Cable (Santa Monica, Calif.: The Rand Corporation, 1971), p. 4.

Possible services for business mentioned frequently include the following:

- Utility meter reading
- Industrial security
- Production monitoring
- Industrial training
- Teleconferencing
- Television ratings
- Opinion polling
- Market research surveys.

Services for government discussed as helpful possibilities include, among others:

- Televising municipal meetings and hearings
- Classroom instructional activity
- Education extension classes
- Teleconferencing
- Surveillance of public areas
- Fire detection
- Education for the handicapped.

From the standpoint of the cable operator, the list is bewildering. Which consumer services are likely to have greatest appeal in building penetration in major markets and in adding to system revenues? What are the costs of providing the various services and, accordingly, which services can most easily be financed in the short run? What services for business and government have good profit potentialities? In what sequence should such services be offered? These questions will be considered in the following discussion.

Technical Aspects of Interactive Cable

Since March 1972 the FCC has required each new major-market cable system to "maintain a plant having technical capacity for nonvoice return communications." The FCC explains, "We are not now requiring cable

systems to install necessary return communication devices at each subscriber terminal. ... It will be sufficient for now that each cable system be constructed with the potential of eventually providing return communication without having to engage in time-consuming and costly system rebuilding. ... When offered, activation of the return service must always be at the subscriber's option."²

There are different ways to achieve two-way communication on cable television systems. According to Pilnick and Baer:

The two basic technical approaches to two-way transmission are: (1) Use separate cables for upstream and downstream transmission; (2) Send signals in both directions simultaneously on the same cable, using different frequency bands to separate the upstream and downstream signals. ... Having a separate cable for upstream transmission presents fewer technical problems and offers more upstream capacity, but is more expensive. ... Carrying signals in both directions simultaneously on a single cable costs less than installing separate cables but is more complex.³

In his study of interactive television Baer classifies the many proposed new services into six broad groupings according to common technical requirements:

1. One-way broadcast services
2. One-way addressed services
3. Subscriber response services
4. Shared voice and video channels
5. Subscriber initiated services
6. Point-to-point services

²FCC, Cable Television Report and Order, Sec. 129, 37 Fed. Reg. 3252, 1972.

³Carl Pilnick and Walter S. Baer, Cable Television: A Guide to the Technology (Santa Monica, Calif.: The Rand Corporation, 1973) pp. 39-41.

After estimating subscriber equipment costs for each group, Baer concludes:

On the basis of subscriber equipment cost alone, one-way broadcast services, subscriber response services, and shared-channel services appear more feasible in this decade for mass home audiences than the other service groups. In particular, information retrieval and other subscriber-initiated services must await the development of low-cost, reliable terminals before they become attractive to home subscribers. Some difficult system design and software problems must also be overcome before subscriber-initiated services can be offered on a mass basis.

We are not concerned with one-way broadcast services at this point.

One-way addressed services include the electronic delivery of mail, newspapers, magazines, and other documents. According to Baer,

although a business market may exist today (November 1971) for hard-copy, addressed document delivery by cable, the cost seems too high for home subscribers over the next five years. Document recording on videotape or other soft-copy device does not appear to be an important service in itself, but it might become attractive if video-tape recorders are purchased for other reasons (such as recording of television programs for future playback). Only a small percentage of cable subscribers may be expected to have video-tape recorders in the next five years.

Two way-services requiring small quantities of return data from subscribers were evidently what the FCC had in mind in the 1972 rules for cable. According to Baer, "for these services a scanner at a central location would ask each subscriber in turn to respond to one or several queries. If the subscriber (or monitoring equipment installed at the subscriber's location) has a response, that information is sent in digital form upstream from his terminal to the central point where it is recorded or processed."⁴

⁴Baer, Interactive Television, pp. 8, 23-24.

These messages could include responses to questions such as whether the television receiver is turned on, and if so, to what station; questions asked by the instructor on an educational program; opinions on proposed city ordinances; and orders to buy home movie equipment displayed on the television screen. Fire and burglar alarm messages could also be sent automatically to a central station. Gas or electricity meter readings could also be transmitted automatically to a recording point.

Baer explains, "Each of these queries can be answered by pushing a button or by automatically sending a few digits of information to the central location. They require, therefore, relatively low information or narrowband responses.⁵ The system also could be capable of turning switches on or off remotely at the subscriber's location. This would permit the sounding of a fire alarm in the home (as well as sending an

⁵A system's communication capacity is measured by its bandwidth in cycles per second (or in the more modern units of "hertz," abbreviated Hz). Each U.S. standard television channel requires a large frequency bandwidth of 6,000,000 hertz, usually stated as 6 Megahertz, abbreviated to 6MHz. Thus, the FCC's 20-channel requirement actually means a usable bandwidth of 20 x 6, or 120 MHz. (Pilnick and Baer, Cable Television..., p. 13.)

Some services, like simple opinion polling, demand only a single bit (a bit--binary digit--is the common unit of information)--a yes or no response. Others, like remote shopping, may require that a few alphanumeric characters, or several tens of bits, pass upstream from subscriber to headend. Such data or message services may require only about 100 hertz (Hz) per subscriber upstream. In contrast, a voice channel requires 3-4 kilohertz (KHz), and standard color video transmission uses 6 MHz. Thus color video origination by one subscriber might require more upstream bandwidth than returning digital data from 50,000 households.

Baer uses the term "narrowband" to describe services requiring transmission bandwidths less than 3 KHz; "voiceband" for 3 to 4 KHz; "wideband" for 4 to 1,000 KHz; and "broadband" for bandwidths above one megahertz. (Baer, Interactive Television, pp. 14-16.)

alarm to the nearest fire station), remote on-off switching of a special channel (for example, medical information for physicians), or remote on-off switching of appliances."

According to Pilnick and Baer

These messages all have common characteristics. They require much less bandwidth than voice conversations, and they can be encoded in digital form for rapid computer processing. Moreover, digital messages from thousands of subscribers can be packed together into a single data stream that uses the upstream cable capacity very efficiently.

Each subscriber would have his own digital code or "address" for two-way response services. A computer at the headend (or some other suitable location) would query each subscriber in turn, using a special downstream channel. This technique is known as "polling." A two-way terminal attached to the cable and television set would record the subscriber's messages, store them, and send them upstream when the terminal was polled. The messages would then be recorded at the head-end computer or sent on to the city council chambers, the police station, or the department store. (See Figure 1 for a diagram of a two-way cable system.)

The basic subscriber response terminal looks like a small box with a telephone-like keyboard and a lock to prevent unauthorized use (see Figure 2). A tunable converter might be built in, and smoke sensors, burglar alarms, and utility meters could be connected to it. Several companies are now (1973) experimenting with prototype subscriber terminals. They cost close to \$1,000 today, but industry sources estimate that further development and mass production may reduce the price to \$100 or so by 1980....

"Other services, such as browsing through a catalog displayed on the television screen, making theater reservations, or requesting a paragraph from the Encyclopedia Britannica will require more complex subscriber terminal equipment.

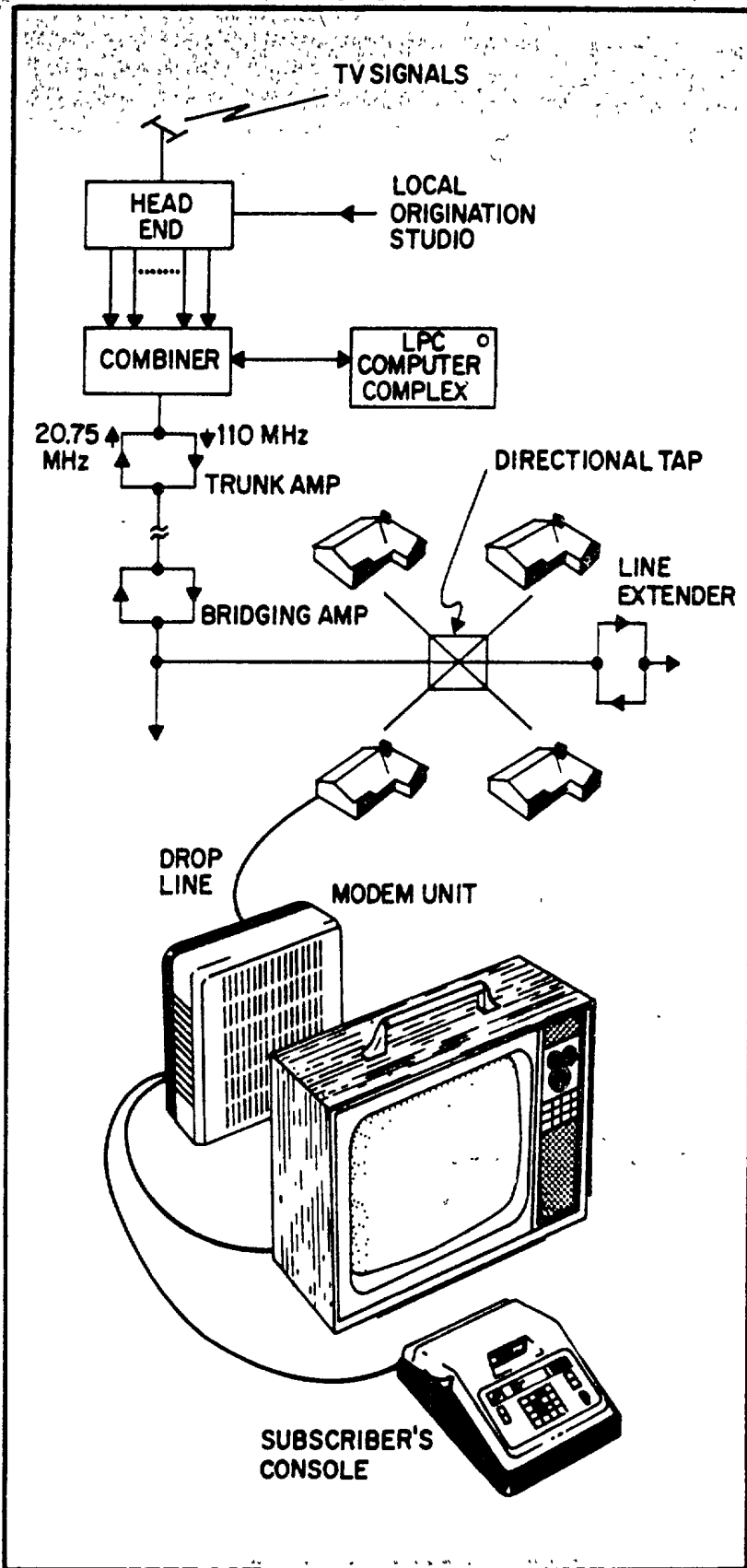
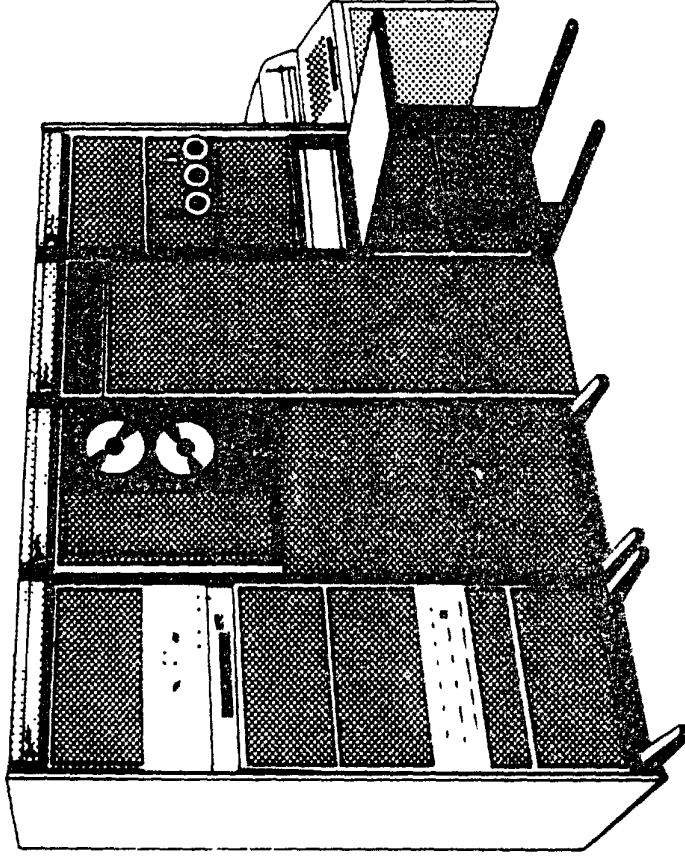
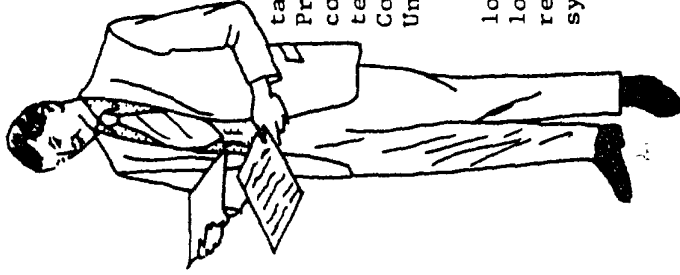


Fig. 1. Diagram of a two-way cable television system. Source: Subscriber Response System, brochure published by Theta-Com SRS Division of Theta-Com of California, Los Angeles, copyright 1973.

The Subscriber Response System is designed for two-way capability with a modest initial investment and can be expanded in a modular fashion as the number of subscribers, the traffic, and the demand for additional services increase. All without obsolescence of previously installed equipment.



