

MULTIPURPOSE FRAME GRABBING INTERACTIVE EXPERIMENTS

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I would like to preface my talk this morning with a quotation from a speech given this year at the Southern CATV Convention by Mr. Alfred Stern, president of TVC; "With our industry's rapidly advancing technology, metro-cable systems will soon be fully capable of making the subscriber home the central point in a total communications grid."

In a few minutes you will see a film of the computer demonstration in Reston which will dramatically illustrate what I believe Mr. Stern is referring to.

But first, a few words about Reston and our cable system: (See figure 1) Reston is a new planned city located 20 miles west of Washington, D. C. which will have 30,000 living units by 1980. Currently there are about 4000 homes of which 62% are cable subscribers.

We presently have fifty miles of dual underground plant with a capacity of 40 channels. On the A system we are carrying 3 network channels, 2 independent channels, one educational channel all from Washington and our local origination channel. On the B system we offer three network channels from Baltimore, a weather channel and a news/stock channel. Fourteen FM radio stations are also carried on both A and B systems. We are providing limited two-way service from the village centers back to the head-end by a third cable which is used primarily for live program origination. The final element in our planning for future requirements was to bury a six pair telephone cable with the trunk and distribution system.

Our management was approached by the Mitre Corporation in January 1971 to participate in a cooperative experiment in interactive television by providing the use of one of our available channels. Incidentally, they are a non-profit research and systems engineering firm whose work is sponsored by various governmental agencies and foundations.

The plan was to microwave the output of two on-line computers located eight miles away in McLean, Virginia, to our head-end where the signal would be transmitted on channel 7 to all subscribers. (See figure 2) Since the subscriber already has a good display device in his TV set and the return path via his telephone, we only needed to add a control box and a frame grabber to complete the home terminal.

The film we are about to see shows the type of terminal operation we have been testing in Reston since June of last year. This particular film was produced at the studios of WETA-TV in Washington, D. C. for use by the Public Broadcasting Service.

The demonstration is introduced by the co-developer of the system, Mr. Kenneth Stetten, an information scientist for the Mitre Corporation.

Film Synopsis

The 16-mm color film runs for 22 minutes, and consists of a live demonstration of the Reston-type home terminal equipment being used to interact with a distant computer producing assorted subscriber-services examples. Kenneth J. Stetten, co-inventor of the system for Mitre, introduces Jack Marsey, his associate, who then conducts the system demonstration.

Seen in the various close-up and general views are a home television set with a video tape recorder and control box on top, and a regular dial telephone with touch-tone adapter, all being operated by the demonstrator. (See figure 3)

Upon completing a telephone call to the distant computer facility, the first page of a "Services Directory" appears on the TV screen. The directory lists such services as "Desk Calculator", "Educational Materials", and "Medical Information" and the keys to be pressed on the touch-tone pad to obtain access to them. This keyboard method of response to the computer is called the "Private" or "Interactive" mode of terminal operation.

The "Desk Calculator" is selected and appears as a five-line "grid" of number spaces with a column of control functions for various arithmetic operations. Numerals snap into grid positions as they are entered by the keyboard. Numbers are instantly added, subtracted, multiplied, and a square root extracted. This calculator program not only shows a useful home service, but emphasizes the advantages of digital (pulse form) data storage over analog (picture form) storage. It takes less storage space in computer memory, and enables full machine capacity for logical computation (arithmetic here) on data before sending back displays to the user.

As an example of information retrieval, a list of "Community Organizations" located in the town of Reston is next called up. Various text informational pages are displayed on demand from the keyboard, by typing page numbers, "next page", "previous page", or "index" pages. This program illustrates the "random access" capability of

computer-controlled digital data storage.

"Educational Materials" are typified in the form of an arithmetic sequence called "Carry". Problems in addition are offered on the TV screen, and when a correct answer is typed in, the display shows the correct answer in proper position and the word "Correct" alongside. A wrong answer draws a "No Try Again" print-out on the screen. On the second consecutive wrong typed-in answer, the computer reveals the correct solution on the display. Repeating a given page of problems results in a different set of random numerals substituted in the same problem structures.

