QUANTUM

February, 1980

3 Leave Shugart; May Start Firm

SUNNYVALE, Calif. — Shugart Associates' manager of product management, James M. McCoy, and two other Shugart product managers have left, reportedly to start a company of their own.

Mr. McCoy, who joined Shugart about 2 years ago from Verbatim Corp., had product line marketing responsibilities for all Shugart floppy and fixed disk drives. He reported to Shugart marketing vice-president W. Ferrell Sanders.

Also leaving Shugart within the past week were Joel Harrison, project manager on the company's 8-inch Winchester SA/1000, and Dave Brown, former engineering director on Shugart's mini-floppy line. Mr. Harrison had joined Shugart from Hewlett-Packard Co., and Mr. Brown from Memorex.

Shugart officials last week said none of the three have yet been replaced.

Mr. McCoy became manager of product management last year when then director of product management, George H. Sollman, left to join Xerox, the parent firm.

Mr. McCoy was not available for comment last week. Sources, however, said the three are expected to join in a new operation.

Electronic News
2/18/80

Computer Systems News
2/18/80

Three officials of **Shugart Associates** left the firm last week to start a new disk drive company. No details yet on the technology or media size, but industry sources say the three clearly have the skills to make either a 5-inch Winchester or floppy disk drive. They are: James McCoy, previously manager of product management; David Brown, former director of floppy disk engineering, and developer of the SA400 minifloppy, and Joel N. Harrison, previously engineering manager and project engineer for the SA1000.

Shugart Spin-out to Enter 8-Inch Mkt.

ELECTRONIC NEWS, MONDAY, MARCH 3, 1980

By JEFF MOAD

SAN JOSE, Calif. — Quantum Corp., a spin-out from Shugart Associates, which includes former Shugart manager of product management James M. McCoy, has been formed to enter the low-cost 8-inch fixed disk drive business against Shugart and Memorex, it has been learned.

President of the start-up company, which has temporary headquarters here, is James L. Patterson, former vice-president of engineering at System Industries Corp. Others at Quantum include former Shugart director of floppy disk engineering David A. Brown, former Shugart 8-inch engineering manager Joel Harrison, and former Shugart director of manufacturing engineering Harold C. Medley.

The company first surfaced last month when it was learned that Mr. McCoy and several others had left Shugart and were understood to be forming a company of their own (EN, Feb. 18). At that time, however, it was not known what type of business was planned.

Mr. McCoy will head Quantum's marketing effort, while Mr. Medley will oversee manufacturing. Mr. Brown will be responsible for engineering, and Messrs. Harrison and Daniels will report to Mr. Brown.

Mr. McCoy said first delivery of the Quantum 8-inch product will be in the second half of 1980. He said volume production of the product will begin by the start of 1981

Interested in Financing

Mr. McCoy said Quantum officials are financing the company but that financing arrangements with venture capital companies and others are expected to be set soon. Mr. McCoy indicated that several small computer manufacturers and other potential OEM customers of the low-cost 8-inch product have expressed interest in finnacing Quantum.

Mr. McCoy recently left Shugart shortly after Messrs Harrison and Brown left the company. Speculation at that time touched on the possibility that Quantum would come up with a 5¼-inch fixed drive. Another Shugart spin-out, Shugart Technology, already has announced a 5½-inch product, and Shugart and Memorex are believed to be studying the 5¼-inch market.

Mr. McCoy last week said that, while the 8-inch fixed disk drive will be Quantum's only product initially, it also plans to consider smaller fixed disk drives.

Mr. McCoy said that while over 20 different companies have indicated they will come up with an 8-inch fixed disk drive product, most of the competition seems to have a higher cost, higher capacity, closed loop technology product in mind. Quantum, said Mr. McCoy, will compete with Shugart and Memorex in the low-cost 5- and 10-megabyte 8-inch market where high volume production will be at a premium.

6 Months Behind

Both Shugart and Memorex are believed to be pushing for eventual volume production rates of 500 8-inch drives daily. Memorex, however, is believed to be at least 6 months behind in its 8-inch program. Shugart recently disclosed delivery of its 8-inch disk drive to Wang Labs, which is expected to be a major customer.

Mr. McCoy claimed that Quantum's engineering, marketing and manufacturing officials "have been in on the introduction of every new Shugart product, including the SA4000 and SA1000." Mr. McCoy predicted that "all of the ingredients are here in the 8-inch market that were there when floppies were undergoing their greatest growth." He said the 8-inch market will grow into a one-half million to one million-unit per year market within 5 years.

"We don't intend to bring any of the competition to their knees, but if it goes like many marketing experts predict, the 8-inch market will be spectacular," he said.

Mr. McCoy agreed, however, that the low-end 8-inch market will be highly price-competitive from the outset. Prices will be tied very tightly to costs. There will be no free rides or attractive umbrellas," Mr. McCoy said.

Ex-System Industries, Shugart Execs Establish 8-Inch Winchester Company

By Paul E. Schindler Jr.

SAN JOSE, CALIF. — A former System Industries, Inc., vice-president and five ex-Shugart Associates executives have started an 8-inch Winchester disk drive firm aimed at competing in the "super-low-cost" market segment.

James Patterson, former System Industries engineering vice-president and now president of the new firm, called Quantum Corp., sees the Winchester market "dividing into two segments: low cost and super-low cost. Only Shugart and Memorex are in the super-low-cost segment."

"It may look like a crowded marketplace," said James McCoy, who recently left his Shugart post as manager of product management (CSN, Data Flow, Feb. 18) to become Quantum's head of marketing. "There are at least 28 other firms in it. But we don't aim to be number 29; we are going to be number three in the lowest-cost segment."

Joining Patterson and McCoy are the other former Shugart executives: David Brown, previously floppy disk engineering director, who will be in charge of engineering, and Harold C. Medley, who had been director of manufacturing, engineerng and development and will now handle manufacturing.

Additionally, Joel N. Harrison, former engineering manager and project engineer for Shugart's SA1000 line, and Donald V. Daniels, previously Shugart's engineering manager for large fixed-disk drives, will serve on Quantum's engineering team.

First deliveries, according to Patterson, are expected in the second half of this year, with volume production by 1981.

The firm temporarily is based in headquarters here but plans to establish permanent quarters in the Santa Clara Valley, Patterson noted.

McCoy: Aiming For No. 3

Quantum's founders are all experts in production of "small, low-cost electromagnetic peripherals," according to Patterson, who said the firm eventually will produce a family of drives, perhaps including a less-than-8-inch Winchester.

There will be no new, innovative technology in Quantum's products, according to McCoy, who said, "The key to Shugart's success was to pull together mature technologies for a high-volume, low-cost operation."

Existing technologies can still be combined in ways that will "improve cost-performance," he predicted, but he declined to give details.

According to McCoy, Quantum's founders—most of whom have worked at IBM and Memorex—are "in their third-generation of low-cost, fixed-disk products."

Financing for the new firm is not completed, according to Patterson, who said negotiations are underway with venture capital firms and "innovative sources" of alternative financing. "We don't think money will be a problem," he said.

Product specifications are not completed, McCoy said, but the first drive will be in the low-capacity range. The interface has not been set, he added, but "if ANSI wins, much of the industry will go with it." He said the timing of Quantum's market entry will "allow us to position ourselves on a winning course" with regard to interfaces.

Quantum will not have a prototype at May's NCC, according to McCoy, but the firm will have "a presence" at the show.

Patterson said the search for an appropriate product began last September. "We examined many possibilities," he said.

He said he didn't want to detail the rejected options because "we concluded that none of them was a dead end."

Selecting the 8-inch drive market was a "difficult decision," according to Patterson, in view of the wide range of opportunities in peripherals. "All of them are boom markets, but all of them have big guns trained on them," he said.

McCoy and Patterson said they did not expect any confusion between their firm and the similarly named Quantum Science Corp., a marketing research firm, which performs no manufacturing.

Reminded of the high infant mortality of firms in the peripherals business, McCoy recalled the situation in floppy disks in 1974. "The projections of who would win then and who actually did turned out to be quite different," he said.

"Our market will range from very healthy to spectacular," he predicted.

Tuesday
June 10, 1980

"Red Letter Day"

QUANTUM

DAVID A. BROWN
Vice President, Engineering

QUANTUM CORPORATION
2150 Bering Drive
San Jose, California 95131
Telephone (408) 262-1100


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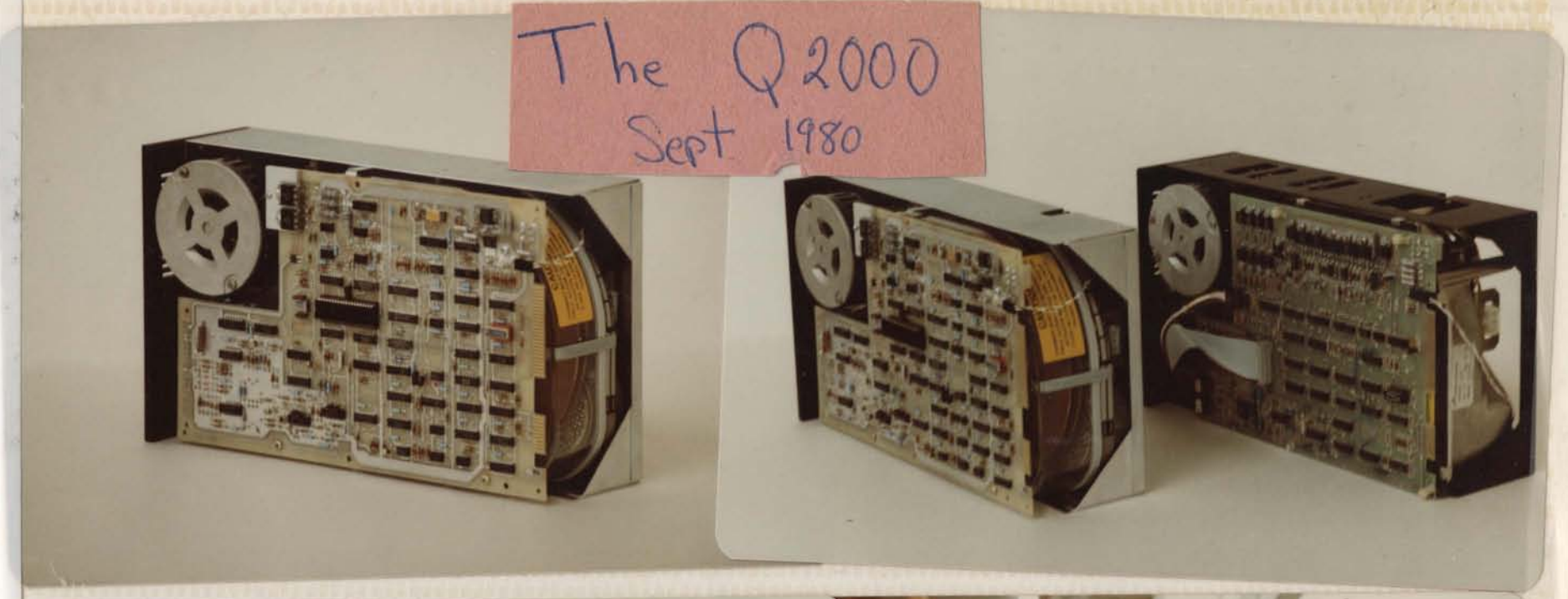
Sept 1980