Local Processing Center (LPC) Computer Complex

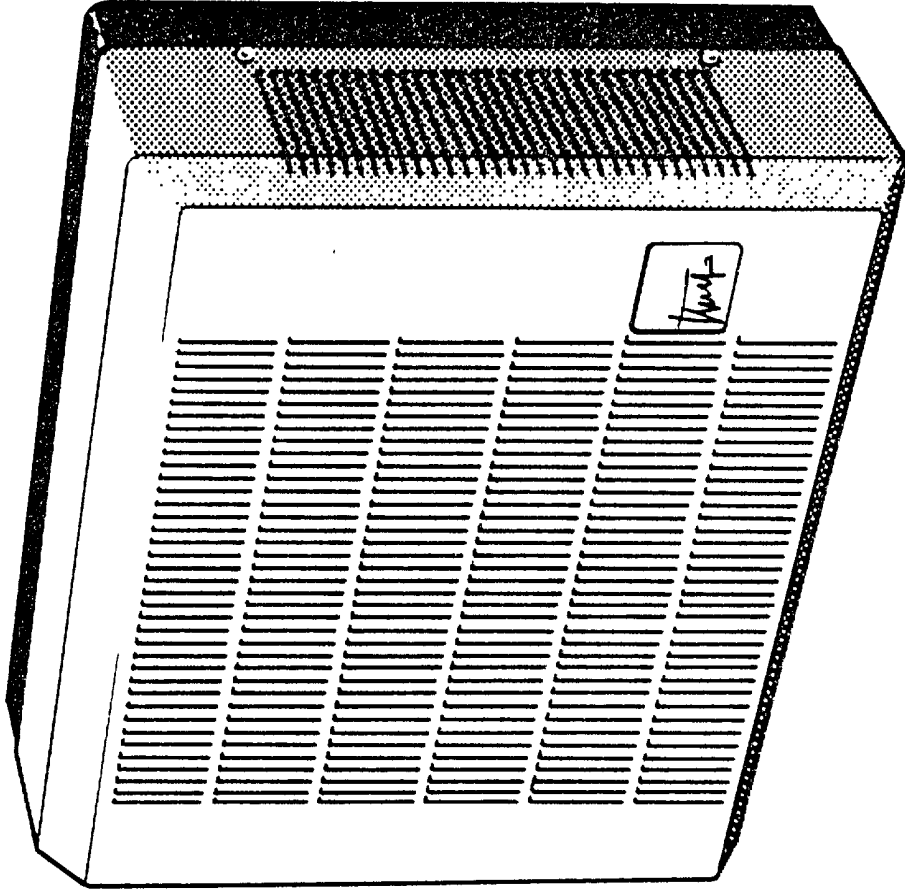


The two-way communications take place between the Local Processing Center (LPC) computer complex and the subscriber terminal which consists of a Control Console and a Modem Unit.

The LPC equipment can be located at the head end, at the local origination studio, or even remotely from the local CATV system.

Fig. 2 Subscriber terminal control console, local processing center computer complex, and subscriber terminal modem (Theta-Com Subscriber Response System). Source: Subscriber Response System, brochure published by Theta-Com SRS Division of Theta-Com of California, Los Angeles, copyright 1973.

(Fig. 2, Cont.)

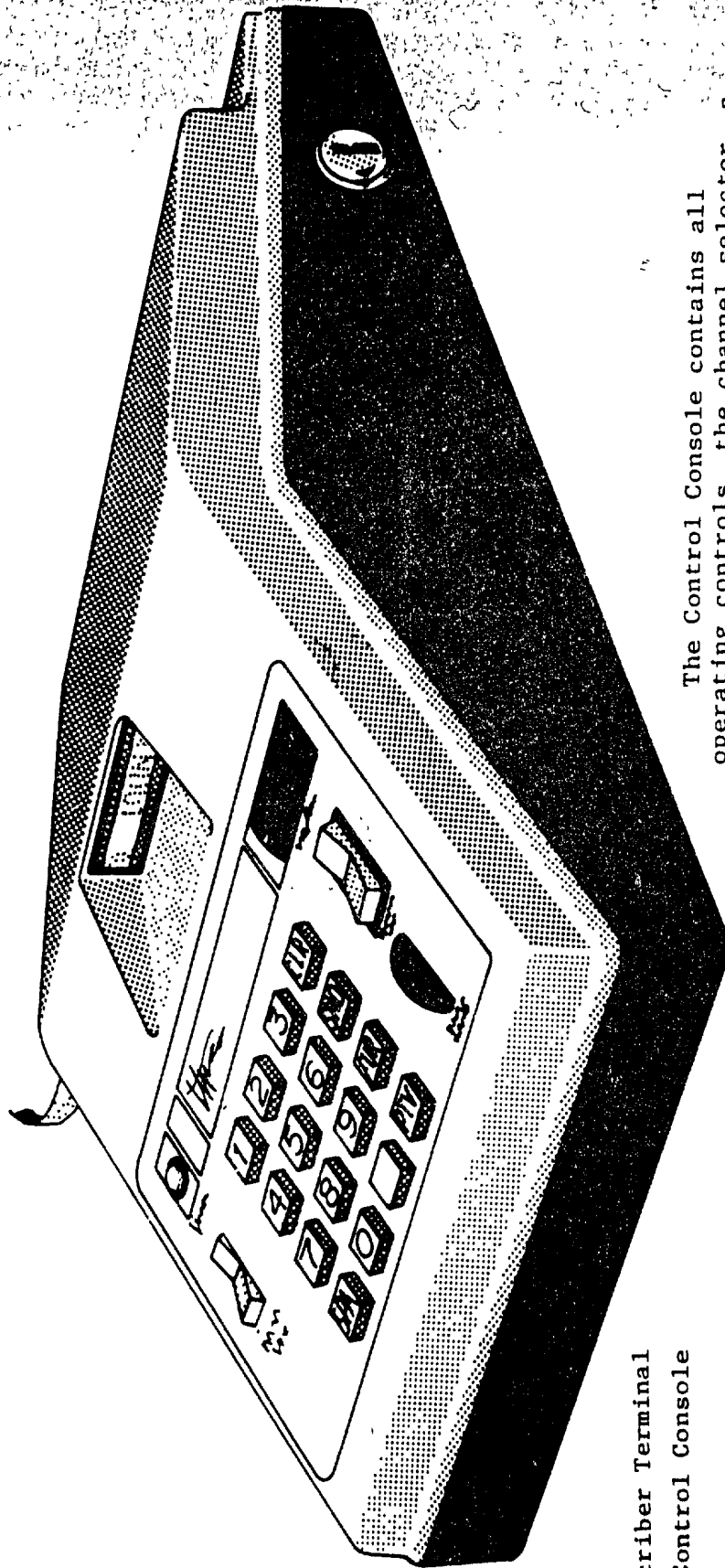


Subscriber Terminal Modem

The Modem performs most of the digital signal processing at the subscriber end and is the interface for all accessories used in the system.

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(Fig. 2, Cont.)



Subscriber Terminal
Control Console

The Control Console contains all operating controls, the channel selector, a keyboard and strip printer allowing the subscriber to engage in two-way communications with the Local Processing Center.

"Institutional users of the cable system may want and be able to afford more expensive terminals and greater upstream capacity. These users include:

- . Businesses that want high-speed computer data exchange
- . Industrial plants that televise extension courses with student feedback to a nearby university
- . Schools that want two-way video for in-class instruction and after-school teacher meetings
- . Hospitals that exchange medical records and diagnostic test results and hold two-way video consultations
- . Police agencies that transmit fingerprints and photos among precinct houses, or monitor streets and public areas with remote television cameras
- . Local government agencies that want two-way video links for teleconferencing.

Experiments in each of these uses are under way today (1973), although they generally use microwave links, closed-circuit systems, or the telephone network rather than cable."⁶

In projecting the near-term development of new cable services, Baer summarizes as follows:

Subscriber response services, perhaps with shared voice return channels, seem more likely candidates for home use in the next five years (from November 1971). The investment cost for the basic two-way equipment required would amount to roughly \$150-\$340 per subscriber, over and above the \$125 per subscriber calculated for conventional one-way cable service. Two-way services that could be provided with this equipment include audience-counting for advertisers and programmers, remote shopping, interactive entertainment and instructional programming opinion polling, and selection of subscription or limited-access channels.

Other response services such as meter reading, fire alarm monitoring, and environmental monitoring would require additional equipment. More sophisticated and costly services such as information retrieval and computer-aided instruction could be added to the basic response system as they prove feasible.

⁶Pilnick and Baer, Cable Television..., pp. 37, 39.

With this capital investment and reasonable assumptions about operating costs, a cable operator would need additional monthly revenues of between \$4.50 and \$13.00 per subscriber to break even on two-way response services. This means doubling or tripling his present monthly revenue from one-way television distribution.

Most of the added revenue would have to come from increased monthly subscriber fees, although advertisers, business firms, utilities, schools and government users would pay for services of benefit to them. Expected revenues from specific services cannot be estimated at the present time, since no real field experience or evidence of consumer demand is yet available.

Providing a mix of response services supported by home subscribers, business, and government users appears to be a better strategy for the cable operator than supplying a single service alone.⁷

Two-Way Demonstration Projects

Field tests of two-way cable communication began in 1971. Initially these were tests of equipment for subscriber response services, not attempts to get data on the consumer demand for two-way communication offered at a price. According to TV Communications, two-way systems were being tested or planned in 16 different systems as of June 1972.⁸ (See Figure 3.) Only five of these tests involved video, voice, and data; Orlando, Florida (American TV & Communications); Irving, Texas (Tocom, Inc.); Reston, Virginia (Mitre Corporation). As might be expected, a number of technical problems have shown up in these tests. Additive upstream noise has been a particularly vexing problem. Since the technology for two-way response services exists, however, it is anticipated that these difficulties will be resolved in time.

⁷Baer, pp. vi, vii.

⁸TV Communications, June 1972.

Table 2

Early Two-Way TV Demonstration Projects

<u>WHERE</u>	<u>WHO</u>	<u>WHEN AND WHAT</u>
Los Gatos, California-----	TelePrompter----- Hughes Aircraft Corp. Fairchild Instrument Corp.	June 1971-- transmission tests only
El Segundo, California----	TelePrompter----- Hughes Aircraft Corp.	Jan. 1972-- principally data
Orlando, Florida-----	American TV & Communications----- Electronic Industrial Engineering	May 1972-- video, voice, and data
Pensacola, Florida-----	Advanced Research Corp.-----	Sept. 1971--data
DeKalb County, Georgia----	Advanced Research Corp.-----	June 1972--data
Monroe, Georgia-----	Scientific-Atlanta----- L.E.A.A.	Future--data
Overland Park, Kansas----	Telecable Corp.----- Electronic Industrial Engineering Vicom Manufacturing Co.	June 1971-- video, voice, and data
Carpentersville and----- Crystal Lake, Illinois	LVO Cable and----- Scientific-Atlanta, Oak Electro/Netics	Near Future-- data
Dennis Port, Mass.-----	Rediffusion Ltd.-----	1971--data
Jonathan, Minnesota-----	Dept. of Housing and Urban----- Development Community Information Systems with General Electric help.	Feb. 1972-- video, voice, and data
New York City, N.Y.-----	Sterling Communications----- Video Information Systems	Feb. 1971--data
Brooklyn, New York-----	Goldmark Comm.----- Warner Communications, Bedford-Stuyvesant	Future--video, voice, and data "showpiece"
Akron, Ohio-----	Television Communications-----	June 1971-- transmission tests only
Irving, Texas-----	TOCOM, Inc.-----	1972--video, voice, and data

Table 2

Early Two-Way TV Demonstration Projects (Continued)

<u>WHERE</u>	<u>WHO</u>	<u>WHEN AND WHAT</u>
Brigham Young University--BYU, Cascade Electronics Ltd. Provo, Utah (actually CCTV)	Hammett and Edison	-----1970--video
Reston, Virginia-----	Continental Transmission Co. MITRE Corporation	-----July 1971-- "frame stop- ping" terminal; response via telephone

Source: TV Communications, June 1972. Reprinted by permission. For more information contact TV Communications, 1900 W. Yale, Englewood, Colorado 80110 (303) 761-3770.

Mitre Corporation Test in Reston, Virginia

Beginning about July 1971, Mitre Corporation, supported by a \$700,000 grant from the National Science Foundation, began a two-year study to develop a two-way interactive cable television system with emphasis on the educational advantages such service can provide.⁹ This demonstration involved subscriber-initiated services using a prototype frame-stopping terminal and was conducted by Mitre Corporation on Warner Cable's Reston, Virginia, system.¹⁰

⁹Information derived from a videotape of the Mitre Corporation demonstration, plus news report in Broadcasting, August 27, 1973, p. 47.

¹⁰Baer explains that "frame grabbing," "frame snatching," or "frame stopping" is a technique that involves transmitting a single frame downstream for recording and display as a still picture on the television screen. It permits displays of pictures, charts, and drawings, as well as alphanumeric characters.

Functionally, a frame-stopping device contains the same sort of receiver and address decoder as a subscriber data terminal, plus electronic or magnetic storage to record a single frame, and a control unit for recording and displaying the frame on a standard television receiver. None of this is technically difficult, according to Baer, but frame storage is relatively expensive.

The first frame-stopping device to be publicly demonstrated was recently shown by the Mitre Corporation in Reston, Virginia. It was just developed as a terminal for computer aided instruction and employs an inexpensive helical scan videotape recorder for frame storage. A frame addressed to the subscriber is recorded at his terminal. It then is continuously replayed from the videotape recorder onto his television receiver until a new frame is ordered.

Similar frame-stopping terminals might cost about \$1,500 commercially at the present time, although Mitre expects the development of low-cost videotape recorders to reduce this figure dramatically in two to five years. . . .

In the Mitre system, one individually addressed frame can be transmitted every 1/60th of a second on a single video channel. Thus, if the subscriber retains a frame for 10 seconds on the average, one 6MHz downstream channel could serve 600 subscribers simultaneously. (Baer, pp. 29, 30.)

In a letter dated May 28, 1975, a company spokesman notes that the videotape recorder (VTR) described above is no longer considered to be a likely frame-stopping device. Mitre's new work is based on the use of centrally located (rather than home located) frame storage, using large scale integration (L.S.I.) shift-register storage (i.e. digital storage technique using large scale integrated circuits).

Since the Reston cable system did not have two-way transmission capability, the upstream link to the central computer was a Touchtone telephone. One home terminal in Reston was connected to a computer and a variety of services and educational concepts were tested. By dialing a specific number, which connected the terminal to the computer, and then pressing a certain digit on the phone, the viewer could receive a variety of preprogrammed information.

The services that were demonstrated included access to the following:

1. Calculations--e.g., extracting the square root of a number
2. Community information
3. A "Dutch auction," which offered various products for sale
4. Community bulletin board
5. Medical information
6. Payment for products or services via cable--e.g., payment for magazine subscription where the amount is deducted from the subscriber's bank balance.
7. Announcement of employment opportunities--e.g., information on summer jobs for teenagers
8. Instructional program--e.g., lesson in grammar involving viewer's answering questions asked in writing on the screen
9. Drill in mathematics--again, where viewer answers questions written on the screen.
10. Games--e.g., "pick up sticks"
11. Retrieval of video tape on topic of interest to viewer--voice plus picture.

