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Staff

Editorial Board

Articles

Applications review

The Institute

Departments

the cover

Perfect alignment between two glass fibers is guaranteed when the optimum separation is attained. Shown here are two preforms that are separated too much resulting in excess light dispersion. More on fiber optics in communications on p. 47. Photos on the cover and in the fiber optics article are courtesy of the Western Electric Co.

Consumer electronics II. Personal computers

Personal computers are now even more personal. They have become portable . . .

The new hand-held models retail for a fraction of the price of the desktop types—$200 to $1000—and are either new machines or upgraded versions of language translators. They come from such companies as Sharp, Matsushita, Nixdorf, Commodore, Radio Shack, and Sinclair.

Matsushita is marketing its unit through its two subsidiaries, Quasar and Panasonic. The Panasonic RL-H1000 consists of a main 6502 microprocessor, an expandable ROM capacity of 16 kilobytes, which corresponds to approximately 40 000 words, and a RAM capacity of 73 kilobytes. The keyboard consists of 65 alphanumeric, symbol, and control keys. Both Matsushita's units and Radio Shack's TRS-80 Pocket Computer have their keyboards styled as a regular typewriter. The various programs are accessed via multiple-choice menus. The display is an eight-dot matrix LCD of 159 columns.

The Panasonic unit has numerous peripheral connections, such as an acoustic coupler to access remote data bases via telephone. Interfaces to a peripheral cassette and miniprinter are also included. With these options, the computer can be used either as a remote terminal or as a desktop model. For portability, the CPU can be placed in a briefcase that houses the acoustic coupler and the RS-232-C interface circuit.

Many of the portable computers on the market have adapters to display any of the software programs on a television set, but portability can have its drawbacks: The user is limited to one-line displays, which makes for a very slow machine. The television interface should help speed it. The smallest and least expensive desktop personal computer was introduced by Sinclair Research Ltd. of Cambridge, England. The ZX80 sells for $200 but has a limited memory of 1 kb. Its membrane keyboard, however, is unique.

The "surprise" of 1980—which industry observers knew was coming sooner or later—was Japan's plunge into the personal computer market in the U.S. The Japanese units haven't flooded the market yet, but inklings of Japanese intentions were observed at the annual Consumer Electronics Show last Summer in Chicago. The Matsushita Electric Industrial Co. introduced a hand-held computer that sells for just under $1000. Sharp also started selling a unit in the U.S. after catering solely to Japanese consumers. Hitachi, Fujitsu, and the Nippon Electric Co. have introduced desktop models. The companies plan to capture a portion of the U.S. personal computer market. For the most part, the software packages are business-oriented and are just as strong, if not stronger, than the American counterparts.

Until last year, the American-made PET desktop computer, built by Commodore, was first in sales in Japan. Now Commodore is being challenged by Japanese brands. The major reasons: price and performance. Ranging from $750 to $1200, the Japanese machines are hundreds of dollars cheaper than comparable U.S. models. Hitachi's Basic Master III, a business machine, and Oki's LF 800, for more general applications, have better graphics, and almost all Japanese models have color displays. In the U.S., Apple, Radio Shack, and Commodore have also introduced units with color graphics that sell for $400 and up.

Radio Shack's TRS-80 color computer was designed mainly for educational and recreational use. The main keyboard can be connected to the company's color monitor or to any color television set. Plug-in color packs allow the user to use the computer for personal finance and to play games like bingo, chess, checkers, football, and pinball. The user can program the computer in Basic and control the color graphics, sound, data manipulation, and storage. The typewriter-like keyboard controls a screen format of 16 lines, 32 characters per line; a graphics array from 32 × 64 to 196 × 256; a 1500-baud cassette interface, and an RS-232-C interface and modem, which allows access to the CompuServe Information Service. This on-line service has been available to other computer owners for some time. Radio Shack has an agreement with CompuServe and offers enrollments in the service at its stores. It is a viewdata-type service that has numerous organizations providing information to a national home information communications network, which can be accessed by the public. Such information providers as The New York Times, Washington Post, Dow Jones, and Associated Press update their data periodically.

A similar service is Source Telecomputing Corp.'s The Source. For a one-time link-up fee of $100 and an hourly rate of about $5, the McLean, Va., company provides access to various data bases. The Source makes available programs of software language so the user can spend his link-up time not only retrieving information, but also writing programs in such languages as Fortran, Cobol, RPG, and Assembly. There are 2000 programs and data bases altogether.

Recently, Reader's Digest of Pleasantville, N.Y., acquired a 51 percent interest in The Source. With the electronic dissemination of information infringing on the print media, more and more publishing houses are finding it prudent to become partners with the electronic media. One of the largest newspaper chains in the country, Knight-Ridder, is engaged in field trials of teletext services with AT&T in Coral Gables, Fla.

Later this year, owners of the Texas Instruments 99/4 home computer will have access to The Source via the Texnet viewdata service, which TI is offering as a software package. It includes text-to-speech capability.