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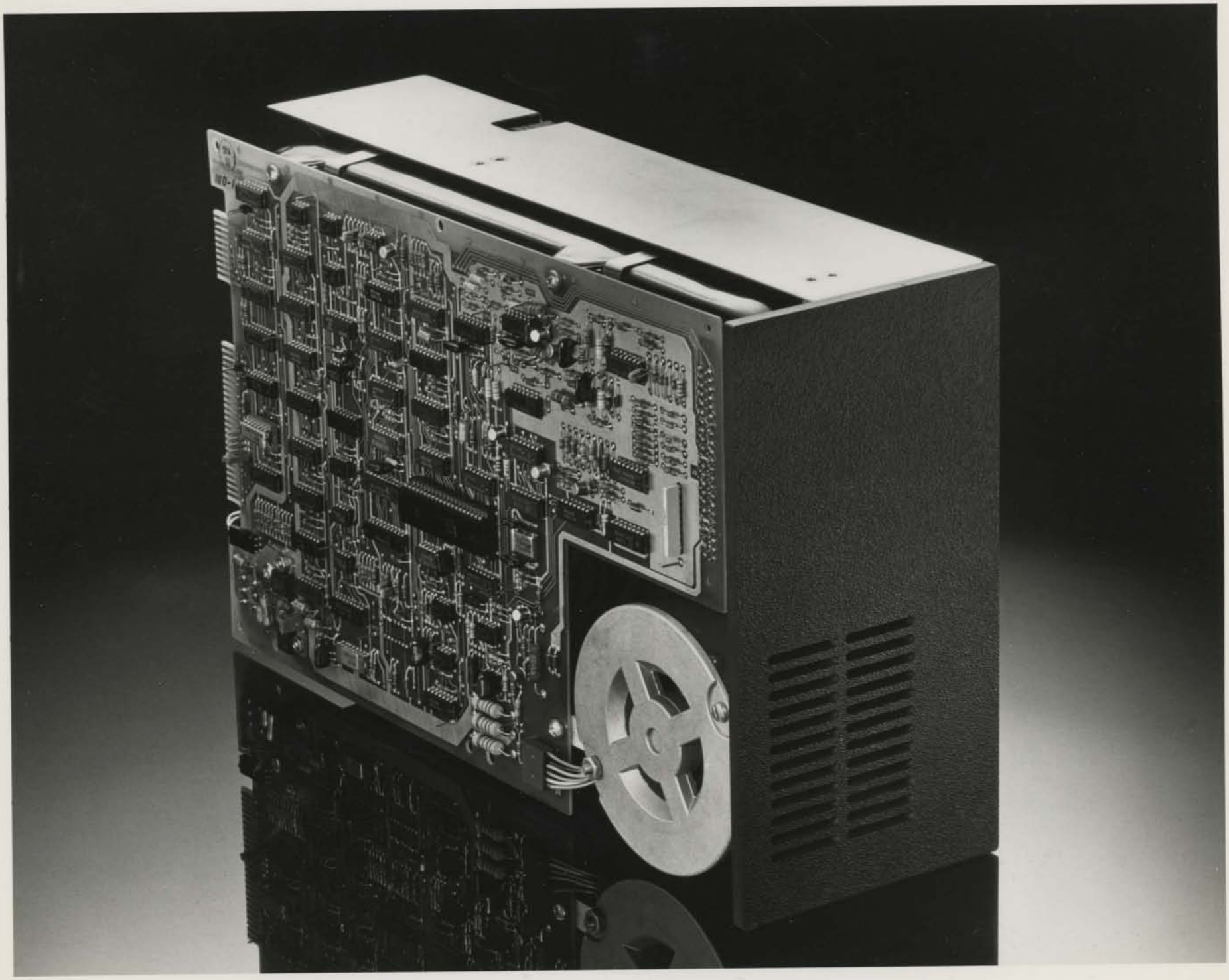

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Dec 1980
"The Founding Group"

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"Engineering for low-cost, high-volume production is even more challenging than engineering for higher capacity and better performance. We did both with the Q2000."

—David A. Brown, VP-Engineering, Quantum Corporation

Low-cost 8-inch Winchester drives designed to be built in volume.

All too often in the disk drive industry, the procedure has been for Engineering to design the drive, then turn it over to Manufacturing and wish them luck. That's why a lot of designs that looked great on paper fell short when they got into production. And why you had to wait for volume deliveries.

And that's why Quantum made low-cost, high-volume production a priority, right from the beginning.

Our engineering group was committed not only to designing for higher capacity and better performance than the industry-standard Shugart SA1000, but to designing for low-cost, high-volume production as well.

Four times the capacity of the Shugart SA1000.

The new Q2000 series gives you a choice of 10, 20, 30 or 40 megabytes of data storage, as compared with the 5 and 10 megabytes of the SA1000. Access time is up to 28% faster. And the Q2000 series is compatible with the SA1000 and with standard 8-inch floppy disk drives.

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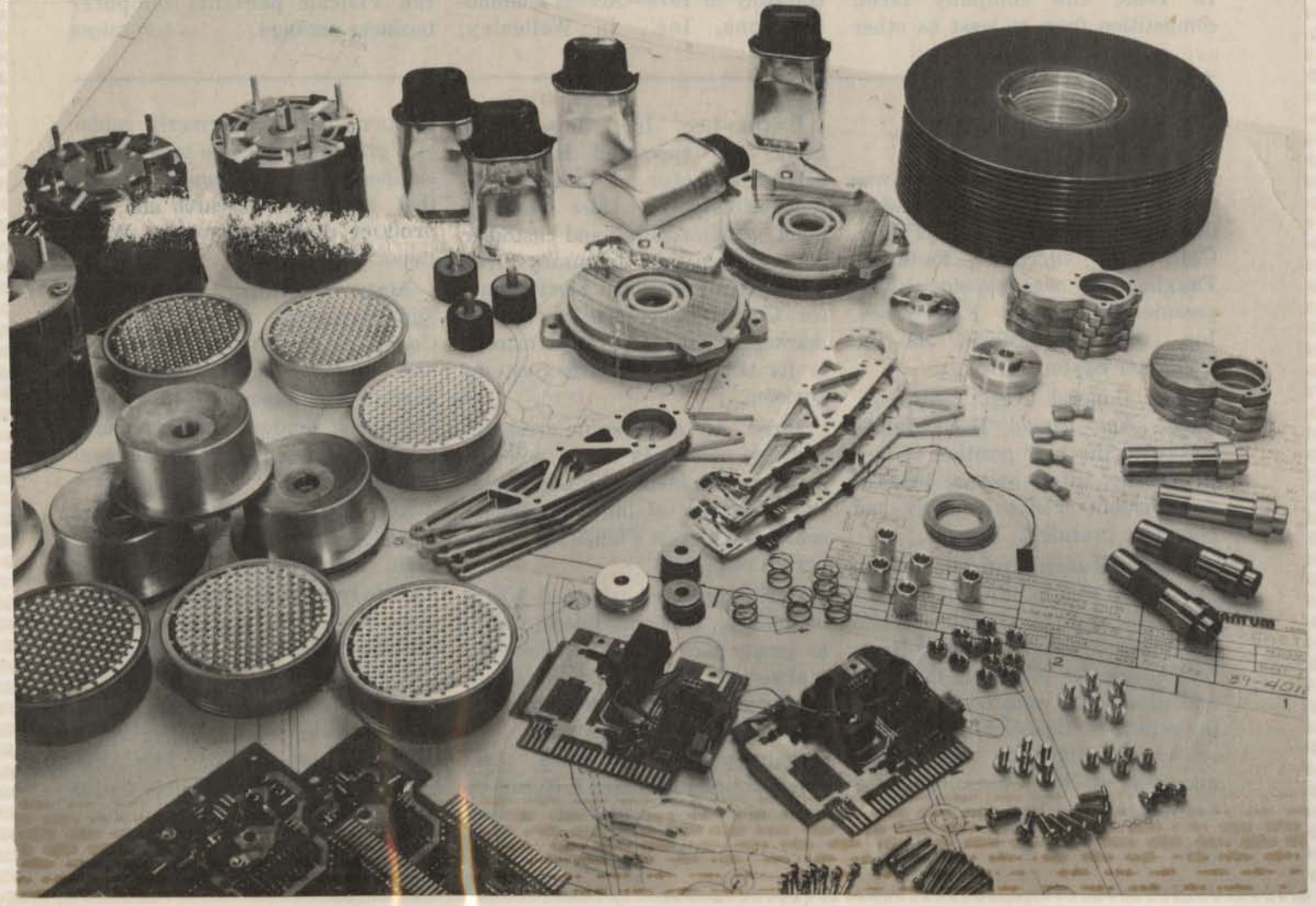

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1804 McCarthy Blvd.

Milpitas, CA 95035

Our phone number remains
(408) 262-1100
Our new TWX number is 910-338-2203

QUANTUM ***Driving down the cost of quality.***

Friday, June 26, 1981 ■ San Jose Mercury

Financial Digest

Quantum moves to Milpitas

Quantum Corp., a one-year-old electronics firm, has moved its headquarters from San Jose to Milpitas.

Quantum also said it secured $7 million in its second round of financing in the last year.

President James Patterson said Quantum moved partly to capitalize on the availability of nearby housing opportunities for employees in Milpitas.

The move to a 46,000-square-foot headquarters and manufacturing facilities also permits Quantum to consolidate its operations.

Prior to the move, Quantum leased three buildings in San Jose.

The firm, which makes instruments to retrieve and store computer data on discs, said it plans to exercise "almost immediately" its two-year option to buy an adjacent four-acre parcel in Milpitas.

Quantum, which employs 85 people, said it expects to hire 115 additional personnel by March.

Quantum's sales figures are not yet available because the firm began selling its product just last January.

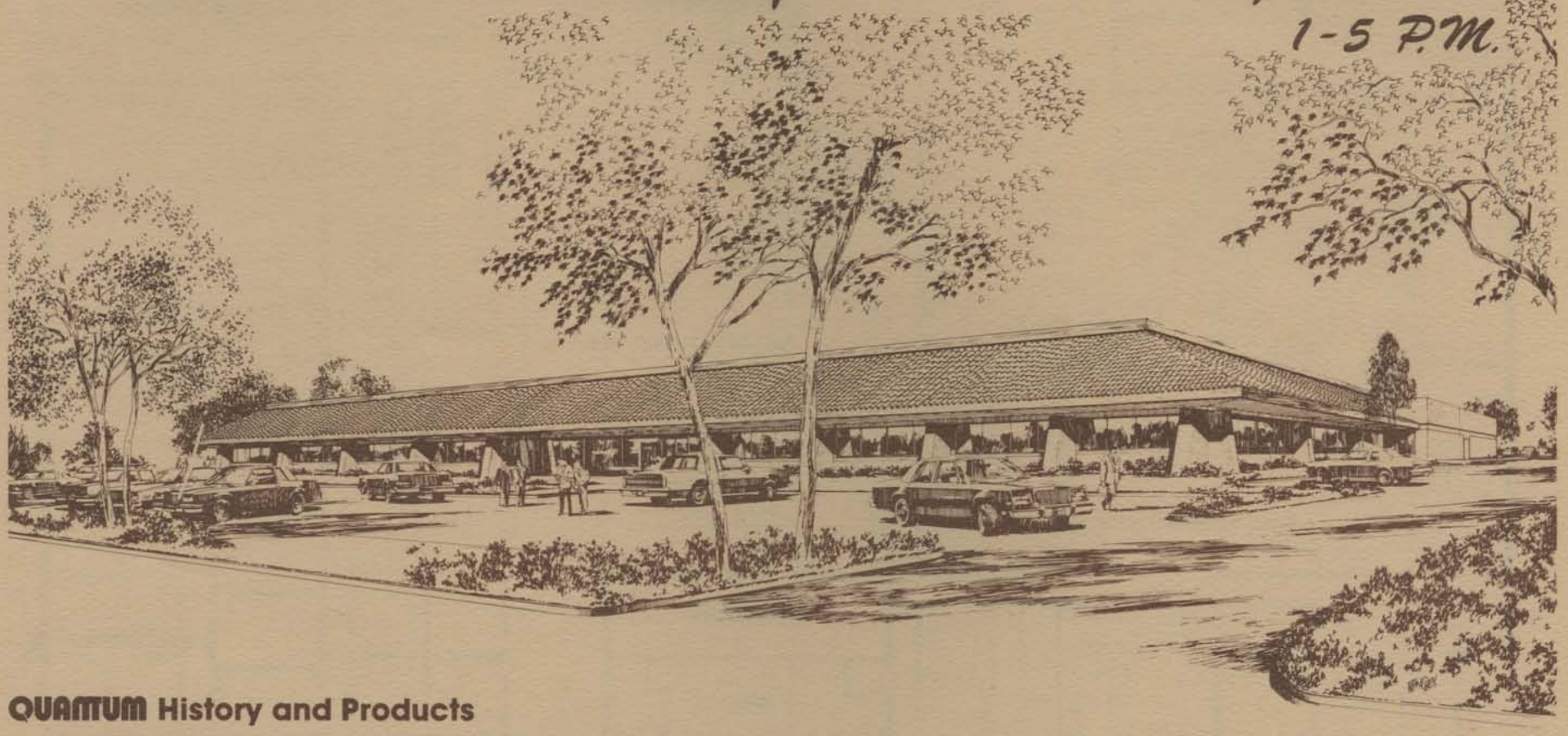
Of the $7 million Quantum raised, $2.5 million came from venture capitalists.

Quantum also secured a $4 million line of credit from Bank of America and a $500,000 five-year loan for the purchase of equipment from the bank.

Quantum raised more than $3 million last year from the venture capitalists.

Welcome to QUANTUM's Open House

August 29, 1981
1-5 P.M.



