JUNE 1986 PHYSICIANS Formerly Physicians TV Guide

VIDEO GUIDE

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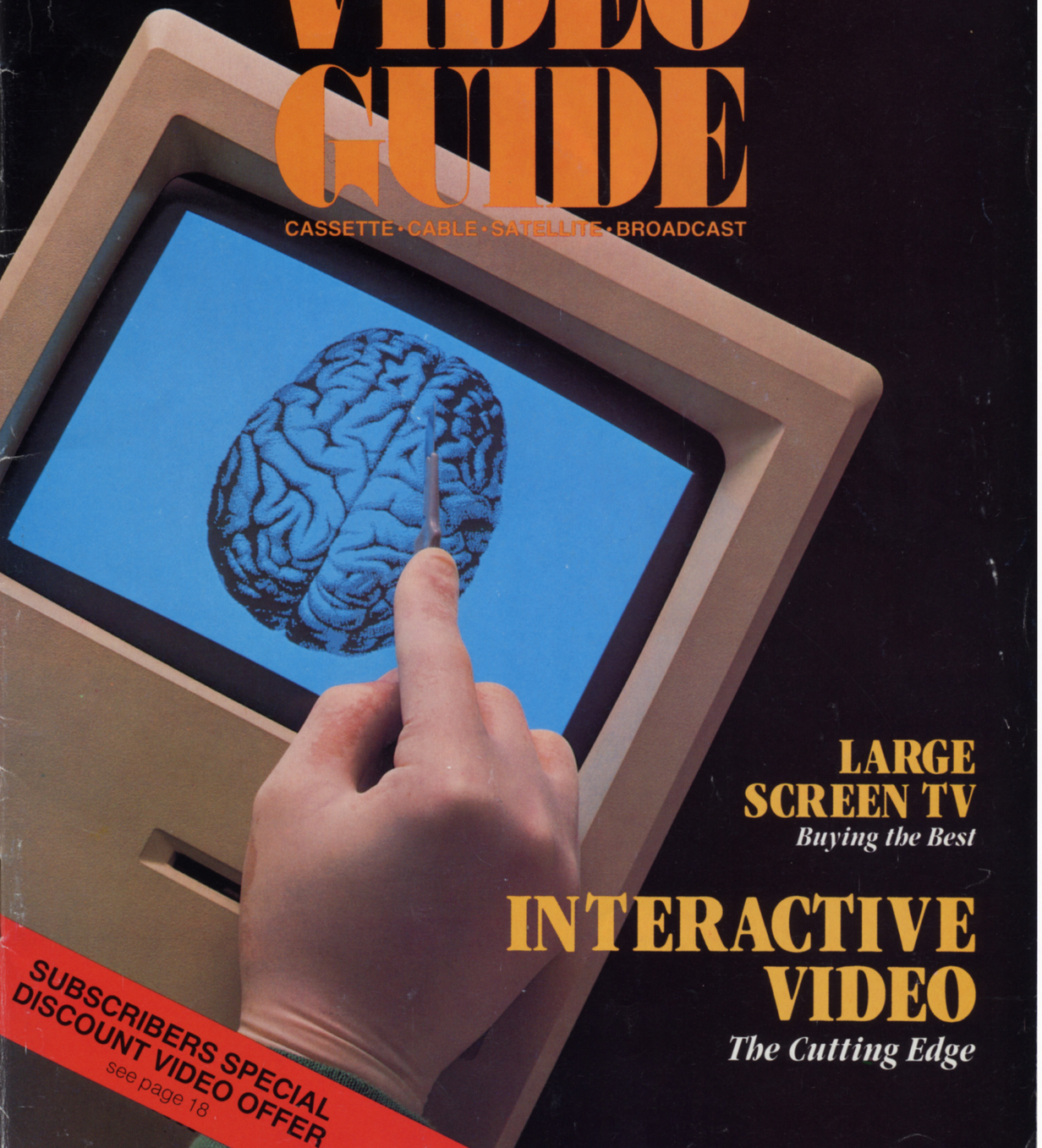

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TWO-WAY TELEVISION

Interactive systems let physicians talk back to their TVs

The interactive video medium continues to grow at an amazing rate; credit its ability to contain and convey vast amounts of complex, detailed information, to enable users to learn and test themselves at a comfortable pace and to synergistically mix visual, aural and graphic information for maximum educational impact. The introduction of new software (programs) and hardware (equipment) is now commonplace, and with the support of video publishers, pharmaceutical companies and medical institutions, interactive video has become the educational medium of the decade.

The computer jargon of hard- and software is appropriate to the medium; the term "interactive" might refer both to its relationship with computer technology and with the user. Most medical-oriented interactive video systems use "Level 3" technology, the current state of the art. Level 3 systems use a sophisticated external computer to control the videodisc player and store an extensive database of information and data. The computer responds to the user's choices by accessing the appropriate information almost instantaneously—allowing the user to concentrate on the data being presented, and not the hardware presenting it. "Level 1" systems are rarely used for medical video programs, being little more than videodisc players with sophisticated remote controls—they are most often used to provide animated graphics for arcade games. "Level 2" interactive video systems add microprocessors that are capable of storing data and, while the amount of data these systems

By Joseph L. Streich

are capable of storing is limited, Level 2 systems are being used for educational, training and commercial purposes.