In the demonstration the question was asked as to how many viewers would be willing to purchase some predetermined combination of the above services. Mitre officials noted that the cost of providing such services might run approximately two-thirds or less than the cost of regular telephone service (possibly \$14 per month). In addition to revenues from subscribers, it was noted, the cable operator might also

get income from leasing channels to pay entertainment programmers, to business firms, and others. What services viewers would be willing to pay for and how much they would be willing to pay per month could only be determined by market tests at some point in the future when two-way interactive services would be offered on a commercial basis.

Mitre's operational experiment in two-way cable

After the technical feasibility of Mitre's two-way system was verified in the 1971 Reston test, the organization proposed to the National Science Foundation that the experiment be expanded to 40 subscribers on the Reston cable system using the Touchtone telephone to connect viewers with the central computer.¹¹ Two major drawbacks to the proposed project were noted: (1) Reston's cable system was one-way, and it was believed that the next test should be on a two-way system; (2) analysis of the demographics of subscribers on the Reston system indicated that they were atypical; a more representative community was thought to be desirable for further experimentation.

Accordingly, Mitre officials developed a proposal for a new project in June 1973. Suggested was an operational experiment in two-way interactive cable television. This second phase of Mitre's study is expected to take about three and one-half years. The first six months will be used to develop the programming to go on the system, arrange with a cable system to participate in the project, and select an

¹¹This section is based upon a talk by Timothy Eller, Mitre Corporation, Feb. 1, 1974, before the Faculty Seminar on Telecommunications, at the University of Michigan, and upon news articles in Broadcasting, Aug. 27, 1973, p. 47, and Feb. 25, 1974, p. 53.

equipment manufacturer from which to procure the necessary two-way hardware. It was estimated that it would take a year to install the system; the remainder of the time will be for experimentation.

Mitre Corporation officials requested a grant from the National Science Foundation to fund the project, its purpose being to determine the educational advantages of bi-directional cable.¹² In the test cable subscribers will be able to select from a computer bank containing numerous formal audio-visual educational materials, as well as community information and certain computerized educational games.

After screening 39 communities as possible test sites, the list was narrowed down to four: Stockton, California; Akron, Ohio; Peoria, Illinois; and Spartanburg, North Carolina. In February 1974 it was announced that Stockton, California, had been chosen. Stockton was believed to have the desired educational, social, and economic diversity. The 1970 Census showed a population of 115,000 in the metropolitan Stockton area. Agriculture and shipping provide the chief employment in the community with only a small amount of industry there.

The community's cable system was being built by the Big Valley CATV system (a subsidiary of Continental Cablevision), which was installing a two-way dual cable system with six separate service areas trunked back to a central point. Four areas were scheduled to have 30 channels; two areas, 20 channels. Mitre can use 15 channels in its experimental work.

¹²"Mitre Selects System in California for Two-Way Test," Broadcasting, Feb. 25, 1974, p. 53.

According to Big Valley's plans, by 1975 the cable system was to pass by 54,000 homes; 35-50 percent penetration was projected by that time, which meant about 20,000 to 27,000 CATV subscribers by 1975. (2,000 subscribers had CATV service in February 1974 but construction was proceeding at a rapid pace.) Because of the manner in which the system was planned, it could be segmented into six areas based upon ethnic distribution of pupils in the schools serving the city.

Under the proposed plan Continental Cable vision is to cover the cost of building the dual cable system which will permit two-way communication both downstream and upstream. Mitre Corporation originally suggested the installation of 1,000 terminals in homes of volunteers selected from among cable subscribers who meet criteria to be established after a survey is made of the Stockton metropolitan area. It was originally estimated that the experiment would cost \$3.2 million during the first three years. This included the investment in terminals and necessary programming, but not the cost of the cable system (to be covered by Continental Cablevision).

The planners expected that it would be nine months from the start of the project before all hardware was on line and running. It was expected that a year would be required to "debug" the system. It was not planned to charge subscribers for two-way services initially. At some point in the future, after an adequate user base has been achieved, two-way service charges would be levied.

Some of the questions to be studied during this experiment include the following: (1) What educational services should be offered? (2) How can they best be furnished? (3) What program content should be provided? (4) What should be the style of delivery of program material?

According to the proposal, the Educational Testing Service is to evaluate the success of the project as it progresses. This will include an appraisal of the ability of Mitre to develop appropriate program content and an evaluation of the effectiveness of alternative styles of delivery. Experience gained by Mitre will provide the basis for a publication dealing with a technical and economic analysis of two-way interactive television. Special attention will be paid to the effectiveness and attractiveness of interactive television as a means of providing needed educational services. As indicated above, the results of the Stockton experiment are not likely to be available for at least 3-1/2 years from the time the project actually gets under way.

Subsequent developments

At the time the Stockton operational experiment was described at The University of Michigan Telecommunications Faculty Seminar in February 1974, Mitre officials hoped the National Science Foundation would make the proposed grant and that the project would get under way in about six to eight weeks. This expectation was not met, however, since the NSF did not fund the project in the amount originally proposed. The final NSF decision is not expected by Mitre officials before October 1975.

There also have been some revisions in cost estimates for the Stockton operational experiment. As of June 1975, the cost of the hardware for the Stockton two-way system was estimated to be about \$1,000,000. Mitre officials now plan to install 450 subscriber terminals with 20-character keyboards--although the system as planned would be capable of supporting many more terminals. The actual number that eventually would be installed on the system is unknown at present; this will depend strongly upon subscriber usage which is the major unknown to be explored by the project. The cost of the first 450 subscriber terminals is included in the \$1,000,000 estimate for hardware. The incremental cost of adding a single terminal is estimated at around \$250. This would provide a pay-TV terminal which is much less expensive than quotations received on subscriber terminals used in developing the original plans.

This type of service could be delivered to the subscriber at a cost ranging from \$10 to \$20 per month using today's technology, the Mitre spokesman estimates. Measured in terms of the time a subscriber would be using the two-way system, the cost is estimated at two to five cents per contact-minute. Moreover, this figure is surprisingly independent of the amount of subscriber usage.

The new target date for beginning operations of the Stockton experiment is October 1976. According to the spokesman this date has low validity because of the uncertainty about NSF funding. Except for the modifications mentioned above, however, he indicated that the

description of the proposed Stockton experiment provided here is still generally correct.¹³

While it is clear that the Stockton experiment, if implemented, will be concerned with the social impact of interactive television as applied to educational uses, at a later point the project may be expanded to add consumer education as well as health care services. The Stockton experiment is not concerned with testing the appeal of various other two-way services, such as premium entertainment, shopping service, and checkless banking transactions. Continental Cablevision, through the Big Valley CATV system, would appear to have an excellent opportunity to explore some of these possibilities on its own behalf, however.

Jonathan/Chaska Community Information Systems project

In February 1972, Community Information Systems (CIS) undertook a pilot two-way cable demonstration in Jonathan Village/Chaska, Minnesota, under a \$175,000 grant from the U.S. Department of Housing and Urban Development.¹⁴ Community Information Systems, Inc. is a private business engaged in the interactive television field and provides

¹³This updated information is based upon correspondence with Timothy Eller, Group Leader, Computer Systems, Mitre Corporation, May 28, 1975, supplemented by a telephone interview on June 6, 1975.

¹⁴This section is based upon information gathered during a personal interview with E. D. McCormick, President, Community Information Systems, Inc., August 1973, together with brochures and other information supplied by CIS. Important information was also drawn from the report, The Jonathan-Chaska Community Information Systems Experiments prepared for the U. S. Department of Housing and Urban Development, by Community Information Service, Inc., June 1973.

consulting services, equipment and/or management assistance. The demonstration facility and the associated cable system in Jonathan/Chaska were built by CIS, under license from General Electric Company for patents and technical expertise.

The communities of Jonathan Village, a new planned community, and Chaska proper together constitute the political unit of Chaska City, located in Carver County, Minnesota, about 25 miles southwest of Minneapolis. As of October 1972 the population of the total community had reached 5,398, of which about 1,650 people were located in Jonathan Village, the first new town to obtain loan guarantees under Title IV of the 1968 Housing Act. In the past Chaska City had been a small urban center servicing a predominantly agricultural area. With the high growth rate of Jonathan Village in the two years prior to 1973, Chaska City was in the process of becoming a residential area tied socially and economically to the Minneapolis-St. Paul metropolitan area. It was anticipated that within the next 20 years the Jonathan Village would provide housing, employment, and services for 50,000 people.

The Jonathan/Chaska experiments are especially interesting because, along with a demonstration of key two-way interactive cable services and a cost estimate of providing them, they provide an estimate of the demand for such services, secured by using survey research techniques.

The CIS demonstration center was designed to inform the public about two-way interactive cable communications. The equipment arrangement includes a "hands-on" area and a home communications center area; this makes it possible to inform people of many potential services. Visitors to the demonstration center are given an audio-visual presentation, which deals with how CATV started and its initial purpose of providing better TV reception, and then explains what cable can provide today in terms of local origination and increased channel capacity. The viewer is then introduced to the Community Information System and, through a series of examples, he learns how two-way cable can be used in areas such as interactive education, information retrieval, protection services, etc.

The hands-on station gives visitors practical experience in operating interactive terminals to receive services. The visitor can select any one of the following interactive programs: information retrieval, interactive education, interactive entertainment, point-to-point data communications, protection services, merchandising, and opinion polling. Equipment available for consumer use includes a television set, an input/output typewriter (to print out messages and send alphanumeric messages), a Responsor^(tm) terminal (used for entering numbers to "call up" specific programs and information). It also transmits alarm messages (fire, intrusion) to the Communications Center.

Using the Responsor^(tm) terminal, the viewers enter the proper access codes for the selected program or service. The selected program is then presented on a color television set. To provide realism, a home information center adjacent to the hands-on area simulates a

present-day den or family room setting containing a television set and a Responsor^(tm) terminal. Visitors are encouraged to operate the equipment and ask any questions they may have.

As a means of getting information upon which to base an analysis of the demand behavior of consumers, a survey was taken of a sample of households in Jonathan/Chaska during an 18-day period beginning in October 1972. The sample of households in which interviews were conducted included 292 in Chaska proper and 120 in Jonathan Village, or a total of 412. Of the 412 included in the sample, 40 did not respond, leaving a total of 372 completed interviews.

An important part of the survey's design was to inform the community, and in particular the respondent households in the sample, about the Community Information System and its services in advance of the survey. Of the 372 households interviewed, 16.4 percent visited the demonstration, 22.8 percent discussed it with friends, 38.2 percent read a brochure describing it, while an additional 20.3 percent read some of the brochure.

Although a CATV system had not been constructed in Jonathan/Chaska as of August 1973, there was a two-way cable link up installed and working at Jonathan that was serving as a test bed for assisting health delivery and education. The network connects two medical clinics with a community hospital to assist the doctors, paramedics, and patients in the community. The other link connects the local high school and grade school to the CIS Information center allowing the student to dial television programs for display in any classroom. The network also allows

two-way audio-visual communication between students in their classroom and local business and professionals at the Village Center in Jonathan.¹⁵

The report of the Jonathan/Chaska Community Information System Experiments summarizes their results as follows:

- . Results of the survey indicate a 64.8 percent demand for basic cable service in the Jonathan Community and 30.3 percent in Chaska. Overall demand was 40.3 percent.
- . Over 95 percent of the respondents interested in the basic CATV service were also interested in one or more extra services before prices were introduced.
- . At the low price range (\$4 to \$6 per month per extra service), 83.3 percent of the prospective CATV subscribers desired one or more extra services. On the average each extra service subscriber demanded 2.1 extra services at an average monthly cost of \$10.00 at the low price range.
- . As would be expected, demand for extra services decreases with price. At the median and high price categories (\$5.75 to \$9.75 and \$10 to \$14.25) approximately 58 percent and 30 percent of the prospective basic CATV subscribers, respectively, still demanded one or more extra services.
- . Several generalizations can be made about the demand and its structure and elasticity for extra services. It is clear that the most popular extra services among prospective CATV subscribers in the area were
 - . Education and Learning
 - . Premium Programs
 - . Alarms

These services are of great interest to all segments of the population, regardless of background characteristics or community of residence. Moreover, the demand for these popular services tends to be relatively inelastic, i.e., as prices change the demand remains fairly constant.

¹⁵CIS, Inc., The Jonathan-Chaska Community Information System Experiments, June 1973, P. I-17--I-23.

The other services, especially Information Please and Home Shopping, have less but nonetheless an appreciable demand. Their demand schedules also tend to be more elastic than those for the other services.

- . In household composition and family income, the population of the total sample representing the communities of Chaska and Jonathan combined, is similar to the U.S. national average. In educational attainment and occupational status, the families sampled more closely resemble the population of the Minneapolis-St. Paul SMSA. The results of this program can be confidently generalized to many metropolitan areas.
- . It is important to note that family income is not a principal determinant of demand levels and elasticity. Rather, the interrelated complex of variables such as age, children in the home and their ages, state in the life cycle, and life styles seem to be more important than income alone. Income seems to be only a limiting factor, becoming a real constraint in the lowest income bracket and reflecting easy consumer indulgence at the higher income brackets.
- . Community Information Systems has constructed and now operates a 14-mile interactive two-way experimental plant in and around the "new town" of Jonathan. It is expected that the size and scope of this test bed will be continually expanded over the next several years. Configured as a modern, conventional system with extra service overlays, it is envisioned that this plant will be the basis for an area-wide, innovative community information system.
- . A plan for the development and implementation of an economically viable extra service business utilizing the area-wide community information system is presented. Projections based on results of the community survey have been utilized to structure an extra service package.

This package would consist of four services: Education and Learning, Premium Programs, Home Security, and TV Games and would be priced at \$22.50/month.

Revenue and profit projections for the regional Community Information System show that if the marketability of extra services can be established, the revenue and net profit potentials of the community information system at maturity (10 years) are more than twice and three times, respectively, those of a conventional CATV system.

- . As a direct result of HUD's initiative, additional projects have been funded in health delivery and educational applications in which the community is actively involved as participants. This high level of enthusiasm, participation, and acceptance exhibited by the community can contribute significantly to the future success of such programs and demonstrates the leverageable impact of sponsored research.
- . Further demonstration and evaluation programs are needed to measure not only operating characteristics and financial feasibility but also to determine the sociocultural implications of interactive wideband communications.