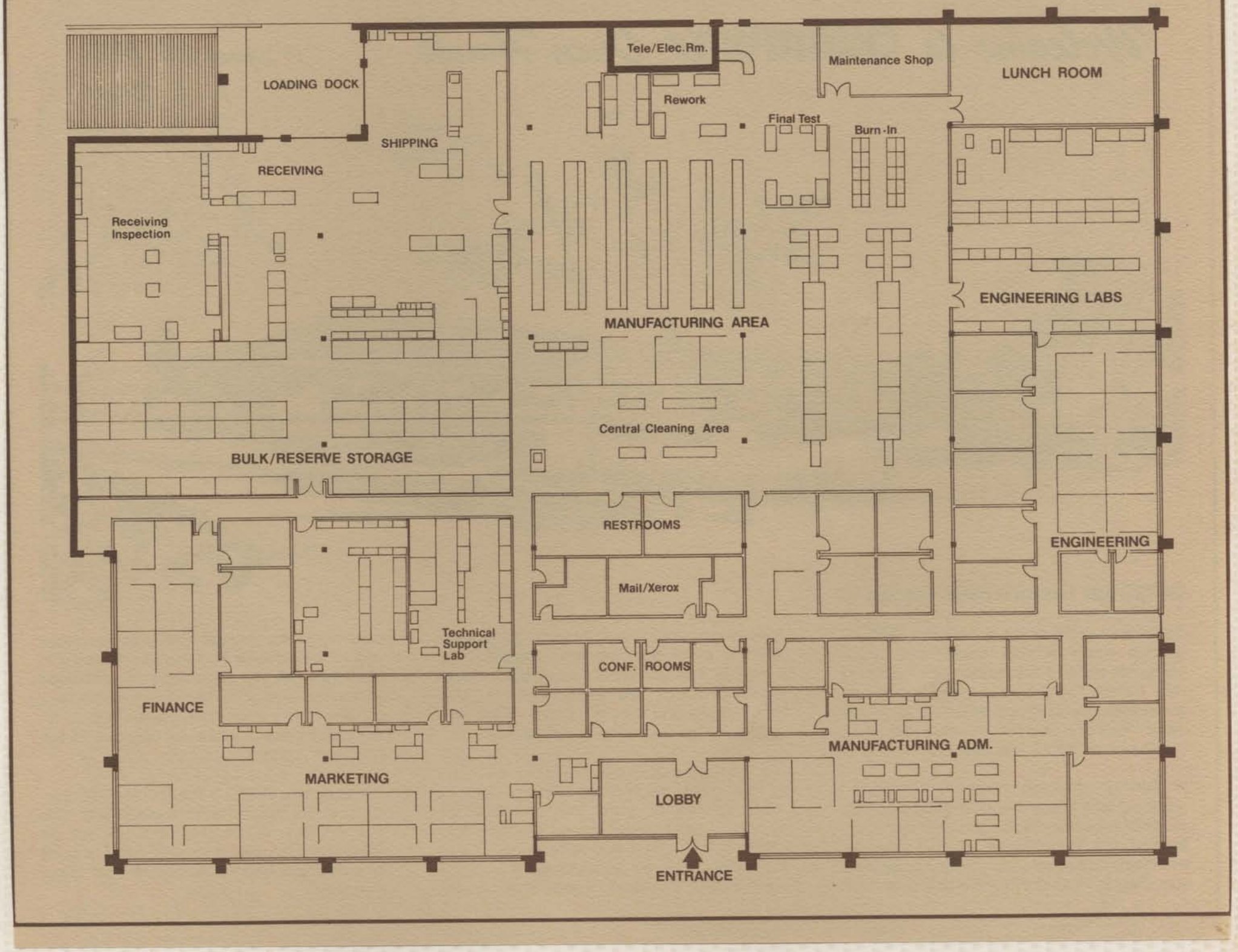
QUANTUM History and Products

Quantum was founded in February 1980 to address major market opportunity. Micro computer systems application were growing very rapidly. There was a need for a new generation, low cost disk drive storage in the micro computer market. To meet this need, the Quantum 2000 was defined.

In June of 1980 the company completed financing with five of the most respected and successful venture capital groups in the country. With the financing, the product development was accelerated on a very aggressive schedule. In August 1980 the first prototype drive began engineering tests. In September, the first evaluation unit was shipped to a customer. The company's focus then shifted from product development to the marketplace and the introduction of the product into high volume manufacturing.

The Quantum 2000 brings a new generation of disk drive technology (Winchester) to manufacturers of small, low cost business systems, word processors, and intelligent terminals. In the past, these systems have used floppy disk drives for data storage. The Quantum 2000 provides significantly larger capacity data storage, higher performance and increased reliability when compared with the floppy disk. The advantages are achieved with a high level of compatibility with the floppy drive. The compatibility makes it easy for the system manufacturer to upgrade to the Quantum product.

The Quantum 2000 is the first of many products which will come from our efforts. Like the Q2000, our future products will be developed to meet a market need and will provide a real and measurable benefit to our customers.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Receiving Inspection
BULK/RESERVE STORAGE
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Maintenance Shop
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Final Test
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Technical Support Lab
FINANCE
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MANUFACTURING ADM.
MARKETING
LOBBY
ENTRANCE

Quantum's
2nd Annual
Company Picnic
9/81
Lake Elizabeth

Disk drive companies multiply

Market is growing at a frenzied pace

By Evelyn Richards
Business Writer

The life of one man — Alan Shugart — tells the story of the disk drive industry.

As a young IBM engineer in the 1950s, Shugart helped build the first drive. Thirteen years later, he put Memorex Corp. into the business. And twice since then, he's founded companies that quickly set records in one of Silicon Valley's fastest-growing industries.

Shugart modestly attributes his track record to luck.

But others know he's combined engineering talent, entrepreneurial magic and a keen knowledge of the disk drive industry.

Probably better than anyone else, Shugart understands what makes the industry thrive: the world craves information.

As more engineers and managers catch on to that principle, they are leaving established disk drive companies to strike out on their own. Nearly 20 companies have entered the market in the past year, at least a half dozen of them in the Bay Area.

George Brennan, who after 22 years in the business recently started his own disk drive company, explained the boom this way: "The appetite for storage is like your house. When you move in, you think, 'How will I ever fill it up?' But you do, don't you?"

Of course, many Americans cope with a cramped house by buying a more spacious dwelling. Similarly, data processing departments, faced with more payroll records or more insurance claims than they ever imagined, buy yet another series of those huge reservoirs for data called disk drives.

There's one distinction, though. Their new drives probably will be smaller than their old, because as technology progresses, it's possible to store more and more information in tinier and tinier spots.

Disk drives look simple enough. They're boxes. Inside are the disks — flat platters that resemble phonograph records.

They are storehouses of information. The largest disk — 14 inches in diameter — can hold enough data to fill several encyclopedia volumes.

The drive itself is a complex assembly of devices that enables information to be encoded magnetically onto the disks — and then retrieved.

Drives make life easier. Before IBM introduced its first model in 1956, data had to be punched onto cards and then fed into computers. Now it's stored inside disk drives.

Last year, the total worldwide disk drive market was $6.3 billion. It's expected to reach $8.7 billion this year, a 38 percent gain, according to Jim Porter, an industry veteran who closely tracks disk drive markets. Porter measures the prices of drives sold to users and the discounted prices when

Cover Story

Disk drive companies

Continued from Page 1D

drives are sold to computer makers, who resell them with complete computer systems.

The frenzied pace cannot continue without some rough times, however. "I could foresee that we will have a shakeout (by) acquisition activity," said James Moore, manager of computer memory industry services at Dataquest Inc. "But right now the market is growing too fast to say we will have collapsing of companies." One young Silicon Valley company, Ontrax Corp., did fold last year. There may not be bankruptcies, but there are other problems plaguing the drive industry, a fourth of which is located in California.

Employees come and go, sometimes giving rise to trade secret lawsuits. Companies strain to make huge research commitments in order to keep up with technological advances and competitors. The proliferation of new products makes it difficult to settle on industry standards. Japanese companies are moving into the U.S. market. And production foul-ups can easily occur in the delicate assembly process.

Even IBM has stumbled. Last spring it found deficiencies in its flagship line of disk drives, and deliveries have been delayed as much as 14 months.

But the problems don't stop newcomers. Within the past year, 17 companies have plunged into the drive market, bringing the number of manufacturers to about 85, according to Porter.

Most fledglings make drives for "small disks," either 8 inches or 5¼ inches in diameter. Some small-disk markets are growing 100 percent a year.

Among the entrepreneurs, many honed their skills at the great-grandparent of the industry, IBM, or at the grandparent, Memorex of Santa Clara.

The newest generation of companies, however, date themselves to Sunnyvale-based Shugart Associates.

Fittingly, Alan Shugart himself has bridged all generation gaps. The director of engineering in the IBM systems development division, Shugart in 1969 left the San Jose IBM plant to head Memorex's entry into the disk drive business.

"I discovered there was a lot of opportunity on the outside," 51-year-old Shugart said during an interview in his Scotts Valley office. "IBM is paternalistic. They keep their employees pretty well caged-in, both intellectually and emotionally."

IBM didn't treat his departure lightly. Taking with him the cream of IBM's development group, Shugart became the centerpiece of litigation between the two companies. In the course of the case, IBM alleged some 600 engineers had left IBM to join Memorex worldwide, according to Gordon Smith, Memorex vice president of communications.

But Memorex was to be only a stepping stone for Shugart. Three years later, taking eight associates along, he founded Shugart Associates in Sunnyvale. The company, now a Xerox Corp. subsidiary, was the first to market flexible disk drives and still holds the lion's share of that market.

Shugart and friends "decided the IBM format would be the industry standard, which was a smart move. They brought out their drives quickly and delivered reliable hardware," Porter said.

"It was a shoo-in," said Shugart.

are starting up at a frenzied pace

But Shugart lasted only about 18 months at his own company before being caught in a stand-off with venture capitalists. Shugart bade good-bye.

In 1979, he once again, in Porter's words, "performed his entrepreneurial magic." His new company, Seagate Technology, has pioneered a small rigid disk drive system that can be used instead of flexible disks with desk-top computers.

In an interview at Seagate headquarters, nestled below tree-covered foothills, Shugart paused to consider how he has managed — four times — to be at the forefront of disk drive technology. "You've got to pick out what the market is going to be," he said, reaching for a Salem. "Seven years from now there will be another one. Someone will latch onto it. I hope I find it first."

Since the small disk drive business is the hottest now, it's "not abnormal or unexpected" that talented engineers and managers are parting ways with Shugart Associates, which with sales of about $230 million is perceived as the lethargic giant in a young industry, Porter said.

In the past 18 months, Shugart employees have left to join at least five new Silicon Valley startups in the disk drive business. In each case the former Shugart employees were either founders or key employees.

These startups include:

✓ Seagate Technology. Shugart started Seagate in 1979 after Finis Conner came up with the idea for a 5¼-inch hard disk drive. Conner had been a Shugart Associates founder and was sued by Xerox Corp. when he left the company to join International Memories Inc. of Cupertino.

Captivated by the idea, Shugart went to Norman Dion for money. Dion is the president of Dysan Corp. of Santa Clara, a leading disk manufacturer.

Dion gave him $500,000. "We did the whole deal on a handshake. We didn't even sign anything until the money was spent," Shugart said, smiling.

Dysan now owns a fourth of Seagate, which in just two years has reached an annualized sales rate of $29 million. Its largest customer is Apple Computer Inc.

Seagate holds about 77 percent of the 5¼-inch rigid disk drive market, which this year will amount to about 57,000 units and may grow to 618,000 units by 1985, according to Moore. But competitors are moving in fast; nearly 20 companies have announced 5¼-inch rigid drives. Those shipping now include Tandon Corp. of Southern California, IMI of Cupertino and Rotating Memory Systems of Milpitas.

✓ Quantum Corp. Milpitas-based Quantum is concentrating on one aspect of the business — 8-inch rigid disk drives.

"Shugart has 60 percent of the market, but it is growing so fast, that really 99 percent of the market is still there to be taken," said Quantum president Jim Patterson.

Specifically, Quantum makes Winchester disk drives, the name for a technology invented by IBM in San Jose in the early 1970s.

The term had an inauspicious beginning. "We had a device that held 30 megabytes. If we put two together, someone said that's a Winchester," referring to the rifle, said G. R. Aguilar, IBM's director of marketing and service programs in San Jose.

Winchesters are sealed systems from which the disks cannot be removed. Quantum already has signed several large contracts with computer manufacturers and is shipping at a $15 million-a-year rate, Patterson said. He expects the company to be profitable for the year ended next March, the first full year of production.

Founded in February 1980 with $3 million venture capital, Quantum later got funding from Technology Venture Investors, a Menlo Park fund headed by former Shugart Associates president James Bochnowski.

As it tries to move into Shugart's territory, "Quantum is the company to watch," Porter said.

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April
1982

DATA FLOW .....

June 1982

(Continued from Page 6)

One of the OEM industry's two leading suppliers of 8-inch Winchester disk drives, **Quantum Corp.**, finally has decided to take the plunge into the 5-1/4-inch Winchester disk drive marketplace, according to informed sources. Late this year the company is expected to formally announce its entry into the market, with production probably beginning early next year. Ever since Quantum was formed in 1980, rumors have been rampant about the company expanding its product line to include 5-1/4-inch drives, but Quantum has steadfastly remained on its original course to concentrate on becoming a leading supplier of 8-inch Winchesters, a goal it clearly has attained. But, apparently driven by requests by some of its larger OEM customers to expand its product line, Quantum has made an internal commitment to the 5-1/4-inch market, and development efforts have begun. There has been no definite word as to what capacities the new drives will be offered in, although knowledgeable sources indicate that Quantum will follow its game plan of supplying low-cost drives in the 20-to-40-Mbyte range. Also in the late-1982 time frame, watch for the long-expected unveiling of Quantum's 85-Mbyte 8-inch Winchester, a product that will propel the company into the thick of the battle in that market's high end.

June, 1982
The "3rd" Company
Picnic

Quantum taking lead in 8-in. OEM Winchester shipments

Despite the increasing availability of higher capacity (12M- to 25M-byte), 5¼-in. Winchesters and plans by many vendors to offer even higher performance, higher capacity hardware, the demand for low-cost 10M- to 40M-byte, 8-in. Winchesters will continue to accelerate at a strong pace, fueled by the growing demand for μp-based small-business systems and word processors, says an executive at one of the few disk-drive companies founded for the express purpose of building this size drive.