By keyboard control, several sections of the course are skipped over to get to the actual "carry" sequence. A two-digit problem ($37 + 25$ in the example) requiring carrying a "one" over to the left column is done first in three partial additions to avoid carrying over. Then the idea of writing the "one" over the left column of digits is graphically developed, enabling the learner to grasp the mechanics, and drill on random-number carry problems repeatedly. A "fill-in-the-blanks" type format is next shown. Then, the computer is asked for a score on this section, and instantly displays the number of correct and total tries with a percentage grade. Shown in this program is just an essence of the instructional power of "CAI" (computer assisted instruction).

A "Tax Guide" for IRS Form 1040 is glimpsed from the "Financial Information" service list. In this sequence, the subscriber can selectively obtain help on any portion of the form that he wishes, without having to "thumb through" the intervening explanatory material. This program is an example of the many kinds of reporting and application forms that are adaptable to computer programming for user aids.

How a housewife, whose child has sipped some kerosene, is helped is next illustrated by calling up "Medical Emergencies" from the main services directory, then "Poison", and then "Gasoline-Kerosene" to see the correct antidote. The two-way capability is exercised in another way by "notifying" the nearest hospital via computer of the pending arrival of the sick child.

Additional services are shown under "Medical Information" in which a list of nearby doctors is quickly found, and even more detailed information displayed. An appointment with a doctor is made through the computer-managed central memory.

The second page of the main services directory is keyed and lists such items as "System Instructions", "News

Sports and Weather", "Telephone Book", and "Welfare Services".

"Welfare Services" turns out to be a "privileged portion of the data base, and requires that a password (or code number) be typed in first to authenticate the caller. When so done, the first page of a "Private Directory" of professional doctors' services is offered with such items as "Communicable Diseases Resume", "Drug Information", and "Scheduled Appointments".

When "Scheduled Appointments" for "Today" is examined, the appointment made earlier under "Medical Information" is listed, along with others. Appointments for a future date are also shown.

A concept of electronic mail delivery is developed by calling for "Mail" from the second page of the "Private Directory". A list of items available for delivery are displayed, these messages presumably having been previously typed into central storage by the senders. A personal letter is selected, read, and then "released" or "erased". A dentist's bill for services is shown and "paid" electronically, using the subscriber's personal charge account or bank identification number.

The telephone is hung up and the terminal placed into the "Public" mode of operation by a control box switch (top of TV set). A series of up to 300 popular information pages can be dialed by the "subchannel" selector switch on the controller. Such services as a public program directory, baseball scoreboard, stock reports, fishing reports, racing form consensus, classified ads, TV listings, voter registration, bus schedules, recycling information, recent book arrivals at the library, and a school lunch menu are selected. Even though a one-way type of cable service, this mode shows that hundreds of informational sub-channels may be effectively supplied within a single TV channel space, with aid of a frame-grabber.

The controller is then changed to show the "raw" time-division multiplexed signal (no frame-grabber operating) flashing by at 60 fields per second. The vertical hold of the TV set is displaced to show the vertical blanking bar in mid-screen, preceded by a fast-changing line of bright dashes which is the 16-bit binary "address" code which identifies each of the following fields of data. (See figure 4) This code is normally masked off at the bottom of the screen, keeping it invisible, but enables selective frame-grabbing under control of an address decoder in the control box. This feature not only enables the user to manually select "Public" subchannels, but in "Private" mode, a special address, unique to each terminal, is activated so that the interactive computer responses will be frame-grabbed only by the subscriber terminal

requesting them. (Film concluded at this point.)

Since the introduction of the system at the NCTA convention in Washington, D. C. last year, nearly 1500 people have attended the demonstrations, representing the general public, educators, the government sector and many of the major equipment manufacturers.

Following each demonstration the participants were asked to complete a questionnaire to assist us in developing some ideas on the potential demand for these services and the extra amount they would be willing to pay for each of the six groups of services.

The tabulated results of this survey showed the following:

1. 78% would pay an average of \$1.70 per month for the one-way services, i. e. weather reports, TV listings, bus schedules.
2. 75% would pay an average of 60¢ per month for a calendar of community events.
3. 33% would pay an average of 28¢ per month for a personal address and telephone listing.
4. 40% would pay an average of 63¢ per month for a personal stock profile on their own portfolios.
5. 72% would pay an average of \$4.13 per month for the home calculator.
6. 95% would pay an average of \$1.33 per computer hour for computer-aided instruction courses in algebra, French, car repairs and others.

The Reston demonstration has achieved three main objectives: it has contributed to widespread interest in two-way interactive TV among manufacturers and cable operators; Government planning groups have been made more interested in the social impact and public service possibilities; finally, the technology has been shown to be here and ready, even though further refinement of the system is needed to effect cost reduction and improve the packaging of the hardware.