A Level 3 computer-based interactive program can be continually updated and refined at relatively moderate cost; once a videodisc is pressed, however, there is no way to change its stored information. Revised computer programs *can* be instructed to avoid outdated segments on a previously pressed, companion disc.

Interactive Survey

While only a fair-sized catalog could function as an all-incisive summary of the interactive medium, a survey of noteworthy current developments and inside comments on the medium's future from those active in the field makes for a manageable introduction to the technology, its applications and the potential these and other interactive systems offer to the medical field.

☐ **Wicat Systems.** This Orem, Utah-based company is currently finishing the last in a series of interactive programs for Smith Kline French International under the umbrella title *Diagnostic Challenges in G-I*. The first program in the series was produced in June 1980, and was one of the earliest patient-simulation discs making use of computer-aided Level 3 technology. Wicat also provides customized interactive hardware on which its programs run. Each disc in the series focuses on a patient suffering from an undetermined G-I malady, requiring the user to exercise his skills in diagnosing the condition. The discs begin with a video sequence of the patient presenting his or her complaint, and then provides the user with four choices for pursuing the case: patient history, physical examination results, ordering lab tests and management and therapeutic options.

Patient history offers 25-50 possible questions the user can ask the patient via the computer. Depending on the question selected, the response may be in the form of still-frame text from the videodisc, graphic text from the computer or a video clip of a responding patient. The user has to beware of "red herring" answers that may lead to the pursuit of erroneous diagnostic options.

Lab tests make use of the videodisc as a visual archive, storing the answers to almost any test a doctor might order for a patient. "We provide more information than would be called for in real life," says Wicat manager Nancy Hughes. "The program has to be prepared for the wrong road a user might take."

At any time, the user can press a "records" key on a companion keypad to view an up to the minute summary of the work done, and knowledge gained about the patient. A "consultant" key summons instant medical advice from an expert in the field, who will make suggestions by comparing the user's choices to the "ideal path" formatted by the disc's designers.

After the user has performed a diagnosis and chosen a course of treatment, the system responds with a detailed analysis of his handling of the case. The response recaps and critiques the user's decisions, points out omissions and in some instances figures the costs incurred in diagnosis and treatment. The user also has the option of selecting a "discussion" mode, for a general walk-through of the case.

☐ **Actronics Inc.** Pittsburgh-based Actronics is the exclusive licensee for the American Heart Association's CPR Learning System—a twin-monitor, Level 3 interactive video system designed to teach cardio-pulmonary resuscitation. Available for sale or lease from Actronics, the system consists of an Apple IIe computer, Pioneer laser videodisc player, random-access audio deck—and a "computerized training mannikin." This most unusual peripheral comes in the form of either an adult or infant, and contains sensors that feed information back to the computer, relaying the user's skill in performing CPR functions. The mannikin responds with nonphysiologic beeps and buzzes that serve as feedback for the user.

Actronics recently introduced a second, simplified system for practicing and certifying or recertifying in CPR, known as "Act II." This smaller system has no audio support, and offers instruction based entirely upon user interaction with the computer through the mannikin and monitor screen.

Last February, Actronics released the first module in a five-part Advanced Cardiac Life Support (ACLS) series designed for use on the CPR Learning System. The *Dysrhythmia Recognition Course* offers instruction in distinguishing and treating abnormal heart rhythms. The next module in the series, on airway management, is due out in late 1986. Its mannikin will come with a sensorized head; users will get hands-on, risk-free experience in dealing with nose and throat blockages, and detailed feedback from the computer will help hone their skills as they progress. Future modules in the ACLS series will cover megacodes, adjuncts and Pharmacology.

Actronics/AHA CPR Learning System.

☐ **Intelligent Images.** This San Diego-based firm is producing a series of Level 3 interactive programs on emergency medicine critical care, for both doctors and nurses. Consisting of eight separate discs (the company hopes to reach a total of 24), the series covers such topics as gunshot wounds, hypovolemic and traumatic shock. The discs have won an award from the University of Nebraska Videodisc Group, a prestigious organization in the interactive field.

The firm is beginning to design a second series of discs focusing on hospital staff development: orientation, patient care, body mechanics and similar topics. Like many other interactive firms, Intelligent Images designs and sells hardware systems too; DXTER™ is the company's proprietary version (complete with touch-screen input) of Digital Equipment Corporation's Interactive Video Information System (IVIS).

☐ **Fusion Media.** Fusion is producing a Level 3 videodisc series for Stuart Pharmaceuticals entitled *Challenge of Serious Infection*. The most recent entries in the series are "Gram Negative Sepsis" and "Challenge of Antibiotic Selection in Surgery." Designed for seminars and conventions, and compatible with the Sony SMC-70 interactive system, the discs present case studies of patients; the user is asked to select the proper antibiotics for treatment. At the end of the program, the system generates a printout summarizing the treatment selected by the user, a recommended reading list and a graphic representation of appropriate antibiotic selection techniques for various pathogens. The final two discs in the *Challenge* series are due in late 1986.