"Systems in these categories are growing at a rate of 40 to 50 percent per year," says Steve Berkley, marketing vice president at Quantum Corp., Milpitas, Calif., "and most of them originally used 8-in. floppy-disk drives for system and file storage." As a result, he says, there continues to be a growing, built-in market for 8-in. fixed-disk hardware. "We're replacing one of the floppies in these systems with a higher capacity Winchester," he explains, "and right now, we're replacing them at a rate of 150 drives per day, six days a week."

That adds up to a lot of hardware, Berkley goes on, noting that Quantum, founded only two years ago by a number of executives from Sunnyvale, Calif., disk-drive rival Shugart Associates and from Sunnyvale-based subsystem builder Systems Industries, Inc. (MMS, May, 1980, p. 47), did $13.8 million in business at the close of its fiscal year last March. Next year, he says, Quantum is looking at $50 million in revenues from the sale of 8-in. Winchesters, and expects to double that figure by the end of fiscal year 1984.

Most of next year's increased revenues will come from the company's existing Q2000 series 10M- to 40M-byte Winchesters, Berkley says, with newer products expected to contribute to 1984's earnings. "Right now, 65 percent of our revenues come from our Q2040 40M-byte drives," he explains, with 30 percent coming from sales of the company's 20M-byte Q2020.

Sales of Quantum's 30M-byte Q2030 drive account for only 2 percent of sales, while its 10M-byte Q2010 accounts for only 3 percent, a figure that reflects the dominant market share held by Shugart's 10M-byte SA1004 8-in. Winchester. "Between the two companies, we're shipping close to 90 percent of all low-cost 8-in. Winchesters," Berkley says. Quantum's Q2040 is priced at $2450 in 100-lot orders; Shugart's 10M-byte SA1004 and Quantum's Q2010 are both priced at $1400.

In terms of numbers, Berkley goes on, Shugart's lower capacity drive is shipping in larger volume in markets where both companies compete. In terms of overall revenues from the sale of 8-in. Winchesters, however, he says, Quantum is posting larger numbers. Moreover, he does not anticipate that Quantum's position of revenue leadership will change. "It's a question of volumes," Berkley explains. "The servo systems and voice-coil actuators proposed by many vendors of higher capacity, higher performance 8-in. drives will remain a production constraint." What it all comes down to, he says, is that no one knows how to build drives using these actuators in large numbers and at low cost.

Shugart's 5M- and 10M-byte SA1000 Winchesters are open-loop drives that use split-band actuators driven by stepper motors—a lower cost, lower performance design derived from the company's floppy-disk drives.

In an effort to get higher performance and higher capacity from an actuator system that could be produced in high volumes, Quantum developed a "hybrid" actuator design. Instead of using stepper motors and split-band actuators to move the read/write heads, the company connected a torque motor directly to a pivot arm onto which the read/write heads are mounted. And, instead of using the incremental steps of a stepper motor to determine head locations, coarse positioning on the Quantum drives is handled by an optical encoder that comprises a scribed glass scale, an LED and a receiver. Fine positioning needed to keep the heads on track is derived from track-location data encoded onto a dedicated sector on the data surfaces of each disk.

While more producible, this type of actuator offers lower performance than the closed-loop servo/voice-coil combination used by other vendors of high-capacity 8-in. hardware. It does, however, give Quantum's products a performance edge compared to stepper motor-driven drives. Average positioning time on the 10M-byte Q2010, for example, is pegged at 60 msec. compared to 70 msec. for Shugart's SA1000. Use of both coarse- and fine-positioning techniques also gives Quantum hardware an edge on capacities. Shugart's SA1000 provides 256 tracks per data surface at 172 tracks per in.; Quantum's hardware handles 512 tracks at 345 tpi.

Vendors of voice-coil drives also stress higher performance. International Business Machines Corp.'s 3310 Piccolo drive, the only other high-capacity (64M-byte), 8-in. fixed-disk drive to be installed in large volumes, operates at an average access time of 27 msec. This drive provides 359 tracks per surface at a track density of 450 tpi.

8-in. Winchesters roll off the Quantum assembly line. *Assembly begins at the head of a "clean tunnel" (background) Quantum uses in place of the clean rooms used by Winchester vendors. In a clean-tunnel environment, purified air blows down over the line while assembly personnel work through plastic curtains. Completed drives in the foreground await shipping and testing. Quantum is shipping 8-in. hardware at the rate of 150 drives a day.*

Berkley does not see the Piccolo as a direct competitor of Quantum's hardware, however. "There are two reasons," Berkley says. "First, it would be rare for an OEM to be evaluating our drive and a higher performance device such as the Piccolo with the idea of selecting one or the other."

Second, Berkley goes on, IBM and Quantum are pursuing different markets. IBM, he says, is selling 8-in. hardware to system designers that are not constrained by the physical dimensions of the cutouts and depths originally specified for the floppy-disk drives in small-business systems and word processors targeted by Quantum.

Just how much 8-in. hardware with capacities of more than 30M bytes will be shipped over the next few years depends on whom you ask.

Jim Porter, Mountain View, Calif., industry analyst and publisher of *Disk/Trend Report*, remains conservative when estimating the amount of 30M- to 200M-byte, 8-in. hardware to be shipped, regardless of performance level. Porter estimated that 16,000 8-in. drives in the 30M- to 200M-byte range would be shipped by U.S. vendors this year, with that figure climbing to 39,000 next year, and to 85,000 in 1984. He concedes, however, that he may revise his figures upward, based to a certain extent on the amount of hardware that Quantum is shipping.

Newark, Calif., industry analyst Andrew Roman anticipates higher levels of demand, especially for IBM and Quantum hardware. "These two companies control 90 percent of the market for OEM 8-in. drives in the 25M- to 100M-byte range," he says, with Quantum alone accounting for 85 percent of this hardware. Roman predicts that a total of 50,000 OEM Winchesters in this capacity range will be shipped in 1982, bringing Quantum's share of the pie to more than 38,000 drives.

Quantum's own figures are slightly lower. At a ship rate of 150 drives a day, six days a week, Quantum plans to move 46,800 drives, more than 30,000 of which will be 40M-byte devices.

"The real test for OEM Winchester vendors is how quickly production can be ramped up," Berkley says, noting that the company plans to quadruple its manufacturing space and to ship at the rate of 600 units a day by late summer of this year. "The real winners will be those that are geared up to meet high-volume demands."

—*John Trifari*

New Issues

Waiting for the 'Window'

Investment bankers are choosing some prime candidates from the horde of quality companies ready to go public

By Jon Levine

Although the overall market for initial public offerings has simmered down considerably in the last 12 months, few venture capital-backed high-tech startups have abandoned the idea of raising their next round of financing by going public. Indeed, many entrepreneurs are using this lull in the market to build a stretch of impressive earnings so that when the market turns up again, they'll be well positioned to go with their offerings.

There are at least nine companies (see table) that readily admit they intend to go public. "Certainly there's been a huge increase in the number of companies started in the last couple of years with potential of publicly held status," says James Bochnowski. His venture capital portfolio of 20 companies in Technology Venture Investors in Menlo Park, Calif., formed only two years ago, already includes "at least five candidates for public offering in the next 18 months."

Other venture funds are nurturing similarly large numbers of companies created or assisted with the more than $3 billion of venture capital invested in the last three years. Adler & Co., New York, counts six of its high-tech firms poised to go public—a larger group, says partner James Swartz, than he's ever had at one time.

Why? Technological advancements, especially in microprocessor applications, have allowed those companies on the leading edge to grow faster than ever before. "It's been a phenomenon of the last five years to see growth from zero to $10 million to $50 million [revenues]," says Robert Towbin, senior partner with L.F. Rothschild, Unterberg, Towbin, the leading underwriter in number of issues and dollar volume in 1981. And when companies grow faster, they typically go public earlier in their histories.

With sometimes staggering amounts of venture capital available to them, few of these high-tech high-fliers will approach the public for funding because they have to. Quantum Corp., a Milpitas, Calif., maker of disk drives, completed a $6.2 million private financing last April to meet its fast-growth cash needs for 18 months. But if Quantum is able to show at least eight months of near-20% pretax profitability by the time the public market turns strongly receptive to new issues again, "We'll have to take advantage of it," says founder Jim Patterson. "It just becomes too irresistible."

Proceeds of a Quantum offering, like those of most of these well-heeled companies, will not be used to pay off debt, as sometimes happens with lesser-quality issues, but rather for expansion into new markets, to acquire product design rights, or expand current capacity. "We don't have any debt at this point," says George Hwang, president of Integrated Device Technology (IDT), a two-year-old standard semiconductor manufacturer in Santa Clara, Calif. Hwang plans to take his company public as soon as he can show a couple of profitable quarters with close to a 20% pretax margin, which he projects will occur by mid-1983. But the public proceeds, which at more than $10 million would cost IDT too much equity to raise in venture capital, Hwang says, won't be needed until that time to expand fabrication facilities, thanks to the final round of $3.5 million in venture capital drawn down in June.

Hwang and Patterson are not alone in their aggressive pre-public ambitions. But whether each venture-backed startup can actually achieve its pre-public goals depends on many factors, particularly the economy. Robert Freund, for example, founder of Semi Processes Inc., Santa Clara, has enjoyed steady growth in his manufacturing business of high-speed gate arrays (semicustom semiconductors) and integrated circuits. The balance sheet at Semi Processes has been spotless from the start: Every month has shown a profit; first-year revenues amounted to $940,000 in 1979 and jumped to $4.1 million last year. Freund expects to take the company public by mid-1983—that is,

Primed to Go Public

Backed by millions in venture capital, these high-tech growth companies expect to go public within the next six to 18 months

Company/ Location	Founded	Venture capital invested	Business	1981 Revenues/ 1982 Revenues (est.)
Daisy Systems Sunnyvale, Calif.	Aug., 1980	$4 million	Computer-aided engineering systems	NA/ $5 million
IBIS Systems Duarte, Calif.	Dec., 1980	$18 million	Mainframe disk drives	None/ None*
Integrated Device Technology, Santa Clara, Calif.	Aug., 1980	$9 million	Standard semiconductors	None/ $6 million
LSI Logic Corp. Milpitas, Calif.	Jan., 1981	$16 million	Semicustom semiconductors	NA/ NA
MicroPro Int'l. San Rafael, Calif.	Sept., 1978	$500,000	Microcomputer applications software	NA/ $20 million
Priam Corp. San Jose, Calif.	March, 1978	$18 million	Disk drives and controllers	$6 million/ $30 million
Quantum Corp. Milpitas, Calif.	Feb., 1980	$11.7 million	8" Winchester disk drives	None/ $14 million**
Semi Processes Inc. Santa Clara, Calif.	Oct., 1978	$1.5 million	Semicustom semiconductors	$4.1 million/ $7 million
Spectra Logic Corp. Sunnyvale, Calif.	Nov., 1979	$1 million	Disk and tape drive controllers	$4 million/ NA

*Estimated revenues of $30 million in 1983 **Actual revenues

NA = Not available

about 12 months before he'll need between $7 million and $10 million of public equity to purchase the manufacturing equipment he'll need to reach $30 million in revenues in 1984.

But Freund is concerned about maintaining his incremental growth pattern in the pre-public stages. "We have a nice backlog now," he says, "but how realistic is it, and how long can we maintain it? Our industry can't expand until the basic economy takes off."

Freund should have no worries if the buoyant new issues market of early 1981 returns, when both high-quality and third-rate offerings came through at high price-to-earnings multiples, regardless of track record. But under poor or mediocre market conditions, says Tom Perkins, a partner in the San Francisco venture capital firm of Kleiner Perkins Caufield & Byers, "the market functions as a funnel, and only the best and fastest will get through, leaving the rest behind."

Regardless of when and if the booming new issues market of early 1981 returns, the coming of young high-tech stocks seems inevitable, and certainly the supply is great. So great that at least some observers wonder if current distribution channels are sufficient to get so many new issues to market. "If the channel was loaded last year with a few billion dollars worth of new issues," says venture capitalist Perkins, "what will happen when those of us who want to make five to 10 times on our money, start to cash in the $3 billion of investments we've made in the last three years?"

And as demand for new high-tech issues shows itself in the marketplace, other investment bankers thus far unfamiliar with the field are sure to join the ranks. The general belief is, if the technologists can pack thousands of bits of information on a sliver of silicon, surely the bankers can find a way to get their stocks to market.

We're playing your song.

It doesn't really matter which tune you call, either.

Because we know what sounds good to you.

Availability. In volume.

Quality. Inherent.

And support. In the day-to-day business of doing business together.

We know you've heard all that before. And it sounds like something a lot of companies might say.

But while that's true, so is this.

During Quantum's first year in business, we captured 6% of the 8″ OEM Winchester market. This year we expect to top 25%—make that 50% if you just count the higher capacity, low cost segment. And our third year should be better still.

We've also been able to deliver without missing a beat. Thanks to our foresight in designing the Q2000 product family so it could be manufactured easily, quickly and in large volume. (We also have a new manufacturing facility that lets us build as many as 600 drives a day.)

Building our drives the way we do is one of the reasons we've been so competitive. And building them into your small business systems can do the same for you. Because you'll be able to pass on our superior price/performance to your own customers. And when your needs change, say, from 8″ to 5¼″, you won't even have to change the name on the P.O.