Program summaries of services that show near-term potential of becoming economically self-supporting, prepared with the aid of community and area residents and organizations, are presented for education, telemedicine, and municipal services.

In the final report on the Jonathan/Chaska Community Information System Experiments, CIS outlined the following long-range goals for Phases II and III of this program:

Provide the U.S. Department of HUD with critical information and operating data to be used to guide the development of cable communication in all communities, allowing the Department to:

- . Use the results of the Phase I project to initiate full-scale demonstration projects in a number of communities which could include Chaska and Jonathan;
- . Determine the utility and cost of the services Chaska/Jonathan residents prefer, using test and evaluation programs which employ the full-scale demonstration CIS;
- . Evaluate alternate methods of financing the implementation and operation of the CIS and the various services it can provide;
- . Test various combinations of public and private participation and management and try various methods and models for performing the functions essential to the provision of services.¹⁶

¹⁶Ibid., pp. iv-vi, I-9.

In an interview with a spokesman for CIS it was indicated that the next step should be implementing two-way interactive cable television in the real world where Jonathan/Chaska would franchise a CATV system offering not only transmission of over-the-air broadcast signals, but also extra services found to be of special interest to consumers in the survey described above. This would permit experimentation to determine consumer demand for extra two-way services for which there would be a charge-- especially important, because responses to survey questions on what prices respondents would pay for various services tend to be inflated.

Alternative levels of prices could also be tested, as well as alternative marketing strategies for promoting the purchase of extra two-way services by subscribers.

It was reported that large retailers were exploring the possibility of conducting shopping experiments on the Jonathan/Chaska TV system when it became operational. Certainly, it would be highly desirable for market testing two-way interactive cable television along the lines described above. Results of such experimentation would provide valuable information for CATV operators considering the implementation of two-way cable services on their own systems.

Subsequent developments

A telephone conversation with E.D. McCormick, President, Community Information Systems, Inc., on May 21, 1975, provides the following information on developments since August 1973, when the foregoing material was written:

Although Phase I experimentation produced evidence of the potential value of two-way interactive cable services, CIS has not yet been able to carry out proposed additional tests in the real world under market conditions as proposed above. No action has been taken on the proposal that a CATV system be franchised and constructed in the Jonathan/Chaska service area. Two key developments were primarily responsible: (1) The high interest rates of 1974 followed by the business recession produced a tight money economy. This made it difficult to attract the venture capital needed to finance the construction. (2) The founder of the firm that developed Jonathan/Chaska passed away about 18 months ago. Negotiations for selling the corporation have not yet been concluded. Until this transaction is completed, the proposal to construct a CATV system in Jonathan/Chaska is not likely to receive the necessary consideration.

The two legs of the interactive cable systems used as a test bed for assisting health care and education are still in existence. In fact, the school leg has been extended two miles to pick up two more facilities: (1) the junior high school in Chaska and (2) the headquarters of the ecology instructional program in the Chaska School District.

Experimentation has continued during 1973-74 and 1974-75 in the use of two-way interactive cable to assist in the educational process and in the evaluation of its contribution. Preliminary evaluation indicates that two-way appears to offer some economies as compared with traditional instructional methods. But significant differences

have not been found between opportunities for learning by direct contract instruction and instruction using two-way interactive audio-visual cable.

A full evaluation of the experiment using two-way audio-visual communication via cable in operating a rural health care system has been made and a report of the findings has been submitted to the Department of Health, Education, and Welfare. The evaluation checked the satisfaction of both patients and physicians with the two-way system. Patients were well satisfied. Physicians reported that two-way cable did not make a significant improvement in the level of their practice or the efficiency of their work. It is believed that a fully automatic system might improve efficiency, but CIS has not proposed such an installation because of the financial investment involved.

As a result of this evaluation, Lakeview Clinic has entered into another study looking at patient blockages principally caused by communication, and the use of two-way interactive cable that can have an impact on these blockages in the health care system. This study is not yet completed.

In short, the two-way interactive cable system in Jonathan/Chaska and its associated activities are still in operation. The construction of the two-way cable system in Jonathan/Chaska and the proposed experimentation with interactive customer services await a more favorable economic climate.

Other demonstration projects

El Segundo Pilot Project.¹⁷ An interesting pilot project began in September 1972, when Theta-Com of California designed and installed a complete two-way interactive system in El Segundo, California, where TelePrompTer had constructed a two-way cable system. The project used the Subscriber Response System equipment developed by Hughes Aircraft Company and produced by Theta-Com. According to Robert Behringer, then president of Theta-Com, the El Segundo project was undertaken to measure the market which company officials believed existed for services; data retrieval, and entertainment. Initially Theta-Com installed fourteen Subscriber Response Terminals (SRT) in El Segundo for test and demonstration purposes. This number was later to be expanded to twenty-five. A two-cable system was installed to connect a Local Processing Center computer complex to the terminal in the subscriber's home. Tests and demonstrations were to be continued until 1,000 subscribers' terminals were installed at a cost of approximately \$200 each. At that point plans were to begin the delivery of actual service to the 1,000 homes. After one year of actual market testing, results of the research would be published.

During the NCTA Convention in June 1973, a wide range of services were demonstrated to interested persons at the Hacienda Motel in El Segundo. They included premium TV (movies, sports events), shop-at-home services (supermarkets, department stores, ticket services), emergency alarms (fire, intrusion), emergency medical information

¹⁷This section is based upon a visit to the demonstration at the Hacienda Motel, El Segundo, in June 1973, together with reports of the project by Theta-Com officials and brochures describing the Interactive Cable TV Project.

and services, among others.

According to Behringer, it is estimated that the cable operator could realize an average of \$10 per month of added income per installation from the two-way services. The estimate assumes premium or pay television as a basis with other two-way services adding incremental income. The figures indicate \$120 per year of cash flow, which would more than pay the carrying charges on the added investments. Based on Theta-Com estimates, it appears that the capital investment, when the units are in production, would be \$200 to \$250 for each home terminal equipment set. This figure includes a pro-rata share of the computer and the computer software for the head-end. It does not include the cost of converting the cable system to two-way.¹⁸

As is usually true with developmental work on innovations, the original time schedule for this pilot project has been modified because of problems encountered in getting the two-way system operational.

According to original plans, subscriber services were to commence in late 1973 when it was expected that 200 SRS terminals would be installed; 1,000 terminals were scheduled to be installed and operational by January 1974. In a May 1973 conversation, however, Behringer reported that the computer had been installed and that Theta-Com engineers were debugging the system at that time. Only 14 terminals had by then been installed and these were distributed

¹⁸ Robert W. Behringer, "Blue Sky to Cash Flow: Market Study," reprint of a paper presented at the NCTA Convention, Chicago, Illinois, May 15, 1975, pp. 5-8. Richard T. Callais, "Subscriber Response System: Progress Report," Subscriber Response System, brochure, Theta-Com of California, June 1973, pp. 10, 12.

in an apartment used for test purchases, private homes, and the head-end of the cable system. He then estimated that it would probably be six months before the experiment would be fully under way. A year later results on consumer demand for two-way services under test market conditions were to be available. At the time of the demonstrations in El Segundo in June 1973, only 14 terminals had been installed and were under test.

Subsequent developments

In the two years since June 1973, growth in the cable television industry has slowed. Such firms have experienced difficulties in obtaining adequate capital for expansion of their systems, not to mention the installation of two-way facilities. Symptomatic of the tight money situation that developed was the sharp rise in the prime interest rate from 6 percent in the early 1973 to 10 percent by December 1973, and 12 percent by mid-1974. During the same period there was an inflationary rise in the cost of building new CATV systems which discouraged new construction and investment in two-way equipment.

Under these circumstances, the following report from the January 28, 1975, issue of The Video Publisher is not surprising: "Theta Cable, jointly owned by Hughes Aircraft and TelePrompter, pulled back from its ambitious test of two-way subscriber wideband.... The curtailment is symptomatic of the economic state of the CATV industry in general."¹⁹

¹⁹The Video Publisher, 4 (January 28, 1975), p. 7.

Additional information on the status of the El Segundo Pilot Project was provided by H. R. Goodman, Manager, Multiplex System Program, Hughes Aircraft Company, in an interview on May 29, 1975. He indicated that product line responsibility for that activity had been transferred back to Hughes Aircraft Company, Theta-Com's parent company.

While a total of forty-five subscriber terminals had been installed, these were used solely for engineering experimentation and product planning study. The firm was interested in measuring certain parameters related to long-term equipment operation on a two-way cable system. After getting the desired data, further experimentation was dropped.

The project was never extended to permit marketing testing of the subscriber demand for two-way services in 1,000 homes as originally planned. Studies of the potential demand of CATV operators for the subscriber response terminals led company officials to the conclusion that such equipment was not what the CATV industry was able to buy in the near future. Accordingly, it did not seem to be worthwhile for the firm to build and install the 1,000 terminals for market testing experiments.

Mr. Goodman emphasized the point that Hughes Aircraft has continued the development and testing of two-way interactive equipment. The firm is, however, stressing the production of equipment which has a more immediate prospect of return than did terminals developed for the El Segundo marketing experiment.²⁰

²⁰ Telephone conversations with H. R. Goodman, Manager, Multiplex System Program, Micro-Electronic Products Division, Hughes Aircraft Company, May 29, 1975.

Orlando, Florida, Test.²¹ Another experiment involving the 2-way transmission of video, voice, and data was begun in May 1972 in the Orlando, Florida, CATV system owned by American TV and Communications with equipment developed jointly by ATC and Electronic Industrial Engineering, Incorporated, (EIE) a wholly owned subsidiary of RCA. According to a spokesman, Phase I of this experiment involved a pilot installation of twenty-four terminals located in homes, businesses, and educational facilities. This "Polycom"^(tm) system was connected to a central computer and involved tests of a number of services: (1) One terminal was located in a local service station for use in credit card sales of gasoline, oil, and other products; billing information was picked up by the computer and made available to the service station management. (2) Terminals in subscribers' homes offered as many as three CATV channels for use in so-called narrow-casting. The terminal had a 13-digit key pad that could be used in opinion polling or in home merchandising of products and services. The company demonstrated two-way capability for use in security systems (burglar alarm, fire alarm). Two-way surveillance terminals were installed for demonstrations over one of the local freeways for traffic control. Through the terminal in the home the system had the ability to automatically connect or disconnect service to the television set. The system also had the basic capability for meter reading along with channel monitoring (i.e., recording what channels the CATV subscriber watches during a 24-hour period).

²¹Based on a telephone interview with Ed Harmon, Electronic Industrial Engineering, Inc., North Hollywood, California, May 24, 1973.

The main purpose of the experiment was to prove technical feasibility of the two-way interactive system and equipment. The experiment was judged successful on this basis.

Subsequent Developments: After technical evaluation of the system was complete, the equipment was removed from operation. A product version of the system was not developed because of concern that the market for two-way services had not yet begun to evolve.

Throughout the CATV industry the impact of tight money followed by the recession of 1974-75 created financial problems that made cable operators reluctant to invest in costly two-way equipment. Although EIE had made a substantial investment in the development of its Polycom two-way equipment and had developed a very sophisticated system, it became evident that there was little demand for it during 1973-75.

As of mid-1975 the immediate outlook for the installation of two-way systems is discouraging. According to the EIE spokesman, a lot of CATV systems are marginal and a good many of them are losing money. Until this situation changes, they have no incentive to invest in a sophisticated two-way system. Instead, the center of interest in 1975 is pay TV, which is becoming viable with the advent of satellite distribution of program material. But CATV operators are looking for the most economical equipment that will provide satisfactory pay TV operation. Consequently, many are installing equipment using a scrambler, which is less costly than a sophisticated two-way subscriber terminal.

When will a demand for sophisticated two-way equipment develop? According to the spokesman, not until the economy turns around and the climate favors long-range investments of this sort. In addition, once Multiple System Operators start accumulating money from their pay TV operations they must start thinking about other types of additional services that might appeal to subscribers and generate more revenue. When the anticipated revenue from two-way services bears a favorable relationship to the costs of installing such a system then decision-makers may consider its purchase.²²

Irving, Texas, experiment. As of May 1973 Tocom, Incorporated, of Dallas, Texas, was in the process of installing the equipment for an experiment in two-way cable television in Irving, Texas.²³ Tocom was franchised to establish the experimental system by the Irving City Council. The cable system was later sold to Leacom of Irving; a subsidiary of the C.H. Leavell Company of El Paso. Leacom, accordingly, is the operating company. According to a Tocom spokesman, the experiment was to be operated as a mini-pilot study with 20 remote units (subscriber terminals) until the system received a certificate of compliance. The initial experiment would test the technical capabilities of the two-way system; later the feasibility of offering selected two-way services would be studied. Eventually 2,000 homes were to be included in the two-way experiment.

²²Based upon a telephone conversation with Marshall Savage, Marketing Service Manager, Electronic Industrial Engineering Inc., North Hollywood, California, on May 29, 1975.

²³This report is based upon a telephone conversation with Jim Smith, National Sales Manager, CATV Division, Tocom, Inc., May 24, 1973. He supplied a brochure describing the Tocom system and a reprint of an article in the Dallas Times Herald, Business Section, by Bronson Harvard, entitled, "Irving Will Experiment with Big 'Little Box'," Nov. 19, 1972, pp. 1-2. Adapted courtesy the Dallas Times Herald.

The Tocom system includes three primary elements: The first element, a so-called Remote Unit, is placed in the subscriber's home and is a combination of a 26 Channel TV Converter, and a Digital Transmitter-Receiver, all housed in one attractive cabinet. The unit sits on top of the television receiver; each home has its own unique identification and responds with a digitally coded signal when interrogated by the Central Data Terminal. The second element in the system is a Computer Controlled Central Data Terminal which is capable of interrogating, receiving responses from, and acting on the responses of 60,000 Remote Units every six seconds. The third element is a Bi-Directional Cable Distribution System, which may be of either single or dual trunk configuration, with a forward transmission bandwidth to allow for 26 channels of TV reception. The system also exhibits a reverse transmission bandwidth in the 5-25 MHz range.

