

When PC Still Means 'Punch Card'

By David L. Margulius

HOLDOUTS

Punch cards became an endangered species when the disk drive took hold in the 1970's. Yet many remain in use, like these from the U.S. Card Corporation.



VERY day more than 23,000 employees of the Los Angeles County Department of Health Services come to work and punch in — literally. Their timecards are good old-fashioned punch cards that are collected, sorted and used to generate the biweekly payroll.

The county's timecard system, in place since the 1960's, survives because to upgrade it would require the rewiring of too many hospitals and local clinics for data transmission and would be too costly. And because it still works.



Douglas W. Jones, an associate professor of computer science at the University of Iowa, with some of his punch cards.

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"We are so used to it — everybody's trained on this system," said Dolores Flores, staff services analyst for the department. She estimated it would require \$5 million or more "to change from the keypunch to something more modern."

As unlikely as it sounds in today's digital era, some punch-card-based information systems are clinging to life. These hardy pieces of paper were so pervasive for so long that they linger on in the form of betting slips, ballots, timecards, image-storage cards and other applications.

Invented in the 1880's by an engineer named Herman Hollerith to automate the United States Census, punch cards were the earliest widely used mechanical system for processing large amounts of data. The cards, punched with holes representing numbers or other data, were fed into a machine that converted the holes into electromechanical impulses for further tallying or processing.

At their height in the 1960's, when computing was synonymous with big mainframe computers from the likes of I.B.M. (news/quote), punch cards were everywhere. In 1967 an estimated 260 billion were consumed in the United States, or 1,300 for every American. As the primary means of writing programs, storing data, running a payroll and issuing checks, they became a symbol of big-company automation and government bureaucracy ("Do not fold, spindle or mutilate"). Social Security, the Internal Revenue Service, railroads, banks and insurance companies all ran on them. They were used to track everything from turnpike tolls and library books to personnel records and business inventory.

Today just three companies in the United States still make and sell punch cards. "I'm one of the last of the Mohicans, I guess," said Bob Oliver of National Card West in Long Beach, Calif. His company sells 100 million punch cards a year, mostly to racetracks in California and sports betting operations in Las Vegas that use them as betting slips.

"All this equipment that's out there has to use something that's the same size as the original punch cards," said Mr. Oliver, who also sells punch-card lunch tickets to the San Diego school district and time cards to a few private companies.

The U.S. Card Corporation in Tiffin, Ohio, produces 30 million punch cards a month, including a few that its president, John Hoyda, said he believed were used for such business applications as inventory control.

"You can tell by the headings and stuff on them — quantity in, quantity out," he said. He speculated that economics played a role in deterring the last few holdouts from switching to digital media.

"The automotive industry still punches a few cards," said Mr. Hoyda, who said he sold through distributors to companies like Ford and Chrysler. (A spokesman for Chrysler, Michael Aberlich, said that the company's use of punch cards was "almost nonexistent" and limited to "some isolated facilities").

The Government Printing Office is a big customer, printing advertising messages on the cards and mailing them with Social Security checks. Because the checks themselves used to be printed on punch cards, Mr. Hoyda explained, the inserting machines are still set up to work with the cards.

Another government application for punch cards, voting machines, drew national attention in late 2000 during the dispute over counting ballots with "dangling" or "pregnant" chads in the presidential election. These Votomatic-style punch-card machines are still widely used, said Douglas W. Jones, an associate professor of computer science at the University of Iowa and chairman of that state's Board

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of Examiners for Voting Machines and Electronic Voting Systems. Mr. Jones said that the cities of Los Angeles and Chicago were especially committed to retaining the punch-card system.

The dangling-chad problem is unique to punch-card ballots, he said, because they are prescored so that they can be punched by a person with a stylus. That makes it possible for a chad to stick to the card if the hole is not punched cleanly. Punch cards for other applications are not prescored and are punched by keypunch machines, which do not leave dangling chads.

Other surviving applications preserve the punch card's shape but add a more modern storage mechanism, like the magnetic stripes used on airline tickets. One derivation, the aperture card, holds a square of 35- millimeter film and is still widely used to archive technical drawings, especially those used by public utilities and aerospace companies like Boeing (news/quote), which has an archive of 40 million cards.

The Bonneville Power Administration, a federal energy marketing agency in Portland, Ore., has a collection of more than 200,000 cards documenting its power plants, substations and transmission lines.

"At different times we've thought we need to get rid of these, this is old technology — yet we still have them," said Mike Johns, a manager. "It's partly security — we still are nervous about some of the record- keeping — and partly the cost to transfer all that information."

In some industries like real estate, aperture cards survive because federal and state regulations mandate a nondigital medium for archival storage. But the punch card's days are clearly numbered. "It's died big time," said Terry DiLorenzo, a saleswoman for Globe Ticket and Label, a ticket manufacturer and distributor in Warminster, Pa.

Ms. DiLorenzo gives the cards another five years of use at most, although she said that current customers range from helicopter manufacturers (cards preprinted with the words "work sequence code") to uniform companies ("linen control route number"). "We ship them all over the place," she said, "but the volume's not there — 10,000 of this, 3,000 of that."

The 1980's were the beginning of the end, said Mr. Hoyda of U.S. Card, explaining, "That's when we really started seeing a decline in volumes." Magnetic computer tapes started eating into sales volume in the late 60's, but it was the rise of the disk drive in the 70's and 80's that dealt the mortal blow.

Large companies still routinely discover forgotten punch-card archives and then scramble to decipher them and convert them to electronic format. A large insurance company is inviting bids on a project to convert 90 million cards with data on old policies, said Bob Swartz, founder of Cardamation in Phoenixville, Pa., which rents out vintage punch-card readers for that purpose. (While many mainframes still in service work with punch cards, the actual reader and sorter machines have become relics and are typically refurbished or rented.)

Mr. Swartz recently rented equipment to the University of Chicago to convert a half-million cards containing 1930's research on ancient Mayan dialects, and to the Lawrence Livermore National Laboratory in California to convert 7,500 punch cards carrying the results of a 1974 nuclear weapons experiment.

"They were thrilled they could find somebody that could read them," Mr. Swartz said.

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Although data in many different formats was encoded on punch cards over the years, much was encoded in the standard Ascii text format and can easily be transferred to modern computer files with the right equipment. Mr. Jones of the University of Iowa has posted software routines on the Internet to help developers decipher common punch-card patterns. A Web site created by Mr. Jones, www.cs.uiowa.edu/~jones/cards, offers an illustrated history of punch cards and pictures of dozens of vintage examples.

Mr. Jones started collecting punch cards in the 1980's when he realized they would eventually disappear. He recently donated a substantial portion of his collection to the Smithsonian Institution and continues to trade "bricks" of the cards with other collectors.

"As far as I know, I'm the only market-maker in antique punch cards," Mr. Jones said. His inventory includes cards preprinted with the logos of Bell Labs, Carnegie Mellon University, the Girl Scouts and dozens of other institutions.

He has also found a compelling personal application for the cards: scrap paper for shopping lists. "It's the common final use," Mr. Jones said. "They're long and thin, fit well in your pocket, and they hold a lot of groceries."