So let's make music.

All you have to do is plug us in.

Quantum Corporation, 1804 McCarthy Blvd., Milpitas, California 95035. Eastern Regional Sales Office: Salem, New Hampshire (603) 893-2672. Western Regional Sales Office: Santa Clara, California (408) 980-8555. International Sales Office: Milpitas, California (408) 262-1100. TWX: 910 338-2203.

QUANTUM

November 1982

Financial Digest

Quantum details plans for public stock offering

Quantum Corp., a Milpitas maker of disk drives, plans to make its initial public stock offering next month.

The firm said Tuesday it has filed a registration statement with the Securities and Exchange Commission for an initial offering of 1.25 million shares. The selling price is not expected to exceed $17 a share.

At that price, the firm would receive $21 million before underwriting commissions. Quantum said it plans to use the funds for capital expenditures and working capital.

In addition, 450,000 shares will be sold by certain shareholders, including several venture capitalists. Quantum will have about 8.7 million shares outstanding after the offering.

Founded in February 1980 by several former Shugart Associates employees, Quantum designs and makes 8-inch diameter rigid disk drives that store computer data.

The firm has delivered about 20,000 drives, and its largest customers include Altos Computer Systems and Wang Laboratories.

For the six months ended Oct. 2, Quantum earned $2.9 million, or 38 cents a share, before extraordinary credits from tax loss carryforwards. Taking the extraordinary credits into account, profits were $3.7 million, or 49 cents a share, on $18.6 million in sales. In the like period a year earlier, Quantum lost $1 million on sales of $2.5 million.

The firm employs 263 people.

The offering will be co-managed by Morgan Stanley & Co. Inc. and Robertson, Colman, Stephens & Woodman.

FRIDAY DEC.10, 1982
QNTM OPEN...20½

DAVID A. BROWN
QUANTUM

Congratulations

TO YOU AND YOUR CO-WORKERS WHO MADE TODAY'S INCREDIBLE ACCOMPLISHMENT POSSIBLE...

WE WISH YOU CONTINUED SUCCESS AND ARE ANXIOUSLY AWAITING YOUR NEXT QUANTUM LEAP!

MOM · DAD · SIS · BARRY

San Jose Mercury ■ Thursday, January 27, 1983

Quantum's sales jump

Quantum Corp. reported a profit on higher sales for the third quarter ended Jan. 1.

The Milpitas maker of disk drives earned $1.9 million, or 23 cents a share, in the period, compared to a loss of $358,000, or 21 cents a share, in the like quarter a year earlier.

Quantum's initial public offering late last year increased its shares outstanding by 1.25 million to about 8.7 million.

Sales jumped 246 percent, from $3.3 million to $11.3 million.

Quantum About To Land Key DEC Pact

By Mike Perkowski

MAYNARD, MASS. — Quantum Corp. reportedly is on the verge of receiving a plum OEM contract from Digital Equipment Corp. for medium-capacity 5.25-inch Winchester disk drives.

The agreement with Milpitas, Calif.-based Quantum will not affect a huge OEM contract DEC already has in place with Seagate Technology for 5- and 10-Mbyte 5.25-inch Winchesters, according to reliable sources.

Exact terms of the agreement—such as its length and the number of units involved—could not be ascertained by press time. Knowledgeable sources, however, maintained that the deal probably will be worth tens of millions of dollars to Quantum.

Officials at both Quantum and DEC declined comment on the report.

Sources said DEC is expected to purchase a large number of Quantum's Q530 and Q540 5.25-inch Winchesters, which have unformatted capacities of 32 Mbytes and 43 Mbytes, respectively. Those drives, along with Quantum's Q520 20-Mbyte 5.25-inch Winchester, were unveiled at last fall's Comdex '82 show in Las Vegas.

It is believed that DEC will use the Quantum drives in future, higher-performance versions of DEC's Rainbow and Professional personal computers. DEC also may use the drives in some low-end PDP-11-based systems.

DEC is known to have evaluated drives from almost every supplier of 30- to 40-Mbyte 5.25-inch Winchester disk drives. Among the suppliers DEC most seriously considered before going with Quantum were Computer Memories Inc., Disctron Inc., Control Data Corp., and Atasi Corp., sources said.

Deliveries of production quantities of drives to DEC are not expected to begin for a few months because Quantum now is producing only evaluation units. Volume production of Quantum's drives is expected to take place by June, sources said.

Although Quantum apparently has yet to deliver more than several evaluation units to DEC, observers said DEC had several reasons for deciding to go with Quantum over a host of other suppliers vying for DEC's business.

Foremost among those rea-

(Continued on Page 98)

Quantum On Verge Of Getting DEC Winchester Pact

(Continued from Page 1)

sons, observers contend, is Quantum's established reputation as a reliable, high-volume supplier of 8-inch Winchester disk drives. In the two years Quantum has been shipping 8-inch Winchesters, it has established itself as one of the leading OEM suppliers in that product class.

Among the customers it claims for its 8-inch drives are Wang Laboratories Inc., Nixdorf Computer Corp., Altos Computer Systems Inc., TeleVideo Systems Inc., and Convergent Technologies. Sources claim that many of those OEMs are leaning toward Quantum as a supplier of medium-capacity 5.25-inch drives as well.

Another reason DEC is believed to have committed to Quantum as a supplier is aggressive pricing on Quantum's part. Although Quantum's published quantity-500 prices for the 30- and 40-Mbyte drives are $1300 and $1500, sources speculated that DEC, because of the high volumes it wants to purchase, might have been quoted prices of less than $1000 per drive.

Also, Quantum's drive is fully compatible with Seagate's ST406 and ST412 drives, which DEC is using and is expected to continue using for some time.

Because of the large number of drives DEC is known to require, it is believed that DEC was concerned about choosing a vendor with proven high-volume manufacturing capabilities. DEC is said to have been impressed with the manufacturing expertise Quantum has demonstrated in the 8-inch Winchester market and believes Quantum can do the same in the 5.25-inch marketplace.

The 5¼" Quantum Leap.

Not a totally unexpected jump.

After we designed, built, and delivered the most cost-effective and manufacturable 8" Winchester on the market, most people figured it would only be a matter of time until we came out with a 5¼" version. And they were right.

But while our Q500™ Winchesters are no giant step for us, they do put quite a bit of distance between us and the rest of the 5¼" market.

You see, we didn't have to reinvent the wheel. Just make it a little smaller. And that makes a big difference.

For example, by using the proven technology we developed for our Q2000™ 8" drives, we're able to offer our Q500 drives in 20–, 30– and 40–megabyte versions. Capacities that are extremely difficult to achieve with a stepper motor drive. But which are no trouble at all for our rotary torque actuator, optical encoder and temperature compensation servo combination.

We've also been able to build in the technical margin of our Q2000 series. And the speed of our new 85 megabyte 8" drive. At 45 ms access time, our Q500 is ideal for the multi-user applications you're thinking about.

Finally, and perhaps most important, the Q500 series can be manufactured quickly, easily and in large volume, just like the other members of our Quantum family.

Our ability to produce as promised is one of the things that helped make us the leader in the 8" market.

And it can help you, too. Especially when it comes time to fill orders.

Speaking of which, you really should find out more about our Q500 drives as soon as possible.

In fact, the sooner the better. There's a lot to be said for getting the jump on your competition.

Quantum Corporation, 1804 McCarthy Blvd., Milpitas, California 95035. Eastern Regional Sales Office: Salem, New Hampshire (603) 893-2672. Western Regional Sales Office: Santa Clara, California (408) 980-8555. International Sales Office: Milpitas, California (408) 262-1100. TWX: 910 338-2203.

QUANTUM

DEC. 1982

You are cordially invited
to attend
Quantum Corporation's
Christmas Dinner Dance
to be held on
Saturday, December 18, 1982
at
Santa Clara Marriott Hotel
Great America Parkway
Santa Clara, California
7:00 P.M. to 1:00 A.M.
$5.00 per couple


SALON A
MAXIMUM OCCUPANCY
130 PERSONS


EXIT

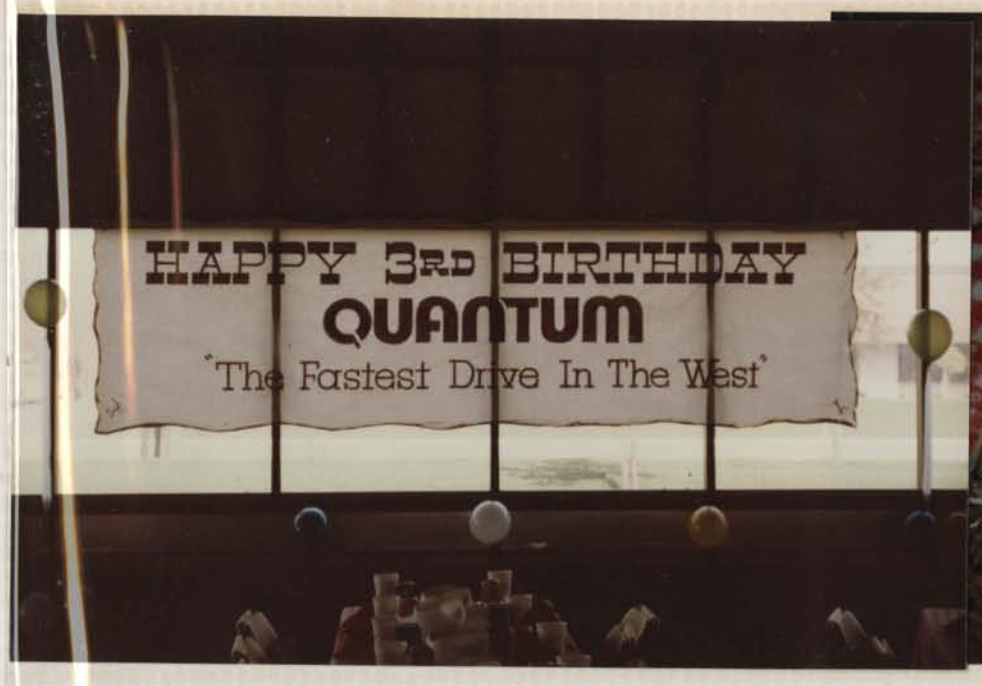

PPY BIRTHDAY
DAVE
YOU MISSED YOUR OWN PARTY


HAPPY
BIRTHDAY
David


QUANTUM


QUANTUM


QUANTUM


HAPPY 3RD BIRTHDAY
QUANTUM
"The Fastest Drive In The West"


Happy 3rd Birthday
Quantum
"Fastest Drive
In the West"

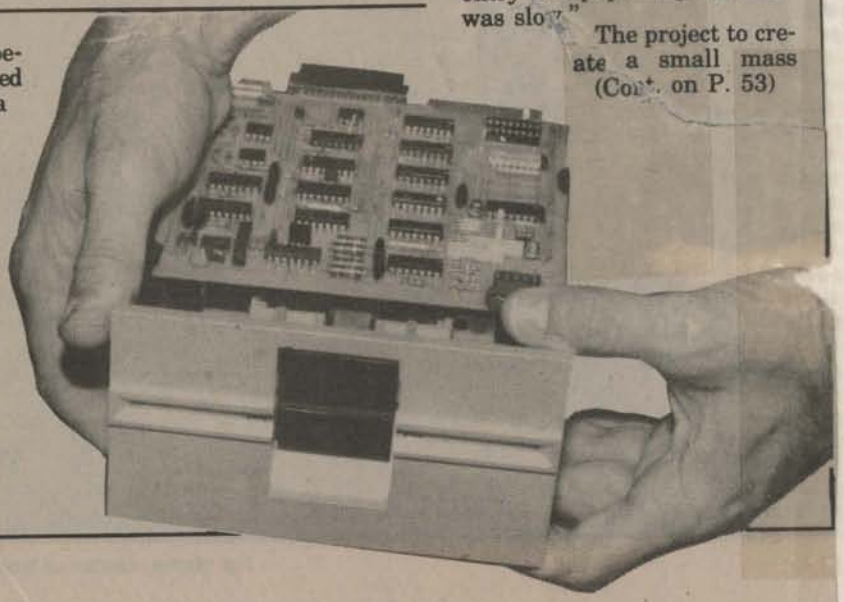

HAPPY BIRTHDAY
HAPPY BIRTHDAY
HAPPY

Family Picnic
June 1983

Today's Disks Traced To '50s Engineers

The story behind the growth of mass-storage random-access memories begins in the '50s with a group of engineers who have since dispersed throughout the industry, some now launching their own enterprises in the highly competitive small disk-drive market.

Product Strategies



"The whole business began when John Lynot stepped off the train here in Santa Clara and began setting up IBM's memory business" says Jim Adkisson, reflecting on the history of the disk drive industry which he influenced by originating the 5-1/4-inch floppy disk concept at Shugart Associates, now Shugart Corp.

Lynot, whose name is on the patent for the first commercial mass-storage RAM, disclaims any major role in the business: "I appreciate Jim's enthusiasm for my work but, of course, very many good engineers have been involved over the years."

Herb Thompson, who did much of the engineering on the first floppy-disk drive, discusses IBM's motivation for creating the drive: "IBM had the Ramek, the first departure from the tape drive, and it was impressive for its time, but it was large and cumbersome.