I would like to conclude this talk by outlining three of the current goals for this system: first, in Reston experiments will be conducted with low cost two-way video communications (similar to picture phone) which will use one TV channel for several dozen simultaneous face-to-face calls. Second, the Reston interactive system will be expanded beyond the "sterile" laboratory type experiment by putting terminals in homes to get unbiased reactions to the whole idea of interactive TV services. These reactions are essential in the development of marketable software. Finally, a similar system will be installed in a junior college where computer-aided instruction courses will be tested.

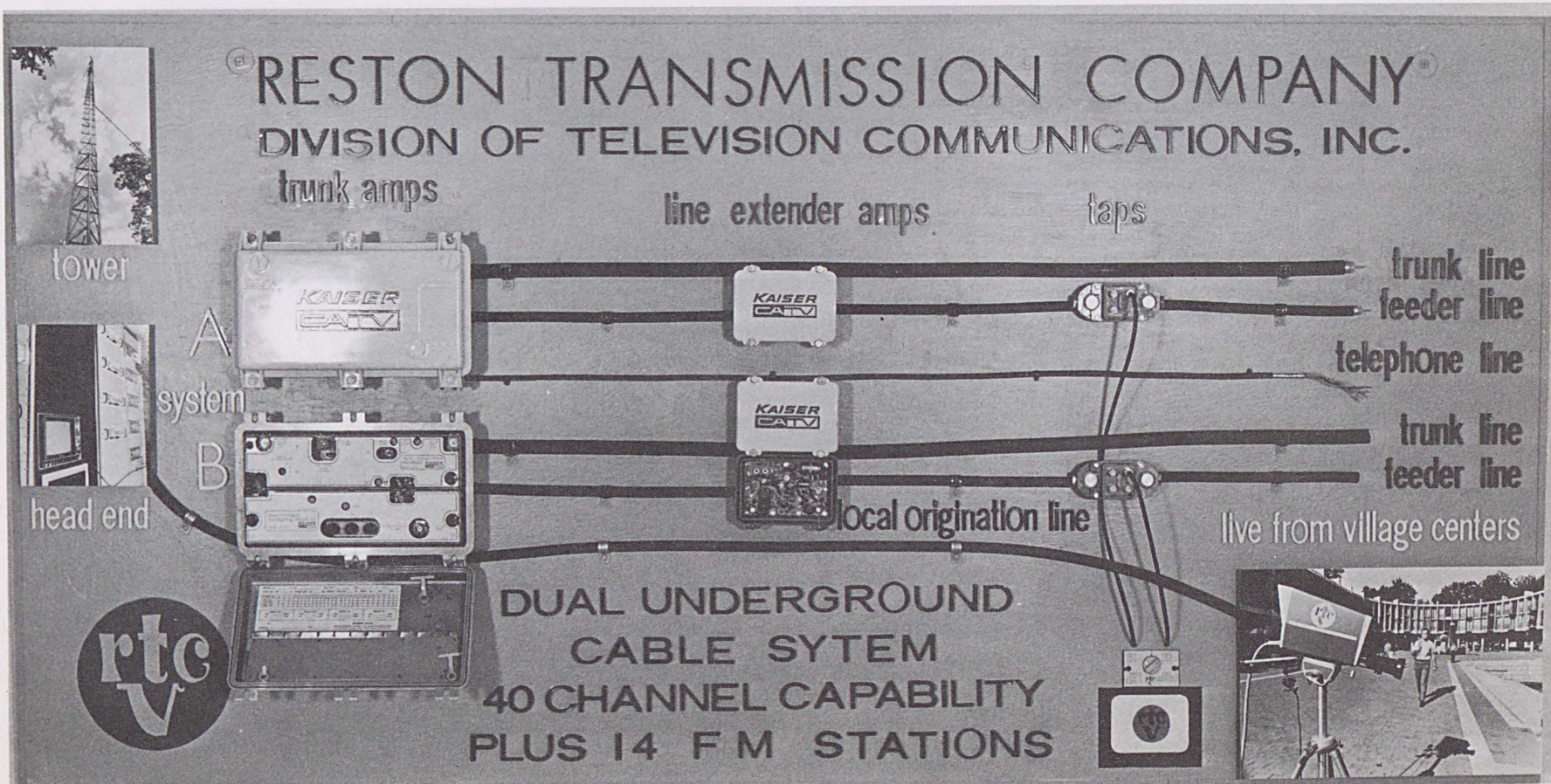


FIGURE 1

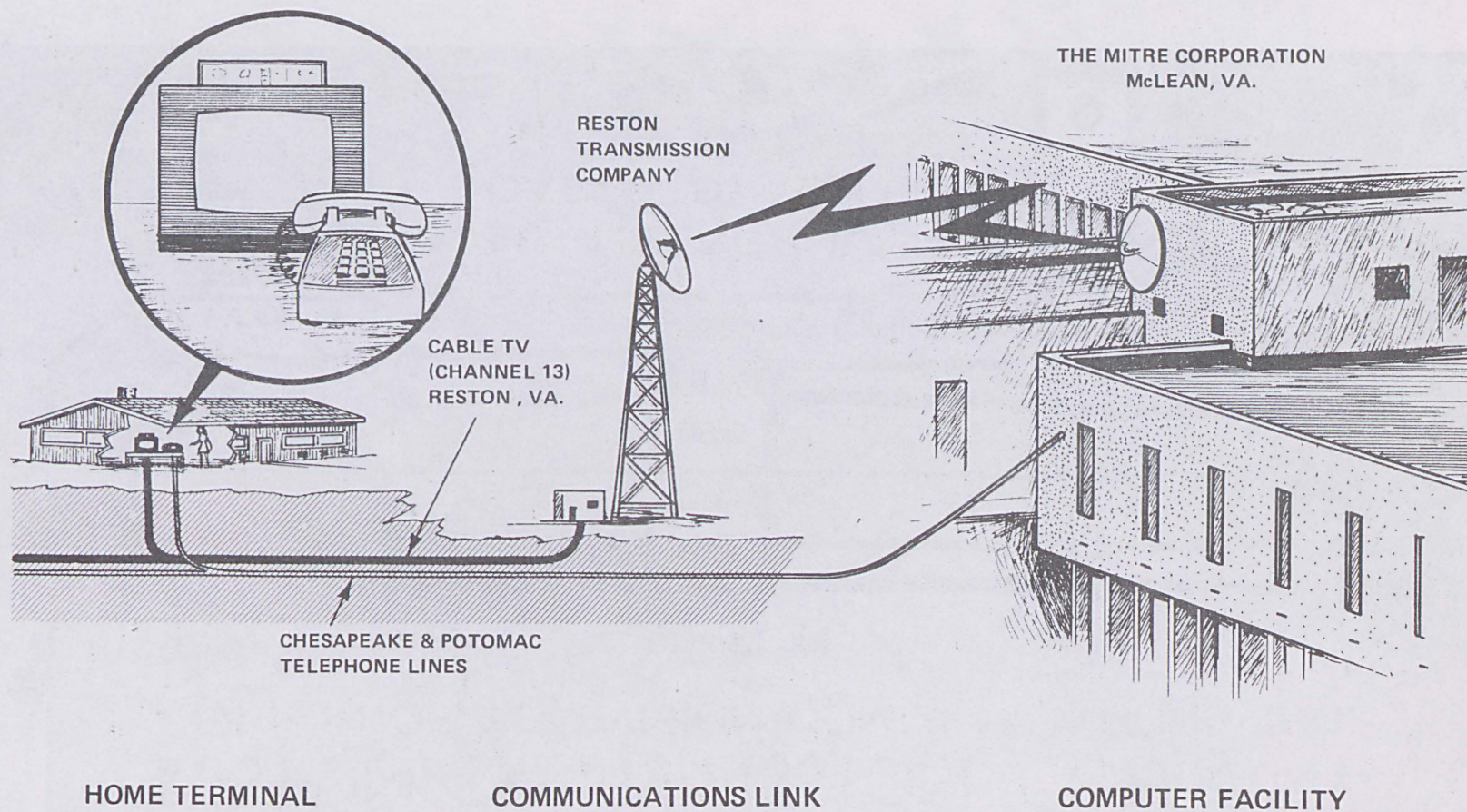


FIGURE 2



FIGURE 3

REASONABLY PRICED. PHONE 926-9358.

SHETLAND PONY---REG., GENTLE, \$75 OR MAKE OFFER.

968-7267.

PRESS 1-NEXT PG 2-LAST PG 3-SUB INDEX

4-MAIN INDEX 5-EXIT

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