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Juan Rodriguez, Storage Technology Corp. vice president, research and technology, holds prototype of optical (laser) storage disk. The disk will provide computers with a new way to store vast amounts of information.

STC Betting Millions on Laser Disk

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LONGMONT — "It is literally impossible," mused Juan Rodriguez, Storage Technology Corp.'s top-ranking research director, "for humans to understand the level of perfection a computer must have to operate properly."

Nonetheless, he is trying to make sure that the engineers working for him on the optical (laser) storage disk come close. Their success could be worth a billion dollars a year late this decade for Louisville-based STC.

And the company is betting \$40 million in research money on the concept.

At a low-lying, secrecy-shrouded factory at the edge of this Front Range town 38 miles north of Denver, Rodriguez and about 335 employees are developing a revolutionary new way to store incredibly vast amounts of information.

Rodriguez calculates that if you have an average-sized living room, you would have enough space for the optical disks needed to store the information contained in all 12 million volumes of the Library of Congress.

With a certain future-oriented humor, STC has labeled its disk storage system the 2001, the year of novelist Arthur C. Clarke's fictional space odyssey.

But the Longmont research team is taking a journey inward, to tiny dots burned by laser

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onto a 14-inch, aluminum platter that looks much like the platinum record a rock star might frame on his wall.

The dots, which under a microscope look like moon craters, follow laser-etched tracks which, if unraveled, could stretch more than 18 miles. Forty tracks span the width of a human hair.

The billions of dots are the building blocks that make up a byte of computer memory, a combination of eight on and off signals that translate into a letter, a comma, a space.

STC's laser, or optical, disk has what computer engineers call a 4 gigabyte capacity — or about 4 billion bytes.

That's equivalent to 2 million double-spaced, typewritten pages, Rodriguez says.

Louisville-based STC is counting on such optical storage as the next giant step in the computer data business, leapfrogging the magnetic tape and disk technology that STC has turned into a billion-dollar-a-year business with 7,700 employees in Colorado among 15,000 worldwide.

Sales of STC's magnetic disk storage systems have slumped in the past year in the face of recession-caused order cutbacks and intense competition from a state-of-the-art International Business Machines product, which STC is only now matching.

STC, which is Boulder County's largest employer, has laid off 750 Colorado workers in the past six months and is forecasting a "very, very tight" year.

Chairman Jesse I. Aweida has touted the optical disk as one of the company's key products of the future. STC is banking on \$100 million in optical disk sales next year, and up to \$1 billion a year by 1987 or 1988. By then, STC forecasts, the optical disk will account for some 20 percent of its business.

Rodriguez, who with Aweida and two other engineers left IBM in

1968 and started STC above a Boulder steak house, is vice president, research and technology. The optical disk has been his preoccupation for the past four years.

The company unveiled its optical disk machine at its annual meeting last week. The disk, enclosed in a plastic container that is about the size of a medium pizza box, pops into the machine, somewhat smaller than four side-by-side file cabinets, like a cassette into a tape deck.

STC says it already has a contract from an unnamed government agency to test uses of the prototype and plans to begin selling the optical disk system, priced at about \$100,000, late this year.

But industry observers do not necessarily share STC's billion-dollar sales enthusiasm.

They are uncertain there is enough demand, suspect that competition could quickly intensify, and point out that unlike magnetic systems, the holes burned into the disk cannot be erased.

"The day could come when this will be big, but how soon is debatable," said Richard Hastings, a securities analyst for Merrill Lynch, Pierce, Fenner & Smith in New York. "What I really want to see is customers lined up at the door to buy these things."

STC is close-mouthed about potential buyers.

"Optical disk tends to deal with very, very, very high amounts of data," said Melissa Yonge, an analyst for Venture Development Corp. of Wellesley, Mass. "Fortune 500, Fortune 1000 companies are going to be looking for this kind of device."

STC's optical disk is being produced for "high end" data uses, for the biggest and most sophisticated mainframe computer. Laser storage applications now being developed range all the way down to the "optical strip" made by Drexler Technology Corp. that could replace the magnetic tape on the

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back of credit and bank cards.

Applications generally are described as "archival," permanently storing massive amounts of data such as telephone calls, bank checks or insurance records.

Rodriguez speculated that an oil exploration ship taking undersea seismic readings could remain at sea 40 to 50 times longer using optical storage. But he conceded that, of course, no one would want to stay out that long.

While STC's product is the optical equivalent of a magnetic tape, other companies, especially in Japan, are making video-type disks whose function is closer to a videotape system. Their immense storage capacity could be used to replace the microfilm and microfiche now used by libraries, government and businesses to record documents on reduced-size negatives.

Byte magazine reported last month that other companies moving into optical disk technologies include Control Data Corp., RCA, Xerox, 3M, IBM, Eastman Kodak, Philips and from Japan, Matsushita (parent of Panasonic), Fujitsu, Hitachi and Toshiba.

"Everyone has these marvelous products," at least in the research stage, said Yonge. "The main winner will be the person who can get them out in volume."

Byte magazine writer Edward Rothchild credited STC with the industry's "most dramatic breakthrough" in reducing the error in placing bits of information on the disk, which he said is coated with a rare, non-metallic element called tellurium.

"We believe no one in the world

is coming close to us," said Rodriguez.

As a symbol of research progress and entrepreneurial camaraderie, one disk in Rodriguez' office has a plaque, dated Dec. 11, 1981, that proclaims "We Can Do It."

Rodriguez, 42, came to the United States at age 12 when his father brought the family from Cuba to take a job in New York as a United Nations interpreter.

Rodriguez learned English while attending high school in Queens, and received degrees in electrical engineering from City College of New York and New York University.

He was recruited by IBM to work at its Poughkeepsie, N.Y. research headquarters, where he met Aweida. After the founding of STC, Rodriguez has helped steer the development of some of the company's key tape and disk products.

In taking the optical disk from concept to product, Rodriguez said STC researchers have overcome three major hurdles: Making a semiconductor that generates pure, laser light; making a light-sensitive, virtually indestructible material to coat the aluminum platter, and laying down laser bursts along 18,000, perfectly aligned tracks per inch.

It has been an incredible puzzle, to say the least.

"I won't tell you the solution," said Rodriguez, grinning.

But his belief that STC has found it shows in his office.

Propped against his picture window, which looks across farm fields to 14,256-foot Longs Peak, is a second disk. It is dated Dec. 19, 1982, and promises:

"We Are Well On Our Way."