"We wanted something that would be small and portable and would also simplify program loading," Thompson said. "At the time, the only alternatives were to hardwire, which was inflexible, or key entry and paper tape, which was slow."

The project to create a small mass

(Cont. on P. 53)

(Continued from Page 53)

"Shugart began with $3.3 million in venture capital" said George Sollman, Shugart's current vice president of marketing and veteran from the early days. "The strategy was to first develop floppy disks, use the revenue to build low-cost printers and, when that was established, we were going to go into small business systems."

The floppy program did not take off as expected, and a request for more capital in late 1974 was turned down, Sollman said.

A policy dispute ensued over the direction the company should take. This dispute eventually led to Al Shugart's resignation.

Don Massaro took over and killed the printer and systems program, deciding to streamline the operation around disk drives only.

"At the time, sales to Datapoint were the only thing keeping Shugart going," Sollman said.

The product that finally led Shugart Associates to success originated in a casual conversation between Adkisson and some Philips representatives, who were working on a word processor.

"Someone mentioned that a small disk drive would be ideal for some of their applications, so I grabbed a cocktail napkin and asked if this was a good size," Adkisson said.

The size of the napkin, 5-1/4-inches, was about to become a new industry standard.

Excited by the idea of a smaller disk drive, Adkisson discussed the idea with a number of people at Shugart and discovered that no one shared his enthusiasm.

"Marketing didn't feel there was enough demand and, whenever I discussed the idea with engineers, they couldn't understand why we should be backing off from the 8-inch specifications," Adkisson said.

The turning point came when Wang became interested in a small disk drive for a desktop word processor and was talking sufficient quantities to make production attractive.

"I put together a set of engineering specifications and headed them to Dave Brown at the factory," Adkisson said. "I was amazed when he had a working prototype in three months, which had a number of innovations. I don't think the minifloppy whould have made it without his expertise."

Brown insists that economics, rather than genius, was at work.

Briefly...

The **Eastman Kodak Co.**, attempting to increase sales of the disk cameras that it introduced in May 1982, said Wednesday that it would improve the type of film used in the cameras . . . In Mountain View, **Acurex Corp.** said it has been selected as a prime contractor for the first phase of the Missile Weapon System Milstar Terminal Program by the U.S. Air Force Ballistic Missile Office, valued at nearly $2 million and spanning 8 months . . . **Quantum Corp.** of Milpitas, a supplier of computer storage disks, was honored by the **National Association of Small Business Investment Companies** at a 25th anniversary celebration that commemorated the passage of the Small Business Investment Act of 1958 . . . San Francisco-based **Visa U.S.A.** Wednesday said a phased introduction of the electron Visa card will begin shortly in Ohio, Florida, Oregon and the Washington D.C. area next month . . . Santa-Clara-based **Granger Associates** said fiscal 1983 profits after extraordinary items amounted to 74 cents a share, a 48 percent increase over last year.

By The Tribune staff and news services

Original 5-1/4-Inch Disk Drive Set To Cocktail Napkin Size

"The prime mover was the objective of keeping materials cost below $100," Brown said. "We wanted the simplest parts and manufacturing procedures."

Brown used a dc stepper motor out of a vending machine, a bargain at $4.

"Actually, the dc motor was necessary to develop enough torque and the helical cam idea came about because we could get one for 24 cents."

Simplicity in manufacturing, which has become a key strategy in the disk business, allowed Brown to produce the prototype in such a short time.

"We start designing with an architecture and then look for ways to simplify the manufacturing stage," Brown said, explaining that price competitiveness and reliability are fallouts of simplicity in design.

Adkisson took the minifloppy to the 1976 NCC.

"We fixed up a jewelry box for a display; and since we didn't want to advertise our business plan to the general public, we kept it in a separate room," Adkisson said. "We could then select whom we wanted to view it."

The arrangement gave the presentation a dramatic, clandestine atmosphere. The interested party would be personally escorted through a maze of corridors and down two elevators to a back room, where the world's first minifloppy sat in its jewelry case. It now sits in the Smithsonian Institution's Museum of American History, having been recognized as an original contribution to U.S. technology.

Adkisson said he feels the minifloppy became a standard because it was significantly smaller than the 8-inch floppy.

A price is paid to gain the convenience of a smaller size, however. For example, a reduction in storage capacity from 250 kbytes to 90 kbytes is offset by a one-quarter reduction in volume in moving from 8-inch to 5-1/4-inch disks.

"I think we will have to see another reduction in volume by the same factor before there will be another standard," Adkisson said.

This theory would explain the difficulty that smaller disk formats have had in arriving at a standard.

Sollman said he feels the success of the minifloppy had a lot to do with timing.

"The combination of the microprocessor and the minifloppy was what really kicked off the personal-computer market," Sollman said. "Soon after we had developed it, people like John Roach, Steve Jobs, and Mark Greenburg started dropping in to have a look."

Sollman pointed out the impact that these men and their respective companies—Tandy, Apple, and Northstar—had on the sale of small systems.

"I think John Roach has been somewhat overlooked in the story of the personal computer," Sollman said. "He virtually remade Tandy and aggressively developed the personal-computer market."

Shugart Corp. has aggressively pursued miniaturization into the microfloppy field. It recently introduced a 3-1/2-inch single-sided microfloppy drive with 500 kbytes of storage, along with an interfacing capability for 5-1/4-inch minifloppies.

Both Adkisson and Thompson are working within the 5-1/4-inch format, attempting to refine the size/capacity tradeoff in a very competitive market. Adkisson left Shugart in 1978 to head a Florida peripherals company, Florida Data Company, but after four years was "lured away by the opportunity to start a disk-drive company" with Joe Booker in 1982.

Vertex is offering a 5-1/4-inch Winchester with 30 to 70-Mbyte capacity and a fast 30-ms average access time. The V100 series offers two-, three- and four-disk versions at 31, 52 and 72-Mbyte capacities. Vertex has devised a closed-loop servo system that continuously samples and corrects head-to-track positioning, allowing a 960-tpi density.

Vertex management includes three former vice presidents and four former directors of Shugart. It is a team that managed to attract $8 million in venture-capital funding. A computerized assembly system has been established in a clean room and production is about to begin.

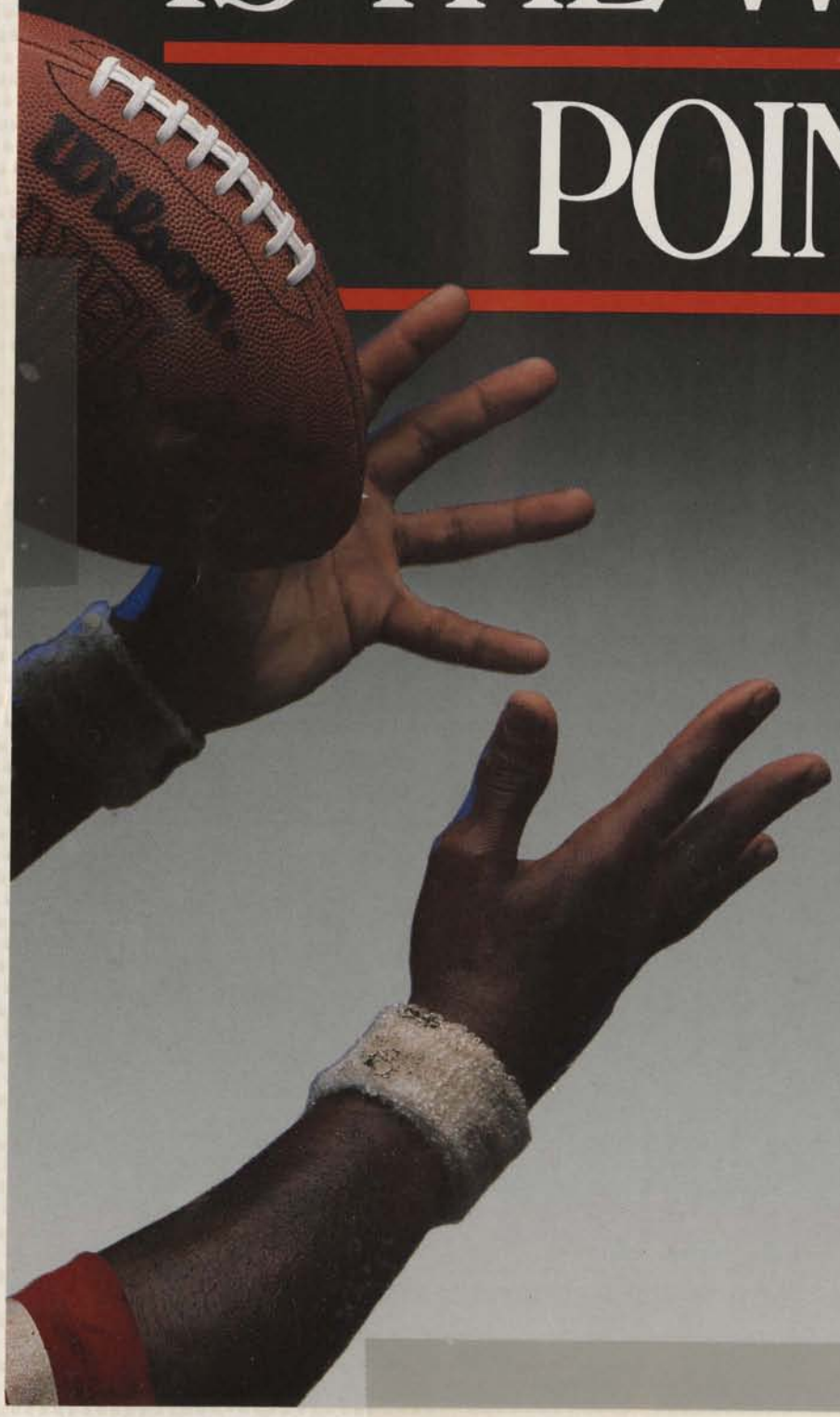
Herb Thompson founded Drivetec in August 1981 to manufacture a 5-1/4-inch floppy. This is the 320 superminifloppy with a 3.3-Mbyte capacity, for which volume production is scheduled to begin soon.

—Chappell Brown

Quantum

First Quarter Report 1984
Quantum Corporation

QUALITY IS THE WINNING POINT.



As a leading supplier of low cost, high performance disk drives, Quantum Corporation's winning point is quality, in our products *and* in our people. Our quality gives us the edge in a tough league. And, it keeps us coming back, season after season, with a winning line-up of products from the winners on Quantum's team.

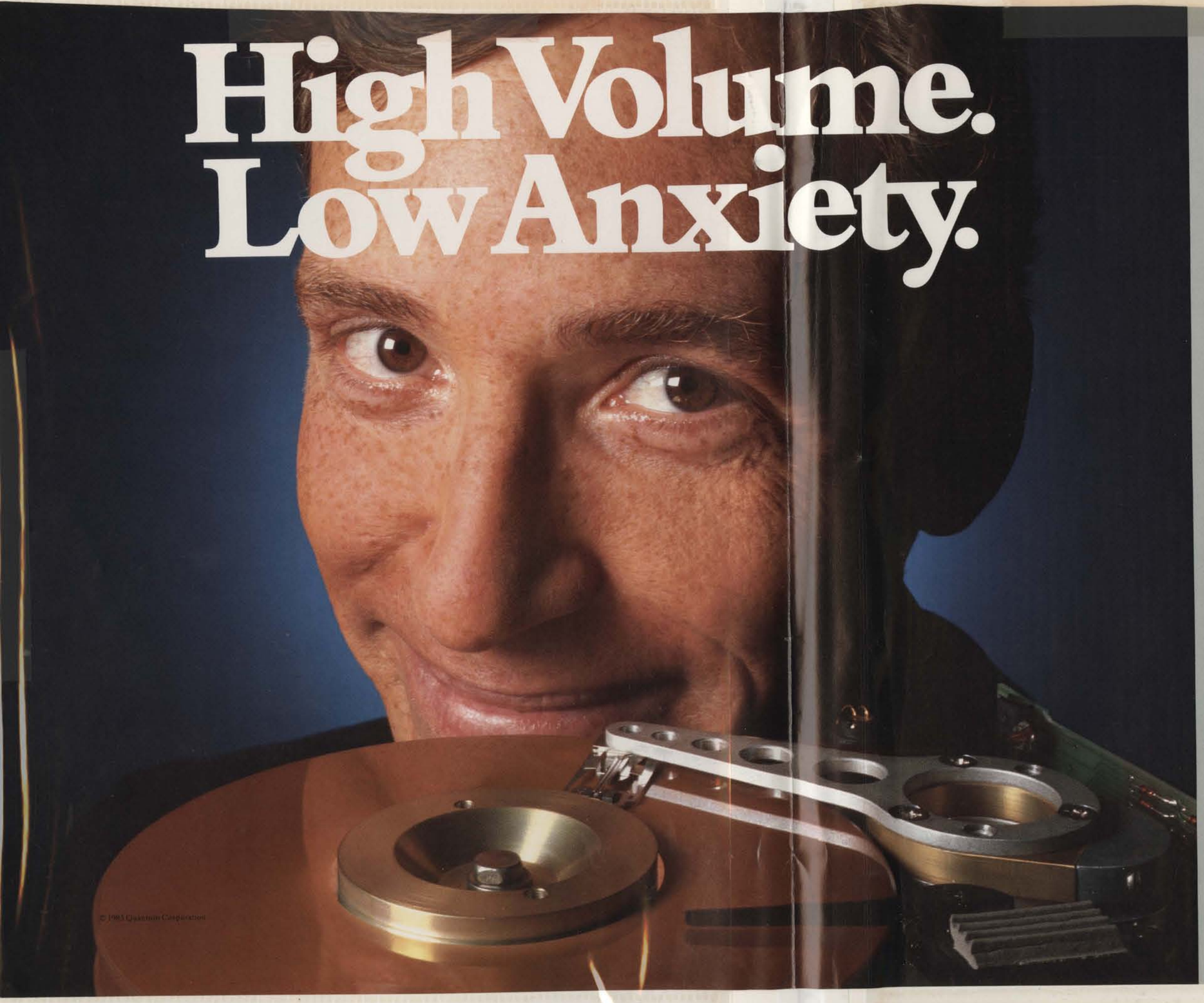
The Quantum Team
Human Resources Department
1820 McCarthy Blvd., Dept. TD
Milpitas, CA 95035
(408) 262-1100

QUANTUM
CORPORATION

Equal Opportunity Employer

You are cordially invited
to attend
Quantum Corporation's
Christmas Dinner Dance
to be held on
Friday, December 2, 1983
at
Sunnyvale Hilton Inn
1250 Lakeside Drive
Sunnyvale, California
7:00 P.M. to 1:00 A.M.
$10.00 per couple

High Volume. Low Anxiety.