Other initiatives are around the corner. In an experiment in Knoxville, Tenn., the United American Bank plans to let its customers borrow Radio Shack TRS-80 computers and use them at home to subscribe to CompuServe. The bank is tied into the customer's home via telephone and computer, and the customer can use the link to conduct all banking transactions, pay bills, and apply for loans.

The next step? Possibly new types of credit cards with on-board microprocessors. They would function as checkbooks with all transactions recorded on the card. The cards would plug into terminals for access to a central location and, here, personal computers could also be used. The French are attempting to develop such a project. ♦

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Consumer electronics III. Toys and games

How do you upstage an innovative toy like Speak and Spell? Build more of the same. . .

That is what Texas Instruments of Dallas has done with the introduction last year of Speak and Math and Speak and Read. In fact, that was the trend last year for many electronic toys and games—more of the same.

In an industry where leaders expect the next big breakthrough to be in both the synthesis and recognition of speech, it was a disappointing year technically. Except for the TI toys and a talking doll by Fisher-Price, most new products in this area again were based on the TMS1000 4-bit microprocessor. The processor's on-board memory gets reprogrammed for each new toy.

The toy industry is a transient market, subject to seasons and buyer whims. For that reason, TI started last year to sell its speech synthesis chips to OEMs. It is offering the TMS 5100 synthesizer and accompanying TMS6100 ROM, a PMOS 128-kb chip set, which can generate 100 words of synthetic speech, for $13 in volume. The company sees a $3 billion speech market for the worldwide semiconductor industry.

TI is also working on a chip set that uses an algorithm to generate allophones, the parts of sound that make up speech, to form an unlimited vocabulary for a text-to-speech application (see p. 80).

Fisher-Price introduced Baby Soft Sounds, a doll that speaks 16 random words when the circuit perceives movement. The manufacturer enlisted the services of a Canadian company, Siltronix, to design and test the chip, while a Silicon Valley company, Precision Monolithics Inc., fabricated the wafer on a new custom production line. Precision Monolithics, whose wafer lines were originally manufactured to demanding military specifications, intends to service other toy manufacturers who want reliability at low cost.

Fidelity Electronics of Miami introduced an electronic bridge game, Voice Bridge Challenger, which announces bids in bridge terminology. Another game, the Sensory Voice Chess Challenger, which has a 50-word vocabulary stored in its 224-kb ROM, also sets up the board and illuminates the path that the pieces move over. It also can duplicate 64 of the world's greatest chess games by such greats as Spassky, Capablanca, and Fischer.

One of the more sophisticated lines of hand-held games has emerged from Bambino Inc. of Los Angeles. The graphics are among the best in the industry (see illustration).

The games show figures that move as if they were animated cartoons. For instance, in the Super Football game, the players' shoulders and legs move during attempts to gain yardage. The ball carrier follows his lead blockers down the field to outmaneuver the defense. The game has two skill levels, programmed with over 100 million computerized plays. The display shows the yards to go to first down, the field position, score, and the time remaining in a quarter.

Coleco Industries of Hartford has introduced a realistic baseball game called Head to Head. The electronic game has a vacuum fluorescent scoreboard that displays all the statistics, including the batter's average. The manager of each team can let the batters swing for "average" results, for "power," or for bunting. After each player's decision is made, the pitcher throws one of 16 computer-assisted pitches of fast balls, slow balls, curves, or sliders. Two skill levels are included, as well as features such as scoring, ground and fly balls, pitchout, and the hit-and-run play. The game requires two 9-V batteries and retails for $39.95.

Radio-controlled toys were again highly visible last year. Entex Industries Inc. has a radio-controlled motorcycle, the Cafe racer, on the market. It sells at $60. The racer runs like a real bike, banking on turns, righting on straight-aways, and even jumping on command. A single transmitter controls the steering proportionally. The motorcycle is 25 cm long and comes with rechargeable ni-cad batteries—a welcome feature for electronic toys where the life of a toy often depends on how often the user is willing to change the batteries.

Meanwhile, the much-heralded Intellivision home computer from Mattel has finally turned up in large department stores. The computer, based on a 16-bit microprocessor, is interfaced to any television set through an RF modulator, thereby making the TV receiver "intelligent." At present, all the $250 computer does is play a variety of games through 17 cartridges. The keyboard is scheduled to appear sometime this year, and then Intellivision may be considered a personal computer, with the user able to write programs on it.

Mattel has introduced some innovative hand-held games that avoid the beaten track used by most manufacturers. Three that stand out are Brain Baffler, Computer Gin, and the Horse Race Analyzer. Each offers more than the usual blips and gadgets (see "Beating an electronic opponent is a challenge," *Spectrum*, November 1980, pp. 26–30). ◆

More of the same was the name of the game. Last year's entries included a host of sports games from Bambino, whose graphics are among the best of hand-held games. Its Football Classic even features a multicolored display.

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