The capabilities of the system to be tested include a number of possible services:

1. Using the response buttons on the Remote Unit, the subscriber may actively participate in such programs as home shopping and opinion polls.
2. In the same way the subscriber may participate in two-way education programs where the home viewers may communicate with a teacher.
3. Each Remote Unit will accept and relay to the Central Data Terminal three separate alarm conditions--fire, burglary, and a need for emergency assistance.
4. One or more of the 26 channels may be delegated as Pay TV channels. Insertion of a key into the Remote Unit allows viewing of the Pay TV program, and also starts the computerized billing procedure, which may be based on a fixed price per program or on the length of viewing time.

5. Other services available to the subscriber include meter reading and remote control of lights, sprinkler systems, motors, alarms, etc.
6. Upon command by the CATV operator, the Central Data Terminal will furnish a print-out listing how many TV sets are turned on and how many are watching each channel every six seconds.

The purpose of the experiment is to get data upon which to base estimates as to the size of the market for the various two-way services and to serve as a guide for deciding in which sequence two-way services should be introduced to subscribers under competitive market conditions. While the Remote Unit is expected to cost about \$150 when it is produced in volume, Tocom executives have not yet decided how much such a system would cost subscribers when it is offered commercially after the experiment. The Remote Unit will be installed without charge during the test. Also, during the experiment, Irving subscribers will be charged only for the two-way services that they actually use. Cable operators in the future will have to make the decision as to whether to sell the Remote Unit to subscribers, lease it, or add its cost into the charges made for the two-way services utilized by the consumer.

Subsequent developments

An interview with a Tocom spokesman on May 30, 1975, provides the information that the Irving experiment was never extended beyond the original pilot study of twenty remote two-way units. In part, the experiment had been planned as a research and development activity

in Tocom's own back yard to the technical capabilities of the firm's two-way communication system. Although benefits were gained from this experience, the slump in the CATV industry discouraged Tocom officials from implementing their original plan to cooperate with Leacom by installing two-way equipment in up to 2,000 homes to test subscriber demand for interactive CATV services. In this regard Tocom executives reached the same decision as other leading producers of two-way interactive communication systems such as Theta-Com, Jerrold, Scientific Atlanta, and Electric Industrial Engineering.

The Tocom spokesman reports that CATV operators have shown very little interest in the purchase of bi-directional systems except for equipment necessary to provide pay TV service. Tocom's system would be too elaborate, and too costly, for pay TV service alone.²⁴

Tocom installations in housing developments. Tocom has found a promising market for its two-way systems among the builders of housing developments, however. In May 1973, a Tocom spokesman reported that the firm had signed a \$3 million contract with Rossmore Corporation to install the Tocom II two-way cable monitoring system in 11,000 homes to be constructed in a new community for people over 55 being developed in Mesa, Arizona. Deliveries to the Mesa project were to begin in December 1973, and the installation was to be complete by October or November 1974.

The contract calls for installation of the full computer and cable system in each of the 7,000 residences being built and for a

²⁴Based upon a telephone conversation with Jim Smith, National Sales Manager, CATV Division, Tocom, Inc., May 30, 1975.

projected increase of 4,000 units. Should the residences exceed 11,000, Tocom's contract will increase to \$5 million. The system will provide capability for home shopping, pay TV, opinion polling, fire-burglar-emergency assistance alarms, meter reading, and remote control functions.

This installation offers the possibility of gathering additional information on consumer demand for two-way services, if the Rossmore Corporation is willing to cooperate in such a study.

Developments, 1973-74

Because of conditions in the economy since 1973, the sale of housing units in Rossmore's Mesa development have been less than originally anticipated. Nevertheless, the Tocom II two-way monitoring system had been installed in 380 homes by mid-1975. Currently, residents are provided with intrusion, fire, and emergency assistance alarms in addition to regular cable service. As more homes are built and sold, Tocom will continue to install their two-way equipment under the terms of their contract with Rossmore. The cost of the system is added to the price Rossmore charges for the lot and the living unit.

The system includes a bi-directional cable using Tocom remote terminals in each home (i.e., a remote receiver/transmitter on each set). The computer is located in the Rossmore main office. In addition to the alarm system, remote teletype equipment provides hardcopy printouts for those who must take action on alarms--these units are located in the fire station, security guard office, police station, and nurses quarters.

As of June 1975, the system is reported to be up and running. Since it became operational, the medical assistance request switch has brought help to two residents who suffered heart attacks. One fire alarm brought help in time to save a house. There have been no intrusion reports, since Rossmore provides excellent security protection for the Mesa project. Residents in the development are pleased with the protection the two-way monitoring system provides. Rossmore management is very happy with the installation. Indeed, the firm has ordered another Tocom monitoring system for installation at the Leisure World development under construction in Coconut Creek, Florida.

Tocom has also contracted to build similar two-way monitoring systems in other housing developments being built under Title VII HUD guarantees. Such arrangements have been made with builders in Woodlands, Texas, located outside Houston, where 25,000 homes are planned (by June 1975, several hundred units had been constructed), and Flower Mount, Texas, where 20-25,000 homes are planned (eight houses have been occupied to date). In each case the system is bought by the developer and the cost is pro-rated to the price charged for the lot and house. In a 10,000 home project, the pro-rated cost per house for the initial investment in Tocom two-way equipment is about \$400 to \$500 including the bi-directional cable. Developers are emphasizing the two-way monitoring systems as a special feature in promoting the sale of houses in their projects.

In both of the contracts mentioned above, Tocom personnel not only install the two-way system, but they also service and manage it thereafter. This arrangement provides management with feedback as to the technical operation of its system in actual practice, the cost of system operation, and the reactions of consumers to the various two-way services made available:

In short, it appears that Tocom management has found a significant market for its two-way equipment among housing developers at a time when CATV operators are not buying such systems. Such contracts provide immediate revenue to support further research and development. Experience is being gained in the operation and management of two-way systems. Technical problems may be identified and action taken to correct them. Much may be learned about consumer reactions as they operate the sophisticated two-way equipment. Thus, there is an opportunity to assess the demand for the various two-way services that are offered.

In the long run, however, Tocom management recognizes that it will be necessary to develop the market for two-way systems among CATV operators in urban markets if the industry is to survive. Nevertheless, selling two-way installations to housing project developers appears to be a promising way to bridge the gap until CATV operators realize there is a potential profit from providing subscribers with two-way services and begin investing in such systems.

Goldmark's Ten City Study in Connecticut: One of the most far-reaching proposals involving two-way cable television has been advanced by Dr. Peter Goldmark, former President of CBS Laboratories.²⁵ In 1972 it was announced that his firm, Goldmark Communications Corporation, would study the broad uses of communications technology in a ten city area in Connecticut. The firm planned to investigate the potential use of broadband communication devices in service industries, in expanding health services through mobile teleclinics, for interconnecting large educational institutions with satellite campuses and bringing entertainment sources into rural areas. The study, funded with a \$400,000 grant from HUD and the National Sciences Foundation, is being conducted in cooperation with Fairfield University, Fairfield, Connecticut under the title "The New Rural Society."

In December 1974, HUD awarded Fairfield University \$300,000 to continue the New Rural Society Project. (Goldmark is a visiting professor there.) This phase of the project is to involve development of new broadband communication techniques to facilitate the decentralization and relocation of state agencies and business operations.²⁶

²⁵ Adapted from Cable Television: Takeoff into Sustained Growth, 1972, Samson Science Corp., a subsidiary of Quantum Science Corp., New York, p. 14.

²⁶ CATV Newsweekly, Dec. 9, 1974, p. 32.

Additional noteworthy two-way experiments: Other two-way experiments funded by government agencies involving delivery of social services include the following:

In June 1974, NSF gave a grant of \$99,129 to Cable TV Information Center to test costs and benefits of two-way cable for delivery of social services in an urban setting. This project is to explore whether CATV can improve delivery of social services to the elderly and create alternatives to the present institutions which serve this increasingly isolated segment of the urban population. It will also explore whether two-way can improve a community's sense of participation in government. The test site is Peoria, Illinois.²⁷

May 1975, HEW (Bureau for Handicapped Children) funded an experiment in which Mitre Corporation is to work with the New York Education Department to install a 100-terminal, two-way system in Amherst, New York, a Mitre spokesman reports. The system will begin service in September 1975 and will experiment with providing instruction to homebound handicapped children. The two-way system will use telephone return and full keyboard terminals in the home.²⁸

May 1975, NSF let three contracts for two-way experiments involving the provision of social services to the public. Each involves a CATV system with two-way capability in a city with a

²⁷Videocassette & CATV Newsletter, June 1974, p. 11.

²⁸Letter from Timothy Eller, Mitre Corp., May 28, 1975.

cooperative local government. These include (1) Rand Corporation's Washington, D.C., office to work in Spartanburg, S.C.--\$1.1 million; (2) Michigan State University to work in Rockford, Ill.--\$400,000; (3) Alternate Media Center, New York University, to work in Reading, Pa.--\$200,000.

These experiments all focus on delivery of social services and will serve to explore and develop interesting uses of two-way interactive CATV. They are not expected to lead to commercially viable uses of two-way, however.

Experiments in Marketing Goods
and Services via CATV

Several of the two-way cable tests described above have demonstrated the possibility of offering subscribers the service of shopping in their own homes. The combination of the two-way cable, the subscriber terminal (or remote unit), and the computer-controlled central data terminal at the head-end make interaction between the subscriber and the marketer possible. The widespread use of credit cards is another important facilitating factor. Before cable operators make the investment necessary to provide shopping service via this two-way interactive system, however, it is necessary for them to have some assurance that consumer demand for this service will be large enough to promise a satisfactory prospect of profit.

It is extremely significant, therefore, that several firms have taken initial steps to experiment with various versions of the electronic shopping concept. Three tests have proved to be particularly interesting.

Simpsons-Sears and IBM experiment

In October 1973, for example, the Detroit Free-Press reported that:

Simpsons-Sears, Ltd. and IBM of Canada, Ltd. said they are experimenting with a computerized catalog-order processing system that converts the unused buttons on customers' touch-tone telephones into a small computer terminal in order to place catalog orders.

The project will end a three-month Toronto test in mid-October. Approximately 2,000 regular catalog customers of Simpsons-Sears were offered the system, and, as of Tuesday [October 2, 1973], 453 customers had placed 1,130 successful orders.

No cost was given for the joint venture. Simpsons-Sears said that if initial test results prove favorable, the system may be offered to customers across Canada.²⁹

Of course, the Simpsons-Sears experiment did not involve two-way cable television. Apparently the firm offered regular catalog customers the opportunity to shop in this manner via direct mail. Return communication was via the unused buttons on the customers' touch-tone telephone. Yet experience gained from consumer response to the computerized catalog-order processing system would be helpful if Simpsons-Sears were to consider utilizing two-way cable as their communication link. Indeed, the material presented in the catalog could be converted into a presentation of the same information via display on the video screen. Viewers could then order by pressing appropriate buttons on the subscriber terminal (remote unit) in their home. Such an approach might reach not only Simpsons-

²⁹"Sears Puts Wish Book Computer in Home," Detroit Free-Press, Oct. 4, 1973.

Sears catalog buyers who are also CATV subscribers, but might attract the attention and interest of additional subscribers who do not customarily purchase through the use of a mail-order catalog.

If Simpsons-Sears finds the computerized catalog-order system profitable and were to adapt it to two-way cable television, the implications would be most significant. Successful experience with this type of marketing in Canada might lead Sears Roebuck to adopt the approach in the United States where the influence on shopping behavior might be important indeed. Hence, the experiment merits close attention.

Call-A-Mart Supermarket, Louisville, Kentucky

In October 1973, Newsweek carried an article describing Call-A-Mart, Louisville's new and unique computerized supermarket. The firm was organized by Mark Weiss, a former employee of IBM. According to the report:

A Call-A-Mart customer simply consults a catalog that is issued by the store and updated weekly, selects what she wants, and phones in the order by number. ...The operator at Call-A-Mart punches up the numbers on a keyboard tied to an IBM computer. A computer-activated voice confirms the order and later that day it is delivered. ...While the computer is recording the order, it also prepares an invoice, keeps a running total on the tab and determines for the delivery-truck drivers the optimum route from warehouse to home. The computer is programmed so it knows all the addresses within Call-A-Mart's delivery zone, as well as the location of every traffic light and speed-limit sign. This permits it to lay out the most expeditious route from store to home.

The 8,500 customers Call-A-Mart has signed up pay \$5 for the catalog. And while Weiss will not reveal his profit figures thus far, his estimate that Call-A-Mart customers average \$35 to \$40 in orders each week indicates that his firm may gross about \$16.5 million this year. ...

The expenses of a computer, the automated warehouse from which he fills orders, and home deliveries are high, but Weiss is managing to stay competitive with such local chains as Kroger and A&P by resorting to a number of economies. He operates from just one location, saving the real estate and building costs involved in a chain operation. He keeps his inventory down to about 4,000 items vs. some 8,000 to 9,000 in a typical large supermarket. The overwhelming portion of sales in a given item are concentrated in one or two brands, so he whittled down the number of brands he carries--with one exception. We have to carry a lot of breakfast foods, he says. Kids are finicky. His operation also eliminates shoplifting, which amounts to about one percent of a normal supermarket's sales. ...

In organizing Call-A-Mart Newsweek notes,

Weiss gambled that a computerized supermarket would attract shoppers tired of the routine of driving, finding a parking space, bucking check-out lines and the rest of the hassle, and he has already signed up 8,500 customers in the four months since he started operating. ...

His customers list is growing rapidly. He reports,

In the last two weeks, we've expanded our customer list 25 percent and in the month prior to that we expanded 100 percent. ...The question is not whether we're going to expand, but where and when.³⁰

Here, too, the system does not utilize two-way cable television but instead promotes the distribution of its catalogs in some unspecified way and relies upon telephone calls from the customer to the Call-A-Mart operator, who punches up the numbers on a keyboard tied to an IBM computer. Yet the system could utilize the two-way capability of cable in its operation, provided the Louisville CATV operator offered businessmen, in addition to two-way cable, a complete two-way system--including subscribers equipped with response terminals (remote units) and at the headend, a computer-controlled central data terminal.

³⁰"Supermarkets: Dialing for Doughnuts," Newsweek, Oct. 22, 1973.