The only surprises you'll get with Quantum disk drives are pleasant ones.

Consistently excellent performance.

Quality and reliability you can count on to keep systems up, anxiety down.

Low Cost.

And the best surprise of all: we can deliver all the medium-capacity Winchesters you need. Now. 8″ drives, from 10 to 85 megabytes. 5¼″ drives, from 20 to 40 megabytes.

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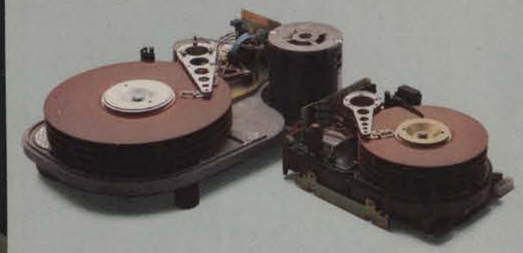
QUANTUM



Fall 1983

m

mas Carol

He circled the room, checking each station
The smile on his face showed his elation.
With a wink of his eye and a touch of
his nose
Up through the nearest clean tunnel he rose.

Once on the roof, he began to exclaim
Calling to Quantum's customers by name.
"On Altos, on Xerox, on Sage and Arrow,
On Wang and Convergent, Rolm, TeleVideo.

"Go to Quantum for all your disk drives.
Quantum's the place where Quality's alive!"
And as he took off, I swore I could hear.

"Merry Christmas, Quantum – you'll
have a great New Year!"

FORUM

Editorial

To say that the public stock market for high-technology issues has taken a nose dive in recent months is an understatement. Ever since the euphoria for publicly traded computer industry stocks died last summer, everyone in the investment community has been decidedly sour on any company with a "Data" or "Mini" or "Systems" in their corporate logos.

Of course, some cooling of the public fever was inevitable—and even good, because any computer industry company could have gone public last spring, regardless of its performance. And many companies without a well-demonstrated track record did go public and received attractive prices.

Now, the market is going the other way. Not only is the stock market in general very soft these days, but the technology issues are taking a beating. And it's disturbing to note that the investment community is down on all computer industry companies, not just the ones that aren't performing up to par.

There are any number of computer industry companies that can boast rising sales and profit figures, reasonable profit margins, and expanding product lines in healthy marketplaces. And many of those companies are getting beat up on Wall Street these days.

For example, take Archive Corp. The tape drive maker went public late last year at $10 a share and so far has shown it can produce its product profitably. But its stock was trading in the $7.50 range last week. The same is true with Cipher Data Products Inc., which is ackowledged as the leading OEM supplier of tape drives for the low end of the computer industry. Last fall, its stock was selling in the mid-20s; by last week, it had fallen into the mid-teens. These companies haven't done anything wrong yet.

Neither, for that matter, has Quantum Corp. Quantum has dominated the 8-inch Winchester market and is starting to make aggressive inroads into the 5.25-inch Winchester field. Yet, except for a brief flurry last spring when it topped $30, Quantum's price has stagnated in the high teens and has even dropped recently as a result of all the turmoil in the low-end 5.25-inch Winchester business.

And that, more than any other single factor, might highlight what's wrong here. The fact of the matter is that a very large portion of the investment community is not sensitive to the nuances of the computer industry, particularly in terms of market segmentation. When it was learned that IBM was cutting back on orders of 10-Mbyte drives from Seagate Technology, MiniScribe Corp., and Intenational Memories Inc., the stock prices of every disk drive manufacturer dropped—whether it was a supplier to IBM or not.

Some companies are trying to do something about the relative lack of sophistication that many members of the investment community are displaying about computer industry companies. Quantum last week took to the road in an attempt to make brokerage houses—particularly those individuals who sell the company's stock—better aware of where Quantum competes in the market and who its competitors are.

Other publicly traded companies probably would be well-served to do similar things in order to better educate the investment community. That way, the industry probably could avoid the class-action lawsuits that have been filed by investors when companies' stock prices fall way below prices of an initial public offering. After all, most manufacturers probably have better things to do with their money than to spend it on defending themselves in court.

Mike Bucwski

8″ rigid disc drives refuse to be ousted

MILPITAS – Has the shift from 8-inch disk drives to the high capacity 5¼-inch been fully consummated? With the preponderance of today's trade press coverage focusing on the 5¼-inch and microfloppy markets, it seems as if this form factor has become an anachronism in the industry.

But if you ask Quantum Corporation, the cautious, self-professed ''little old ladies of the Winchester drive,'' the 8-inch market, which has been the company's bread and butter, is still a viable one. In fact, the company's steadfast refusal to relinquish this fixed drive product line propelled them to the lead among suppliers of 8-inch OEM rigid disk drives in 1983.

Currently, the gap in revenues derived from their 8-inch versus the 5¼-inch product line is narrowing. Yet, Quantum's decision not to be hasty in dropping the 8-inch line exclusively in favor of their high capacity 5¼-inch drives is still paying dividends to this quietly profitable outfit.

''Last year at this time, we pondered the shift from 8-inch to 5¼-inch drives and came to the conclusion that we'd probably start to see it go downhill in 1984,'' says Jim Watson, director of sales with Quantum. ''But we've just done a new forecast for our fiscal year 1985 and we see a pretty steady demand for the 8-inch product.''

Watson and Rolf Brauchler, director of marketing with Quantum, attribute the continuing demand for its 8-inch product line to several factors. ''One of the real keys is the tremendous inherent inertia in the OEM business,'' says Brauchler. ''When a large supplier like WANG designs your product into their system, it gets shipped for a lot of years.

''Everybody's aware that selling cycles for computers and related products have grown shorter over the years. But what you sometimes overlook is that the shipping cycle continues to stay in the three-to-fi range – in some case longer.''

The continuing, albe ing, demand for the 8-i appears to be skewed tc European consumer Brauchler. He indica ''high inertia accounts'' who deliberate over ir a product into their sy fore committing to l usage – prevent an transition to the 5¼-i taking place.

''I think this is mo of your European cu says Brauchler in ref this ''high inertia'' cha tion. ''They start a litt and they don't get prod the field as fast as U panies do. However, uct has a much longer

''I would say that shift totally occurs fr to high capacity 5¼-in clearly there will be market for an 8-inch Europe than here in th

continued o

8″ rigid disk drives

continued from page 4

Quantum defines high capacity 5¼-inch drives according to their status as an announced versus delivered product. While *announced* 100 MB 5¼-inch drives are considered ''high capacity,'' today's deliverable 20-40 MB products constitute the high end in the 5¼-inch form, in their view.

Just when this shift will occur was made more difficult to answer when Seagate announced a half height, high capacity 100 MB 8-inch drive last December at COMDEX. Although this drive technically differs from Quantum's top of the line 8-inch drive, Seagate's entry to this market, in Brauchler and Watson's view, confirms ''it's far from being a dead form factor.''

''Seagate has allegedly been trying to develop a high-capacity 5¼-inch drive for some time,'' says Watson. ''Their introduction of a high capacity 8-inch drive suggests to me that they had looked long and hard at how to build a high capacity 5¼-inch and couldn't find a way to do it reliably.

''At the same time, it's an acknowledgement that doing 100 MB in a 5¼-inch form factor is extremely difficult and a risk that they were not willing to sign up for. That's a vote of confidence in our belief all along that the 8-inch product continues to be viable.''

However, John Trifari, director of corporate communications with Seagate cautions against such a generalization. ''Because Seagate is announcing a high capacity, high performance 8-inch drive does not necessarily mean all other 8-inch drive vendors will benefit,'' he says. ''For one thing, we offer characteristics in our drive that others don't – namely the half height configuration.''

Trifari believes Seagate and Quantum may be looking at different sides of the same coin. Seagate's 8-inch drive, he says, is designed to meet ''specific market needs for multi-user desk top network configurations requiring high memory capacities that can be manufactured reliably in high volume.''

''The technology to achieve those ends requires a device that adapts to the desk top environment,'' explains Trifari. ''We could just as easily have manufactured a 14-inch drive as well, but you don't want a washing machine sitting by your desk. The fact that it's an 8-inch drive does not denote any causal relationship that says, 'Therefore, all 8-inch drives are going to benefit.' ''

Still, Watson cites a number of reasons for Quantum's calculated approach to entering the 20-40 MB 5¼-inch drive market while maintaining their higher capacity 8-inch line. ''People just are not seeing the kind of quality and reliability in these high capacity products because they are discovering that when you get to those kinds of densities, it seems to change the whole ballgame.

''The disk drive becomes much more sensitive to electrical noise and interference from the system that it's in as well as from outside sources. Many of these things were unanticipated.''

Tandon, the Chatsworth-based disk drive manufacturer, says Brauchler, is a classic example of a company realizing the difficulties of producing a high-capacity 5¼-inch drive. ''They were one of the 10 or 15 companies at the National Computer Conference in 1982 that announced a high-capacity drive,'' explains Brauchler. ''At that time they announced, I believe, a 31 MB drive that they still are not delivering today – 19 months later. And they just announced another slip in their schedule.

''They have found that the higher capacity, high density products are much more difficult to build than the low-end product that they're currently shipping in volume. Tandon has not found a way to design and build a reliable, high capacity drive.''

In pursuing what they consider a more technologically feasible product line, Watson and Brauchler believe Quantum is well situated to continue operating in a profitable fashion. ''People are finally realizing that the name of the game is manufacturing and delivering the product,'' declares Brauchler. ''I think the whole market is evolving somewhat more slowly than most people had thought.''

Buy Quantum – 8" Disk Drive Leader

QUANTUM CORPORATION is a disk drive manufacturer that may be on the verge of explosive growth. It is offering 1,700,000 shares to the public next month between $15 and $17. We advise purchase of this high potential, high risk offering.

That the world is in the midst of a computer revolution is obvious to everyone. That one area of the computer industry – computer disk drives to manage secondary data storage – is in the midst of its own technological boom, is becoming ever more obvious to investors. Quantum will be the newest investment medium in this area. In the late 1970s the firm received abundant venture capital financing as it developed its disk drive systems. At least seven venture capital firms are presently major stockholders and all are retaining significant portions of their equity interests even while selling small chunks to the public in this offering.

Quantum

The central memory systems of even the largest computers are relatively limited, capable of storing just a few million characters of information. But with the accelerating uses of computers for storing and retrieving extensive data bases, the need for instantly accessible supplementary memory is an increasingly important feature of all computer systems. Magnetic disk drives serve that need. Presently three sizes of drives are on the market – 14-inch, 8-inch and 5-1/4-inch. All are manufactured with a variety of data storage capacities. Even though Quantum is still a very young company, it is the second largest manufacturer of 8-inch drives, second only to Shugart, a Xerox subsidiary. In the higher capacity 8-inch drives – that is, those capable of handling more than 20 million characters – Quantum claims to be the largest independent supplier to the computer industry.

Quantum is now expanding its line of 8-inch disk drives and is developing a new line of the smaller 5-1/4-inch drives. The former are used in a broad range of word processing, small business computer, and computer terminal systems. The latter stand to become increasingly popular in smaller desk-top and portable computer systems. The company hopes to commence volume production of the 5-1/4-inch drives by mid 1983.

Competition in this industry is intense and the risk of technological obsolescence is high. Companies such as Quantum scramble to stay abreast of the leading edge of the technology. Within five years, this company *could* be a multi-hundred million dollar giant. Alternatively, it could be spinning on its disk axis, little further progressed than it is today. We believe the chances of success are sufficiently high to compel purchase of this offering for aggressive portfolios.