☐ **Baker Videoactive.** Philadelphia-based Baker offers a Level 3, 12-disc adaptation of Barbara Bates' textbook and videotape series, *Guide to Physical Examination*, through J.B. Lippincott, the book's publisher. The first disc, on the thorax and lungs, has been completed and is currently being tested; the entire set will be available in late 1986, according to Baker president John Loven. Why repackage a work that has already been available in print and video? "We improve on the tapes with interactivity," says Loven. "We spread out some very dense material, and allow the user to control and review the pace of information."

The disc is set up to access material in three different ways. First, the user learns only about the examination in question: the various steps involved, as seen with an assortment of patients. The second access is in tutorial form: the material is presented in two-minute lessons, including relevant segments on the theory and physiology of the area being examined. Finally, in "Free Access," a table of contents is displayed, and the user can randomly search out areas of specific interest.

According to Loven, Lippincott will be making the discs available in formats compatible with the most popular computer systems—IBM and Apple. He adds that the pub-

lisher will eschew "exotic" hardware—such as touch-screens or graphic overlays atop video segments—so that Baker's discs are as simple as possible to use with computers already on the market.

☐ **Reactive Systems.** On behalf of Roche Laboratories, New Jersey-based Reactive has created three discs, and is currently working on a fourth, in a series entitled *Diagnosis: An Animated Educational Exercise*. The program is to be used as an instructional exhibit tool at medical conventions.

Reactive's Level 3 system includes a "proprietary interactive mannikin" that can simulate a variety of conditions subject to discovery in a physical examination. The

Reactive/Roche Diagnosis: An Animated Educational Exercise.

user begins by screening a videodisc segment of a patient interview, followed by an "examination" of the mannikin. The doctor can examine the mannikin's eyes with an ophthalmascope, palpate its abdomen, check its blood pressure, listen for heart and lung sounds, detect swollen glands or discover surface abnormalities in the skin.

Sensors in the mannikin relay the doctor's probings back to the computer, and can even trigger audio responses a living patient might make in an exam. The course of treatment selected triggers realistic changes in the electronic patient, which the doctor can discover with a follow-up exam. The doctor selects treatment by typing in commands on a keyboard, with the computer recognizing key words on-screen: no menus are used. At the end of the program, a narrator comes on-screen to discuss the doctor's findings.

"Morton," the third program in the series, is named for its accompanying mannikin, an unfortunate chap suffering from either of two different pairs of related conditions. Either path is selected at random by the computer, and the user must discover the condition based on his examination of Morton and the relevant lab tests. Morton displays a few new symptoms, such as a swollen jugular vein and liver, but his condition responds to the form of treatment selected by the user.

Reactive has experimented with group-response systems for use at symposiums or in classrooms, with up to 20 doctors collectively entering their choices on individual keypads. A bar-graph display represents the variety of treatment responses received, and the computer can be instructed to respond to either the majority choice or the choice of a moderator or teacher.

☐ **National Board of Medical Examiners.** The NBME is currently working on a project that may fundamentally change the way medicine is taught in the United States. Targeted for 1988, CBX—Computer-Based Examination—will replace part of the medical boards administered by the NBME. Currently, students taking the boards confront multiple-choice questions in dealing with a PMP (Patient Management Problem) simulation using a form of interactive print. For the last 15 years, the NBME has been developing the CBX. Level 3. Based on the powerful IBM PC AT computer, the NBME hopes to provide a "dynamic simulation" of the PMP process, according to NBME's Dr. Don Melnick.

Each student taking the boards will sit at a separate AT computer, with access to individual copies of a library disc containing all the information on a theoretical patient. Tied into a computer-based model of a patient, the disc will contain hundreds of different test results, all appropriate to the patient at a specific point of treatment, permitting the student to pursue almost any possibility relating to the patient.

Unlike systems designed for conventions or promotional use, CBX will not feature live-action patient dramatizations, but will focus instead on visual information stored on videodisc or within the computer: EKG results, X-rays, microphotography, graphic representations, clinical photography and more. "Dramatizations don't convey medical information. . . they're like icing. They don't contribute to our ability to evaluate competence," says Melnick.

The NBME may eventually make its technology available to its client base, boards representing various medical specialties and to the medical schools training the students who will eventually take the boards. Baker Videoactive's Lowen speculates that this will cause the schools to shift to more interactive-intensive instruction—a ripple effect that, if it continues, will make interactive video an intrinsic part of the American medical scene.

Medvid Futures

As the interactive-technology medium continues to grow, it will need to overcome the hurdle of standardization. Currently, any number of videodisc players, computers and peripheral devices can be assembled into an interactive system. Unfortunately, programs designed for one system are not necessarily compatible with another. Without a conference of manufacturers and software producers to develop standard formats (as often happens in consumer electronics), the market will probably determine which system or systems will come to dominate. Sony, for example, has just introduced a complete interactive system called Sony View. Unlike its previous SMC-70 computer, which ran on CPM-language programming, the View system uses MS-DOS—mak-

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