Of course, Call-A-Mart would have to undertake promotion to get cable subscribers to buy the \$5 catalog of merchandise, but there would appear to be no difficulty in accomplishing this task. Indeed, it might be possible to display the catalog pages on the video screen and thus either eliminate the need for the printed listing of merchandise or supplement the catalog with the television presentation of weekly specials to stimulate buying.

Experience gained by Mark Weiss may well provide a basis for the development of a system of electronic shopping for groceries and other household supplies. His innovative use of the computerized catalog is another significant step in the evolution of retailing.

Cable Catalog

In January 1974, Cable Catalog, a national experiment in consumer marketing via cable television, was announced by Formont Associates of New York City. Elizabeth Forsling Harris, chief executive officer of Formont, described the plan as follows:

Cable Catalog will display merchandise from Neiman-Marcus in more than 50 communities with a total of 500,000 cable TV subscribers. The experiment is scheduled to extend through the first three calendar quarters of 1974.

During the first stage of testing, Cable Catalog will offer subscribers a selection of 31 items from Neiman-Marcus. In the second stage, a second store and an additional 500,000 cable TV subscribers are to be added. And by the Christmas shopping quarter of 1974, Cable Catalog will be displaying merchandise from Neiman-Marcus and two other stores (yet to be named) to an audience of some 2 million subscribers.

Subscribers will see a "motion picture catalog" of merchandise fed directly into the cable TV systems by means of video cassettes.

Noting that two-thirds of the cable TV market is located outside the nation's major marketing areas, Elizabeth Forsling Harris, chief executive officer of Formont, said that the service will not be offered in New York, Los Angeles, or San Francisco. She added that the experiment, if successful, could mean a "major breakthrough in retailing techniques."³¹

Additional information about the Cable Catalog experiment which comes from another source indicates that the merchandise featured on the 30-minute video tape may be ordered by mail. The tape cassette is being sent free to cable systems in 17 states reaching up to 500,000 cable subscribers. The 31 items of merchandise displayed on the tape range in price from a baby Neiman-Marcus print pillow retailing for \$10 to a Kimberly three-piece pant suit tagged at \$120. The tape, produced at a Neiman-Marcus store in Dallas and narrated by Chairman of the Board Stanley Marcus, was put together by Caravatt-Kleiman Inc., New York, at a cost of \$25,000. After the first nine weeks of the experiment, Ms. Harris (Elizabeth Forsling Harris of Formont Associates) said that Formont will pay each system a nickle for each order received from a subscriber of that system, or 6 percent of the gross revenues taken in from people on that system who order merchandise, whichever is higher.³²

Three aspects of this experiment are especially significant. The first is that merchandise normally sold in the Neiman-Marcus department store is being offered to cable subscribers. The second is that the products are promoted via video tape and made available to CATV system

³¹"Cable Catalog to Test Selling via Cable TV," Merchandising Week, January 28, 1974, p. 19.

³²"Shop by Cable," Broadcasting, Feb. 4, 1974, p. 43.

operators at no charge. It may be assumed that the advertising know-how of this leading department store is utilized in offering the 31 products to CATV subscribers. Third, the CATV operators stand to gain revenue up to 6 per cent of the gross revenues generated by consumer purchases. If this method of selling proves to be attractive to CATV subscribers, therefore, the system operator will gain an additional--and potentially important--source of income.

The Cable Catalog experiment still lacks key elements of a two-way interactive system. While the merchandise is promoted via the cable video screen, the order is placed by mail rather than by pushing a button on a subscriber terminal. This arrangement is understandable, however, because as of January 1974 most CATV systems had not yet installed subscriber terminals and central data computer equipment, and the Cable Catalog approach nonetheless provides a way of gaining information on the responsiveness of consumers to products displayed and promoted on the cable video screen. Especially significant would be information on what types of product normally sold in a department store consumers would be willing to buy without examining the items firsthand and, if they fall in the category of clothing or footwear, trying them on.

Nothing is mentioned in the description of the system as to how payment is made--whether by check or via a Neiman-Marcus credit card. This is an important aspect of the experiment, since the tasks of providing capital to finance credit purchases and minimizing credit losses by sound administration are challenging problems that must be solved if profits are to be satisfactory. Further information about

this experiment, therefore, should be of great interest to those considering the possibility of marketing via two-way cable television.

GiftAmerica

In June 1974, Business Week reported on a venture undertaken by Western Union to increase its unregulated business. In the fall of 1973, according to the report, Western Union began promoting Gift-America, a service which offered consumers the convenience of dialing a toll-free number and having silver bowls, clock radios, and similar merchandise delivered anywhere in the United States within hours. Before undertaking this venture into retailing, Western Union hired Booz, Allen & Hamilton, management consultants, to survey the market. J. Walter Thompson Company was given the assignment of creating the advertising to promote GiftAmerica. Computers were programmed to handle orders, and more than 5,000 franchises were lined up as outlets.

When the first TV ads began running in the fall of 1973, according to an insider, the phones began to ring with calls from advertising men who said they could not understand the commercials. In June 1974, it was reported that J. Walter Thompson was no longer handling the GiftAmerica account and that the firm's first president, who had a technical communications background, had been replaced by a marketing executive.

The idea for GiftAmerica was developed by Russell W. McFall, Chairman-President, who submitted the proposal to three separate committees of Western Union officers before he found one that endorsed the idea. "Most of the officers felt that, with the scarcity of capital, the money could be better spent elsewhere," says the source.

"Besides, nobody knew a damned thing about merchandising."

McFall still believes in GiftAmerica, but the operation had already cost \$18.4 million through March 1974. In its certification of the 1973 annual report, Price-Waterhouse noted in relation to GiftAmerica, "Recoverability of certain start-up costs is dependent upon the ability of a subsidiary to achieve and maintain a satisfactory level of operations."³³

While GiftAmerica was apparently not promoted on cable television, the operation has some elements that relate to electronic marketing. The gifts were advertised on over-the-air television. Viewers could order gifts delivered to relatives or friends by dialing a toll-free number. The gifts were delivered within hours, presumably by franchisees. How payment was made is not indicated, although such a transaction could be handled by charging the purchase to one of several widely held credit cards.

Attention is called to GiftAmerica because it appears to be the type of service that might be marketed effectively via two-way interactive cable television. Television commercials could be cablecast to promote the use of GiftAmerica service by people wishing to send gifts to friends or relatives located in other parts of the country. Consumers could use alphanumeric subscriber terminals to specify the gift desired and to give the name and address of the person to receive it. This information could be transmitted to the local Western Union

³³"GiftAmerica," Business Week, June 8, 1974, pp. 72-74.

office and relayed to the franchisee servicing the community where the recipient lives. This dealer would then deliver the gift. The purchase again could be charged to widely held credit cards.

Before a firm like Western Union would be likely to consider the use of two-way cable for GiftAmerica, obviously, enough system operators would have to install subscriber terminals and central data computer equipment so that potential gift-givers could be reached via cable. CATV penetration of the 100 major markets would, also, have to be great enough to make cable a competitive promotional medium as compared with over-the-air broadcasting. Clearly these conditions are not likely to be achieved until some years in the future. Yet the GiftAmerica concept appears to have considerable potential appeal to cable subscribers. Western Union's experience in stimulating consumer response with its present approach should provide interesting data on the feasibility of this idea.

CableMart, Incorporated

In August, 1974, CableMart, Incorporated, had completed a period of four and one-half years of experimentation in the marketing of products to the subscribers of cable television systems.³⁴ CableMart (CM) had promoted these products through the use of direct mail, insertions in billing envelopes mailed to CATV subscribers, plus commercials presented via programs carried on cable systems. Items marketed in this manner included blenders, radios, digital clocks, floor polishers, Kodak

³⁴Summarized from a case history prepared by the author entitled, CableMart, Inc., Marketing Series No. 107, University of Michigan, Aug. 1974.

cameras, among others. Their average price was \$40, although the firm had experimented with products selling for as much as \$300.

CableMart, Incorporated, was a joint venture organized by Mark/James, Incorporated, a manufacturer's representative and syndicator, and Times-Mirror Communications, Incorporated, a giant publishing company with interests in several cable television systems. The function of CableMart was to experiment in cable television as an adjunct to the direct mail marketing of special products to the ultimate consumer.

In these tests the merchandise was offered via the "Cable Family Shopping Center," a division of CableMart set up to handle all promotion to individual subscribers. Cable television subscribers were provided with a membership card in this organization, which enabled them to charge their purchases of the merchandise that was offered. Orders were placed either by telephone or by mail since two-way interactive capability was not then available on the CATV systems over which CableMart was promoted. The products were delivered by a fulfillment house by mail, or by parcel delivery. The customers sent their payment to CableMart, which handled the bookkeeping and the collection of accounts.

During a six-month period beginning April 1, 1971, CableMart conducted initial experiments in four California cities served by cable television systems which were owned by Times-Mirror Communications, and which reached a total of 26,000 subscribers. The participating systems were located in Long Beach, Palos Verdes, San Clemente, and Escondido. The tests produced a small profit over operating expenses.

In the fall of 1972 the experiment was expanded to cover cable television systems in 18 states across the United States serving approximately 350,000 subscribers. Cable systems not owned by Times-Mirror Communications were included in this phase of the test. This experience had been successful enough to encourage officials of CableMart to plan further expansion of the Cable Family Shopping Center (CFSC) concept to cable systems owned by other Multiple Systems Operators (MSOs). More specifically, executives planned a step-by-step expansion beginning in February 1974 to include the systems owned by 12 additional MSOs in various parts of the United States with 1.5 million subscribers. The amount of time required to carry out this expansion plan was not specified since much depended on the speed with which the CableMart plan could be successfully introduced to additional cable systems, the availability of capital to cover developmental costs and to finance the credit purchases, and on other considerations as well.

In discussing the desirability of moving into full-scale operation with the Cable Family Shopping Center concept, executives considered a number of factors. The first was an anticipated increase of the cable television audience from approximately 9 million in August 1973 to between 35 and 40 million by 1980. Second, CM executives were aware of several field demonstrations of two-way interactive CATV under way in the summer of 1973. The demonstration by Theta-Com in El Segundo, California, was cited as an example. As CATV systems installed subscriber consoles making two-way interactive services available,

electronic shopping would, of course, become even more convenient than the existing CableMart plan, which involved the placement of orders either by telephone or by mail. The CableMart plan could easily be converted to utilize a two-way interactive system. Recognizing this trend, CableMart executives wanted to get enough experience in marketing over CATV to allow them to take full advantage of the two-way interactive capability at such time as cable operators began to install push-button terminals for their subscribers. When such installations would begin on a significant number of CATV systems and how soon each system would make such equipment available to significant percentages of its subscribers was difficult to predict.

Third, consideration in gauging the potential success of expanding the CableMart operation throughout the United States was the size of the audiences that could be reached by commercials promoting the Cable Family Shopping Center concept over those CATV systems that might be interested in signing up with the plan. Very few data were available on the size of the audiences reached by over-the-air programs carried on the cable to subscribers, however.

Rather than depending entirely on CATV operators to originate programs that would attract sizable audiences, CableMart executives were considering the development of some instructional programs of their own that might attract audiences which contained good prospects for CFSC products. A spokesman of CM explained this idea as follows:

What we envision as a marketing tool would be--let us say-- a full hour program presented at an appropriate time one day a week. For example, on one day present early in the afternoon a program on gardening, interior decorating, child care, personal care, as well as various types of cooking lessons. In the evenings present material that would be more attuned to the family interest or to men, such as golf lessons, bridge lessons, stamp collecting--any type of instruction that would have a broad appeal--and then at the end of the lesson, offer the viewers the opportunity of ordering every product that is used by the instructor on the program. In other words, if you present a bridge lesson, you could sell viewers the bridge table, the chairs, the cards, the instruction book on bridge, and so on. If we offer a series of 13 golf lessons by Arnold Palmer, we could then sell the viewers Arnold Palmer golf balls, clubs, bags, umbrellas. ...

We believe that such programs will attract an interested audience for the Cable Family Shopping Center and that they will serve as an effective vehicle for selling goods via CATV. The cable operators are likely to favor such an approach since it promises to bring them in additional revenue.³⁵

Financing and administering credit was another consideration of key importance to predicting how rapidly the Cable Family Shopping Center concept could be expanded into new markets. In the first test, CableMart had offered subscribers the opportunity of charging purchases to the credit card issued to members of the Cable Family Shopping Center. This policy required CableMart to finance credit purchases and administer the credit system. In the second test, therefore, CM executives decided to offer subscribers the option of charging their purchases either to Master Charge or BankAmericard accounts. While this arrangement shifted the credit problem to the bank credit card firms, it was not particularly successful. It was discovered that many CATV subscribers did not have

³⁵CableMart, Inc., p. 19.

either of the two bank credit cards included in the CFSC plan. Moreover, reluctance to apply for such cards apparently had a depressing effect upon willingness to purchase.

The alternative of handling the credit problem through the Cable Family Shopping Center, as in the first experiment, required not only substantial capital as CableMarts expanded to additional cable systems, but also know-how in handling credit business. Times-Mirror Communications, Incorporated, was not willing to contribute additional capital to help finance the expansion of the Cable Family Shopping Center concept. Accordingly, their interest in the CableMart joint venture was sold to Field Enterprises, Incorporated, of Chicago, in November 1973. Mark/James, Incorporated continued as a partner in the venture. Field Enterprises contributed not only the necessary capital, but also experience acquired from handling credit sales of encyclopedias by mail to ultimate consumers.

This change in ownership of CableMart delayed the expansion planned by executives of the firm. The step-by-step expansion program, which was to have begun in October 1973, actually was inaugurated in February 1974, and by August 1974 had been extended to three additional cable systems. This development underscores the importance of providing adequate capital and know-how in operating the credit aspects of any electronic shopping plan involving purchases charged to a credit card.

The CableMart operation is well worth watching. The firm is gaining experience in marketing via cable television. The past experience of its executives in direct mail selling provides useful

background for the CM venture. While purchases are now being made by telephone or mail, a logical step would be for the firm to experiment with the use of two-way interactive cable television with one of the cable systems doing such developmental work. Since market tests of two-way services have been cancelled by CATV operators and equipment suppliers, as outlined above, such an opportunity may not present itself for several years. Nevertheless experience gained in such experimentation when the opportunity presents itself would pave the way for the conversion of the Cable Family Shopping Center plan to the use of two-way interactive cable, on a step-by-step basis, as cable operators equip their subscribers and their headend facilities with the necessary hardware.

Cable Response Network, Incorporated³⁶

In November 1973 Shop-at-Home service was inaugurated on 40 cable systems with approximately 500,000 subscribers exposed to the program. Shop-at-Home is the title of a 30-minute video tape produced by a new company called Cable Response Network, Incorporated, of New York. It was scheduled to run from November 1 through the Christmas holidays. This show was the first of a series of video tapes that will promote various types of merchandise. The CATV system was provided with the show free, with the agreement that it would be run at least once a day over the operator's origination channel.

³⁶Adapted from Video Publisher 3, No. 12 (1973):1; and Broadcasting, Nov. 12, 1973, p. 47.

The Shop-at-Home program that was presented November 1 through December 1973 was 30 minutes long and described a dozen different products that were presented in an entertaining manner by a host and hostess, singer Johnny Andrews and actress Suzanne Astor. Each item was followed by a slide listing its number and price. The viewer could order by phoning a toll free number or by writing to the Shop-at-Home address. Master Charge and BankAmericard were accepted. The program was produced at Windsor Total Video, New York City.

The products promoted on the program were especially selected by Mail Mart Associates, a mail order house, for sale during the Christmas season. The following items were included at the prices shown:

Heartlace necklace	\$10.95*	Supa-sharp knife	\$12.70
3-player chess	16.70	Home and Apartment	
Lazy pad	52.95	tool kit	16.95
Wall of shelves	67.45	Touchlite	32.45
Supermatch-acrylic	11.45	Slimaster cycle	20.95
Supermatch-crystal	26.95	Flight bag	16.45
5-year flashlight	7.95	Alarm strong box	41.45.

*Shipping charges were included in the prices, and customers were told to allow three to four weeks for delivery. Orders were filled and shipped by Mail Mart.

According to the plan, the cable received 15 percent of the sale in return for running the show. A free gift was also provided for the cable system to give to a lucky CATV viewer as part of a plan to stimulate interest in Shop-at-Home.

Cable Response Network (CRN) would not disclose its gross margin percentage, but the profit potential might be limited since CRN bears all the costs of program production, duplication, and distribution.

Principals in CRN include Robert W. Rawson who has a background in the mail order business and Robert Schultz who heads a CATV audience-rating service known as Video Probe Index.

In February 1974 Robert Schultz, vice-president, Cable Response Network, Incorporated, commented as follows on the Shop-at-Home experiment:

Almost 40 systems ran the show based on a verbal description given them on the telephone. The tape was then sent them with the option of running or returning. Only a few saw the tape and then decided not to run the show. The subscriber potential exposure was estimated at 500,000. The viewership, I would imagine, was quite small even though a number of systems ran it more than the required once-daily.

I might add that the results were disappointing. Whether this was because of the audience size, items selected, lack of promotion, or just plain resistance during a period of economic uncertainty, is hard to say.

What I can say is that we will not invest again in a general merchandise show. In the future we will concentrate on a specific interest group show.³⁷

It would appear that a program such as Shop-at-Home would need to be promoted to cable subscribers in order to get them to watch the cable system's program origination channel. CRN did not do this; instead the firm relied upon the cable operator to publicize the program. Obviously the cable systems did not deliver a large enough audience to permit an adequate test of the Shop-at-Home concept. The plan of

³⁷Letter to the author, February 13, 1974.

appealing to special interest groups in future programs also appears to be preferable to relying upon a general merchandise show.

Telephone Computing Service, Inc. . . .

A new home computer service using Touchtone telephones as the input medium and a voice-response system for output was placed in operation in Seattle on June 4, 1973.

The service, called In-Touch, was provided by a new company, Telephone Computing Service, Inc., a subsidiary of Seattle-First National Bank. Home subscribers paid \$6.50 a month for a variety of data processing services, including automatic payment of bills by telephone, income tax preparation, and operation as a four-function calculator.

For the monthly fee subscribers received 100 minutes of usage and paid four cents a minute for more. The system used all twelve buttons on the Touchtone telephone. Templates over the buttons instructed subscribers in the use of the system. Each user had a personal code number that activated the phone-computer link.

There were six major services: funds transfer for bill payment, family budgeting (data acquisition by phone and a weekly mailed printout), income tax processing, calendar reminder service, household record-keeping, and calculator service. As a calculator, the system accepts Touchtone input and supplies results by voice answer-back.

After four months experience with this service, Seattle-First National claimed that response had been "fantastic" with "several

hundred" subscribers signing up since the service was introduced in June 1973.³⁸ The one problem then evident with the service, according to Seattle-First National, was convincing people that the telephone-linked equipment can keep reliable records.

After six months of operation, however, the president of Telephone Computing Service, Inc., announced that the firm would go out of business on December 29, 1973. It was explained that a major obstacle was the need for customers to have Touchtone telephones. While the procedures used to operate the computer via the Touchtone telephone were believed to be simple by company executives, they proved to be too complicated for many people. Other inconveniences included lack of weekend computer time, too small a pool of merchants to whom bills could be paid using the system, and too high a service charge, among others. The most popular aspect of the service was its ability to pay bills.³⁹

In spite of the failure of this venture, In-Touch is an example of a type of service that might be modified, simplified, and offered over a two-way cable system. Since the payment of bills was popular with customers, the service might stress this function initially. As other services customers want are identified, they, too, might be added. The growing use of electronic computers by students might hasten acceptance of this function as time passes. The possibility of a joint venture involving a CATV system with two-way capability and a bank like Seattle-First National might be worth considering.

³⁹New York Times, December 29, 1973, p. 31.

If the CATV system installs two-way subscriber terminals, they would serve as well as, or better than, the Touchtone telephone as the communication link with the computer. A CATV system might offer pay TV as well as other services that--combined with home computer service--might build a package appealing to a large enough percentage of the cable subscribers to make the venture profitable. Here is a long range possibility that is worth keeping in mind.

Electronic Funds Transfer Systems (EFTS)

In September 1973 Business Week published a special issue dealing with "new banking," which suggests a revolutionary change in the methods by which people and business firms handle their money transactions. This system is popularly referred to as the cashless-checkless system. More specifically, it might be described as paperless electronic funds transfer systems (or EFTS). According to Business Week, Electronic Funds Transfer Systems will be banking's next big step.

Evolving rapidly, the basic technology and system design for an electronic funds transfer system (EFTS) is ready to go. Major questions of ownership, control and regulation remain to be settled. But both bankers and data-equipment suppliers agree that any system must include at least the basic processing elements in the diagram: (1) credit cards, (2) point of sale terminals, (3) cash dispensers and remote tellers, (4) communications link (initially dial-up or leased telephone lines later, cable TV, or specialized communications carriers), (5) local switches (local message-switching computer centers), (6) bank computer centers, (7) verification centers (for a fast initial check of card validity, credit standing, transaction limit, and frequency-of-use pattern), (8) automated regional clearing houses, and (9) national data network.⁴⁰

⁴⁰"The Quickened Pace of Electronic Banking," Business Week, Sept. 15, 1973, p. 116 ff.

As an example of the potentialities of EFTS Business Week reports that in Columbus, Ohio in September 1973, after a nine-month test in suburban Upper Arlington, City National Bank and Trust Company was forging ahead with plans to install 125 terminals in 60 major stores and supermarkets in the Columbus area. This arrangement permits "paperless" payments by customers with credit cards.

Also in Atlanta and San Francisco, it was reported that automated clearing houses were distributing company payrolls electronically and automatically crediting employees' bank accounts. Banks were urging customers to use single multi-payment checks to pay many bills at once. The Atlanta Payments Project had further plans to set up a regional electronic payments system that would extend electronic cashless, checkless transactions to the retail sales level.

Again, in Pittsfield, Massachusetts, seven financial institutions, including a federal credit union, savings bank, and commercial banks, were cooperating on a joint study to set up a city-wide electronic payment system. If these plans go through, Pittsfield could become a model for electronic funds-transfer systems in smaller towns.

While in the beginning the communications link in EFTS systems will be over ordinary dial-up or leased telephone lines, cable television systems could compete effectively for this business at such time as they are equipped to handle two-way interactive television service. Also, the availability of an electronic funds transfer system in the area served by a cable operator would greatly facilitate the handling of payments from subscribers utilizing electronic shopping, premium entertainment, or other two-way cable services.

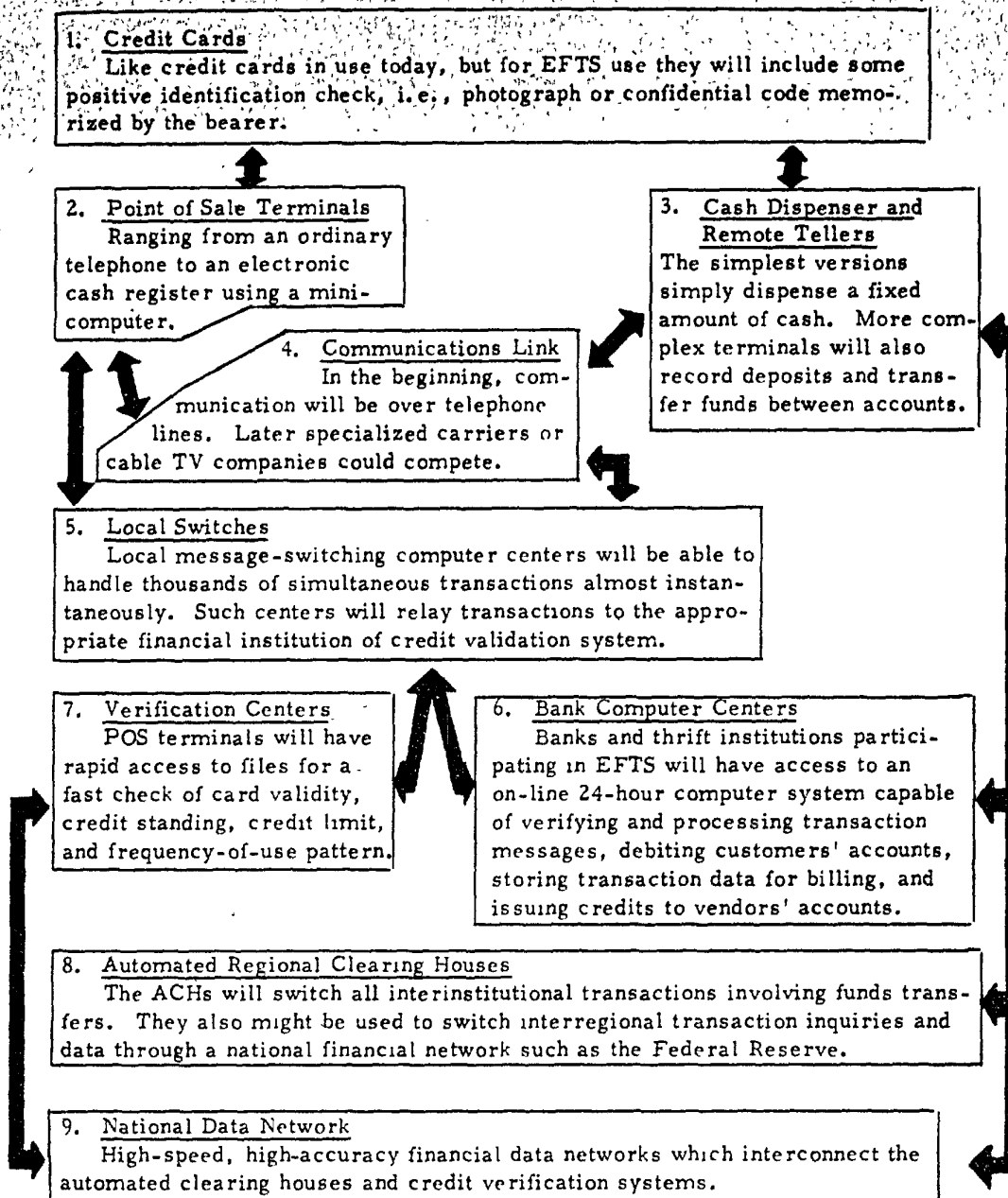


Fig. 3. Basic processing elements of the Electronic Funds Transfer System.

Source: "The Quickened Pace of Electronic Banking," Business Week, Sept. 15, 1973, p. 117.

There are, of course, serious problems to be overcome in developing the EFTS. In spite of this, a number of bankers close to the advance work in the field believe that paperless EFTS systems are coming on so fast that they are shortening their own timetables. According to John F. Fisher, Vice-President of City National Bank in Columbus, "We believe that by 1977, 5 percent of the metropolitan areas of the country will have EFTS in place and by 1983, that will grow to 35 percent of the metropolitan areas."⁴¹

Fisher was talking about the systems that put terminals at the point of sale, directly triggering a process to electronically debit the customer's account and credit the merchant's account without generating any paper records except a receipt. With such systems, merchants could also issue cash, and post credits to a customer's account for returned merchandise.

Potential Market Demand for Two-Way
Interactive Services by 1990⁴²

The foregoing discussion of demonstrations and experiments with two-way interactive cable television makes it clear that this innovation is still in the early stage of development and testing. As of August 1974 two-way services are not being offered on a commercial basis.

⁴¹Ibid.

⁴²This section is adapted from "30 Services that Two-Way Television Can Provide," The Videocassette & CATV Newsletter, Box 5254, Beverly Hills, Ca., 90210, pp. 1-10.

Nevertheless interactive services are expected to become an increasingly important factor in the growth of cable television in the decade ahead. Accordingly, it is interesting to speculate on their potential. Of special significance is a 1973 study by Paul Baran and Andrew J. Lipinski of Cabledata Associates, Inc., Palo Alto, California which explores the dimensions of a projected new industry involved in providing information services in the home. Paul Baran describes this study and its findings as follows:⁴³

As a part of this study, we considered entirely new demands for communications of a type presently not provided. We obtained the cooperation of a group of experts whom we felt would be the people most likely to provide a useful forecast of developments in two-way information services. The experts were individuals who generally were proficient in the technological aspects of the future systems and were often broadgauged "company philosopher" types. Since there are no real experts on new communication services, our respondents were people who are practical technologists, yet also imaginative and not afraid of making estimates for currently nonexistent services.

To obtain the view of these experts, we used the Delphi technique, which provides for the use of questionnaires to collect judgmental data from expert respondents who remain anonymous with respect to one another.

The panel's judgments were elicited by means of two questionnaires. In the first questionnaire, respondents were given a list of 30 potential new home information services, and were asked to estimate such things as the most likely year of mass introduction to the United States and the percentage penetration of households five years later.

⁴³Paul Baran is president of Cabledata Associates, Inc., 701 Welch Road, Palo Alto, CA. 94304. He is the author of one of the definitive reports on two-way television, "Potential Market Demand for Two-Way Information Services to the Home: 1970 to 1990." His work in the area of two-way television is an outgrowth of an earlier study on the future of the telephone system made for American Telephone and Telegraph Company.

In the second round, respondents were given the results of the first-round questionnaires and were asked to re-estimate all numerical forecasts in the light of the other panelists' responses.

The results indicated that the biggest market in 1989 in terms of dollar value will be for plays and movies from a video library. This service was forecast to have a dollar value of \$2,829,000,000.

The next biggest market would be for computer-aided school instruction (\$2,047,000,000).

Other services with markets estimated to be over the one-billion dollar mark were cashless society transactions, person-to-person communications involved in paid work at home, computer tutor systems, and adult evening courses on television.

The total value of the market for all 30 services would be about \$20 billion. Some of the services were overlapping. For instance, electronic shopping at home overlaps cashless-society transaction, but counterbalancing this "double accounting" is the realization that the list of 30 services is incomplete. Omitted were such major services as home security systems and utility meter reading. The various services were as follows: (Value estimates in millions of dollars).

Education: The category of services for the home that will produce the most revenue for cable TV is expected to be educational services.

The four separate educational services included in this category are: computer-aided school instruction, \$2,047; computer tutor, \$1,414; correspondence school, \$943; and adult evening courses on TV, \$1,131. These four services differ chiefly in the amount of interaction they offer between the student and the system....(Total value \$5,535).

Business Conducted from the Home: Services enabling people to conduct business from the home are expected to account for 20-25% of total anticipated revenues for these broadband services.

Five separate services are included: person-to-person paid work at home, \$1,713; secretarial assistance, \$707; access to company files, \$46; computer-assisted meetings, \$707; and banking services, \$566....(Total value \$3,739).

General Information Access: The next major category of services provides "access to information" and includes nine services: dedicated newspaper (a newspaper, the organization of which has been predetermined by the user to suit his preferences), \$849; fares and ticket reservations, \$124; daily calendar and reminder about appointments, \$292; newspaper, electronic, general, \$200; legal information, \$285; weather bureau, \$228; bus, train, and air scheduling, \$79; library access, \$95; index of all services served by home terminal, \$106....(Total value \$2,258).

Shopping Facilitation: The next major category concerns ways to make shopping easier. This includes five separate services: cashless-society transactions, \$1810; shopping transactions (store catalogs), \$584; grocery price lists, information, and ordering, \$566; special sales information, \$354; and consumers' advisory service, \$354(Total value \$3,668).

Entertainment: Three separate services are included under the general heading of entertainment. These include: plays and movies from the home library, \$2,849; past and forthcoming events, \$130; and restaurants, \$35....(Total value \$3,014).

Person-to-Person Communications: While we have good person-to-person communications systems today, there are a number of primarily communication activities that might be done better by new communications systems than by present means. These include new services for message recording, \$106; household mail and messages, \$707; mass mail and direct advertising mail, \$0; and answering services, \$743.... (Total value \$1,556).

Our panel of experts forecast that all these services would likely be introduced between 1975 and 1990, with the most likely date for introduction of these services being about 1980.⁴⁴

A summary showing 30 information services for the home with forecasts as to when they may be introduced and what they may be worth in dollars is presented in Table 3.

⁴⁴"30 Services that Two-Way Television Can Provide."

Table 3

FORECAST FOR INTRODUCTION OF INFORMATION SERVICES FOR THE HOME

SERVICE	Estimated Year of Introduction			Projected Dollar Value of Market in 1989 (In Millions)
	Early Estimate	Middle Estimate	Late Estimate	
1. Plays and movies from a video library	1975	1980	1985	2829
2. Computer-aided school instr.	1975	1982	1987	2047
3. Cashless-society transactions	1975	1980	1990	1810
4. Person-to-person (paid work at home)	1980	1985	1990	1713
5. Computer tutor	1975	1980	1990	1414
6. Adult evening courses on TV	1975	1980	1985	1131
7. Correspondence school	1978	1984	1990	943
8. Dedicated newspaper	1980	1983	1990	849
9. Answering services	1975	1980	1985	743
10. Computer-assisted meetings	1975	1980	1985	707
11. Household mail and messages	1980	1985	1990	707
12. Secretarial assistance	1975	1980	1985	707
13. Shopping transactions (store catalogs)	1977	1985	1990	584
14. Banking services	1975	1980	1985	566
15. Grocery price list, etc.	1975	1980	1990	566
16. Special sales information	1975	1982	1990	354
17. Consumers' advisory service	1975	1980	1985	354
18. Daily calendar, etc.	1980	1983	1985	292
19. Legal information	1980	1985	1990	285
20. Weather Bureau	1975	1980	1980	228
21. Newspaper, electronic, gen.	1980	1985	1990	200
22. Past and forthcoming events	1975	1982	1990	130
23. Fares and ticket reservation	1975	1980	1985	124
24. Message recording	1975	1980	1985	106
25. Index, all served by home ter.	1975	1980	1985	106
26. Library access	1980	1985	1990	95
27. Bus, train, air scheduling	1975	1977	1980	79
28. Access to company files	1980	1985	1990	46
29. Restaurants	1975	1980	1985	35
30. Mass mail/direct adv. mail	1980	1990	1995	0

Source: Paul Baran in "30 Services that Two-Way Television Can Provide," The Video-cassette and CATV Newsletter, Jan. 1974, p. 10.

Summary and Conclusions

In major urban markets, where three network signals, as many as three independent stations, plus an educational station are all available over the air via rabbit ears, the cable operator will find it difficult to attract subscribers. If he is to build penetration of the television viewing market, he needs to offer some services that will develop a "competitive edge." Offering two-way interactive cable services has been suggested as a possible solution of this problem. The promise of two-way cable services and the problems involved in developing them are summarized in the paragraphs that follow.

1. An extensive list of possible two-way services has been suggested for consideration by cable operators, whose problem is to determine which are likely to have greatest appeal in building penetration in major markets and in adding to system revenues. Estimates of the cost of providing such services are also essential in reaching a decision as to the sequence in which potentially promising services might be introduced.

2. Subscriber response services, perhaps with shared voice return channels, seem more likely candidates for home use in the next five years. The investment cost for the basic two-way equipment required would amount to roughly \$150 and \$340 per subscriber, over and above the \$125 per subscriber calculated for conventional one-way cable service. Two-way services that could be provided by this equipment would include remote shopping, interactive entertainment and instructional programming, selection of subscription or limited-access channels,

and audience counting for advertisers and programmers.

3. With the equipment mentioned above, and reasonable assumptions about operating costs, a cable operator would need additional monthly revenues of between \$4.50 and \$13.00 per subscriber to break even on two-way response services. This means doubling or tripling his present monthly revenue from one-way television distribution. Most of the added revenue would have to come from increased monthly subscriber fees, although advertisers, business firms, utilities, schools, and government users would pay for services of benefit to them. Providing a mix of response services supported by home subscribers and business and government users appears to be a better strategy for the cable operator than supplying a single service alone. Expected revenues from specific services cannot be estimated at this time, since no real field experience or evidence of consumer demand is yet available.

4. A number of demonstration projects have been undertaken or are in progress with the purpose of uncovering technical problems in providing two-way services and getting better information on anticipated costs. We have reviewed Mitre Corporation's test in Reston, Virginia, as well as the plans for the operational experiment in Stockton, California; the Jonathan/Chaska Community Information System Project; the El Segundo Pilot Project; the Orlando, Florida test; and the Irving Texas experiment. Unfortunately, plans for market tests of consumer demand for two-way services have been delayed or cancelled as a result of the impact of unfavorable economic conditions on the cable industry. If and when they are likely to be reinstated is unknown.

Several experiments supported by government agencies are going forward, however, involving the delivery of various social services. These are not expected to lead to commercially viable uses of two-way, however.

Installation and management of two-way systems in housing developments appears to offer a promising opportunity for equipment producers to gain experience in the operation of interactive systems and to accumulate information on consumer demand for intrusion, fire, medical emergency, as well as other services.

5. Several firms have taken initial steps that might be regarded as preparing the way for eventual development of two-way electronic shopping. Elements included in their approach are computerized catalog ordering systems, promotion of purchases by direct mail, over-the-air television, or cablecasting; placement of orders by Touchtone telephone, by mail, or by toll-free telephone; payment by charge to credit card or C.O.D.; delivery by fulfillment house, company-owned and franchise-owned trucks or by parcel post. None provides for placement of orders via two-way cable subscriber terminal, possibly because cable systems have not yet installed such equipment in a significant percentage of subscribers' homes.

6. Experiments utilizing various combinations of these elements of two-way electronic shopping, which may be thought of as evolutionary steps toward fully developed electronic shopping services, include the following firms:

- a. Simpsons-Sears and IBM of Canada. Three month test of computerized catalog-order processing system using touchtone telephone for placement of customer orders. Of 2,000 regular catalog customers, 453 placed 1,130 successful orders. No costs reported.
- b. Call-A-Mart Supermarket of Louisville. Interim report on first year's operation of unique computerized supermarket where consumers phone in orders for grocery products using \$5 catalog for information on items and prices. Had signed up 8,500 customers; estimated gross profit about \$16.5 million for the year.
- c. Cable Catalog. Experiment with motion picture presentation of 31 items of merchandise from Niemann-Marcus during 1974. Thirty-minute videotape sent free to cable systems in 17 states reaching 500,000 cable subscribers. Orders placed by mail. No report on sales and costs of experiment.
- d. GiftAmerica. A venture by Western Union offering consumers the convenience of dialing a toll-free number and having silver bowls, clock radios, and similar merchandise delivered anywhere in the United States within hours. Promoted via over-the-air television commercials. After six months it was reported the venture had cost \$18.4 million. No report of revenues generated by the promotion.
- e. Cable Response Network, Incorporated. Four months' experience with Shop-at-Home service offered on 40 cable systems with 500,000 subscribers reported upon in Feb. 1974. Thirty-minute Shop-at-Home program was supplied to cable operators via video tape. It promoted 13 different products believed to be potential gift merchandise for Christmas shoppers. Orders placed by toll-free number or by mail. Purchases charged to credit card; fulfillment by Mail Mart (direct mail order house). Results were disappointing. Possible reasons: small audience for program, items offered, lack of promotion of Shop-at-Home program to stimulate subscribers to view program. Changes in approach planned.

- f. CableMart, Incorporated. Report on 4½ years of experience in marketing products via cable television via the Cable Family Shopping Center. Items promoted chiefly were hard goods, priced \$40 to \$300. Promoted by mail and via cable television commercials. Orders were placed via phone or mail; purchase was charged to credit card; delivery by established fulfillment houses. After 4½ years CFSC was being promoted over cable television systems in 18 states with approximately 350,000 subscribers. Results: a spokesman claims the venture had broken even up to that point. Plans made for expansion to 12 additional MSOs in various parts of United States with 1.5 million subscribers when market conditions are favorable.

7. In building a package of two-way cable services, a cable operator might combine some type of electronic shopping plan with a home computer service and a service providing checkless/cashless banking transactions. Two interesting experiments involve the following:

- a. Telephone Computing Service, Incorporated. A new home computer service using Touchtone telephones as the input medium and a voice-response system for output was placed in operation in Seattle in June 1974. Home subscribers pay \$6.50 per month for data-processing services, including automatic payment of bills by telephone, income tax preparation, and operation of a four-function calculator. Although initial response was favorable, the service was withdrawn after six months. If changes were made to correct problems encountered in the original operation, however, this service might well be considered by a CATV operator for inclusion in a two-way package offer to subscribers.
- b. Electronic Funds Transfer System (EFTS). A number of experiments with "cashless/checkless" banking were underway in September 1973. Revenue and cost information were not available.
- 1) After a 9-month test, a bank planned to install 125 terminals in 60 major stores and supermarkets in Columbus, Ohio. This development would permit so-called paperless payments by customers with credit cards.

- 2) Seven financial institutions in Pittsfield, Massachusetts, were cooperating in joint study to set up city-wide electronic payment system.
- 3) In Atlanta and San Francisco automated clearing houses were distributing company payrolls electronically and automatically crediting employees' bank accounts. Banks were urging customers to use single multipayment checks to pay all bills at one time.

8. Because review of these experiments with various types of two-way service does not provide any significant information as to the revenues and costs that operators may anticipate in providing such facilities, prospective profits cannot be estimated at this time. Certain of the tests may provide such essential data in the future, however, and cable operators would be well advised to watch closely for publication of the results of these interesting and significant experiments.

9. As of June 1975 two-way interactive cable services are not being offered commercially. Nevertheless, observers expect them to become increasingly important factors in stimulating the growth of cable television penetration in the decade ahead. Hence it is important to review the predictions of experts as to the timing of the introduction of various two-way services and the anticipated growth in the demand for these services by 1989. In a study using the Delphi technique these experts made forecasts of the potential market for 30 possible two-way services by 1989.

The five individual services showing the most favorable prospects include the following (in order of projected value of their markets):

	<u>Projected Dollar Value of the Market in 1989 (In Millions)</u>
. Plays and movies from video library	\$2,829
. Computer-aided school instruction	2,047
. Cashless society transactions	1,810
. Person-to-person (paid work at home)	1,713
. Computer tutor	1,414

Shopping transactions were estimated at \$859 million which placed them thirteenth on the list. Grocery price lists which bring in revenues of \$566 million were fifteenth. Special sales information was estimated at \$354 million (sixteenth), the same as providing a consumers' advisory service.

10. When the individual services were classified as to type, the groups projected potential markets by 1989 ranked as follows (in millions of dollars):

Educational services	\$5,535
Business conducted in the home	3,739
Shopping facilitation	3,668
Entertainment	3,014
General information access	2,258
. Person-to-person communications	1,556

11. These projections were made before the recession of 1974-75 which has served to delay the development of two-way interactive television. Accordingly they are probably optimistic. The rank order of potential markets by size, nevertheless, would still appear to be significant. It will probably take longer, however, for these markets to develop to the magnitude estimated.