All of Quantum's disk drives are sold to computer manufacturers that in turn incorporate them in their larger data processing systems. Principal customers include Altos and Convergent Technologies, both of which made highly successful public stock offerings of their own recently. Other large customers include Wang and Data System Design. Quantum also has recently entered into agreements with Nixdorf, Industrial Micro Systems and Vector Graphics. Approximately $5 million of the company's share of offering proceeds will be used to purchase capital equipment to increase manufacturing capacity. In the nine months ended October 2, Quantum netted 60 cents a share. Based on an 80 cent per share annual earnings rate, that places the $15 to $17 stock offering at 19 to 21 times earnings, a multiple we view as eminently reasonable in today's market in view of Quantum's exciting growth potential.

QUANTUM CORPORATION – 1804 McCarthy Blvd., Milpitas, CA 95035; (408) 262-1100. Offering of 1,700,000 common shares @$15-$17 per share; 1,250,000 shares (73%) by the company and balance by existing stockholders. Managing Underwriters: Morgan Stanley, 1251 Ave. of the Americas, NY 10020; (212) 974-4000; and Robertson, Colman, Stephens, Woodman, 100 California St., San Francisco, CA 94111; (415) 781-9700. After the offering, 8,721,372 shares will be outstanding and book value will equal $4.05 a share. Six month revenues equal $2.13 a share. 263 employees. No dividend. Proposed symbol: QNTM.

3 Mo. Ended	Revenues	Net Income	Prof. Marg.	Earn./Sh.*
June 27, 1981	$ 386,000	$ (875,000)	nil	$ (.10)
Sept. 26, 1981	2,109,000	(157,000)	nil	(.02)
Dec. 26, 1981	3,261,000	(358,000)	nil	(.04)
Mar. 31, 1982	7,900,000	1,576,000	19.9%	.18
July 3, 1982	8,658,000	1,703,000	19.7%	.20
Oct. 2, 1982	9,950,000	1,193,000	14.3%	.14

(*pro forma to reflect shares to be sold in current offering.)

NEW ISSUES™

The Investor's Guide to Initial Public Offerings

Issue No. 51 November 24, 1982

Quantum to build subsystems for retail computer stores

Quantum Corp. of Milpitas, which supplies disk drives to computer manufacturers, is getting into the business of building storage subsystems to be sold at retail computer stores.

Quantum, a four-year-old maker of Winchester disk drives, Wednesday announced it has formed a subsidiary to develop subsystems. The company also will continue to make disk drives.

Until now, Quantum has sold its disk drives to original equipment manufacturers. They, in turn, couple disk drives with a power supply and a controller to create computer storage subsystems.

James L. Patterson, president, said Quantum picked executives from within the company to run the new subsidiary. He doesn't expect Quantum to begin large volume subsystem production for two years.

"We've been calling the project 'asparagus' because we plant it and it takes two years before the crop comes up," said Patterson.

Heading the yet unnamed venture will be Stephen M. Berkley, formerly vice president of marketing for Quantum's disk drive operation.

Also named to the subsidiary's management were David A. Brown, executive vice president of operations, and A. Dale Hiatt Jr., vice president of manufacturing. Previously, Brown was vice president, engineering, and Hiatt was vice president, manufacturing, in Quantum's OEM disk drive business.

"As microcomputers become more widely used and less expensive, the challenge for microcomputer peripheral vendors is to develop innovative products to retain market leadership," said Patterson. "This new venture will serve to strengthen Quantum's market position and assure its competitiveness over the long term."

Director of sales, James G. Watson, has been appointed as Berkley's successor as marketing vice president. Watson joined Quantum in October of 1982 to oversee distributor sales and original equipment manufacturer sales of two Quantum disk drive products.

Prior to Quantum, Watson served as northwestern regional manager of OEM peripheral sales for Control Data Corp.

Replacing Brown as vice president of engineering is Arthur P. Geffon, formerly manager of new product development. Prior to joining Quantum in June of 1980, Geffon was project manager of the SA850 floppy disk drive program at Shugart Associates.

Richard P. Taylor has been reassigned to succeed Hiatt as vice president of manufacturing. Taylor joined Quantum in June 1983 as vice president in charge of quality and reliability. Previously, he was manager of quality and reliability at Digital Equipment Corp.'s Colorado Springs disk drive facility. A replacement for Taylor has not

Quantum Forms Unit To Develop Mass Storage Subsystem For PC Operations

MILPITAS, CALIF. — Quantum Corp. last week said it has new subsidiary lop a low-cost subsystem for ter operations. , the company ganized its top- nent, including of Quantum's to posts at the d subsidiary.

he subsidiary— y is operating ry quarters in Calif.—is presi- Berkley, who was Quantum's president. Berk- report directly sident and chief es Patterson.

ey posts at the Quantum co- rmer engineer- t David Brown ufacturing vice- Hiatt. Brown ce-president of , reporting to iatt reports to le of manufac- sident.

t of marketing t Quantum was Watson, who as Quantum's Watson joined Quantum in September 1982 from Control Data Corp., where

Taylor, who held quality and reliability management positions at Digital Equipment Corp.'s Colorado Springs, Colo., facility, has not yet been replaced in his prior post at Quantum.

Both Geffon and Taylor report to Patterson.

Berkley declined to go into specifics about the still-under-development product, although sources have speculated that Quantum may be working on a subsystem based on a 3.5-inch Winchester disk drive.

Berkley also did not reveal when the company plans to introduce the product. He said the subsidiary will soon move into a new facility in Silicon Valley, although the exact site has not yet been picked.

He added that it has not been decided if the subsidiary will handle activities other than development of the subsystem. "If it makes sense to market or manufacture the product through Quantum, then we'll do it," Berkley said.

Berkley said there currently are between 10 and 15 people working at the subsidiary, but he noted, "That number is changing daily." Among the people working at the subsidiary is Joel Harrison, a company co-founder and Quantum's manager of new product development.

Quantum's primary motivation in setting up the subsidiary is to allow the company to react quickly to new market opportunities, especially in today's highly competitive marketplace, Berkley said.

"First of all, this product is sufficiently different from what Quantum does today that we decided to focus a dedicated group of people to it," he said. "There will be very little overlap with what Quantum currently is doing.

"Also, we certainly want to grow to be a major company,

Berkley: Set to head up the new subsidiary as its president.

and we're looking at Quantum for the long term. We're going to have to do some creative and innovative things to remain a market leader. You've got 40 or 50 people competing in the market, and you've got to do something different to stay ahead, or else you end up looking like all the rest of those 40 or 50 companies."

Since its formation almost four years ago, Quantum has distinguished itself as one of the more successful OEM suppliers of low-end Winchester disk drives. Shortly after it began shipping its first 8-inch Winchester disk drives in late 1980, Quantum took the lead in that market and currently is believed to have a market share of better than 50 percent in that field.

In recent weeks, the company also has begun making some noise in the midrange market for 5.25-inch Winchesters, having landed sizable OEM orders from Altos Computer Systems Inc., Wang Laboratories Inc., and Tele-Video Systems Inc.

Microcomputer Subsystem Start-up Venture

We are staffing a new, well-financed Peninsula high tech venture. These are unique opportunities to challenge creative engineers and managers who want the chance to be part of this outstanding team.

Our client is developing a totally innovative microcomputer subsystem; no product like it exists in the world today. Each position offers high equity participation, excellent compensation and benefits.

This same Management Team has a recent proven record of "start-up" achievements, and is forming a new team now. The first opportunities are in the following areas:

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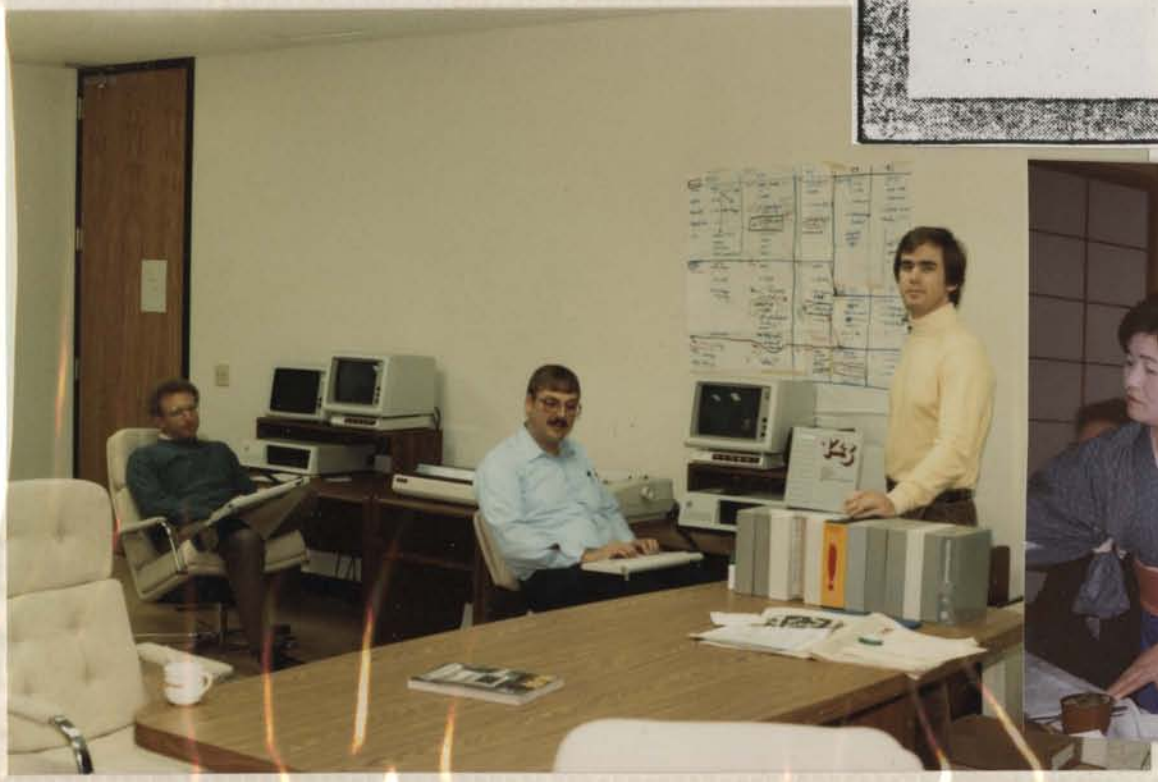


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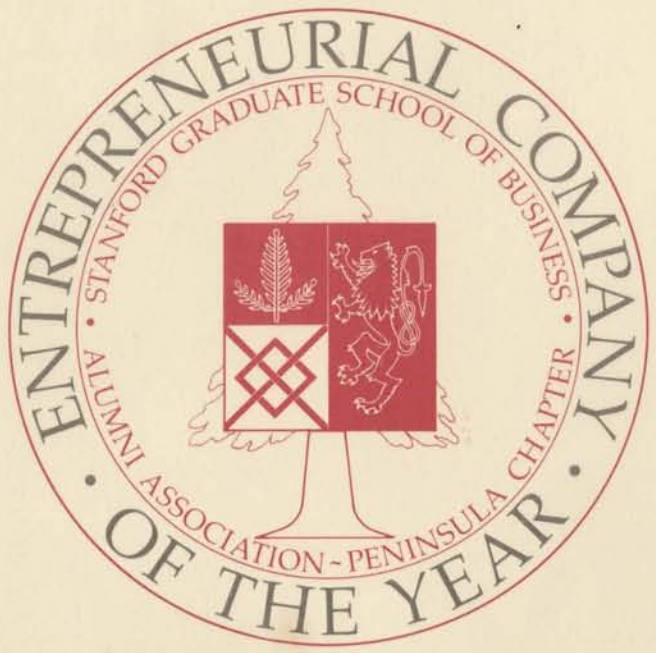


The Peninsula Chapter
of the
Stanford Business School Alumni Association
cordially invites you to honor

QUANTUM CORPORATION

1985 Entrepreneurial Company of the Year

Accepting for the company
James L. Patterson, President and Chief Executive Officer

Introductory remarks
Robert K. Jaedicke, Dean, Stanford Graduate School of Business
Wednesday, May 22, 1985

The Menlo Circus Club
190 Park Lane
Atherton

Cocktails — 6:00 p.m.
Dinner — 7:15 p.m.

RSVP by Wednesday, May 15, 1985

Please see map on back.

The ENtrepreneurial COmpany REcognition (ENCORE) award goes to the Peninsula area company whose management has best demonstrated both the risk-taking and creative qualities of the entrepreneur and the ability to build a major, professionally managed firm. The ENCORE Selection committee is honored to choose Quantum Corporation as this year's recipient.

QUANTUM CORPORATION

Quantum Corporation is a consumer-oriented company, responsive to market needs. The company's products — 8-inch and 5¼-inch Winchester type drives — are sold to OEMs producing microprocessor-based, multi-user business computers, word processing systems, personal computers, and add-on sub systems. Quantum believes manufacturability is the key to successful product design. Jim Patterson, president of Quantum Corporation, said, "We've always focused on those products we know we can produce in great quantity with excellence. And we've always emphasized simplicity and 'manufacturability' throughout the design process."

Quantum Corporation, founded in February 1980, is now the leading manufacturer of 8-inch and 5¼-inch disk drives for computer systems. It employs over 600 people and industry analysts have forecast over $120 million in sales this financial year. Morgan Stanley in their investment research analysis of the company in November 1984 wrote: "Amidst disasters and disappointments in the Winchester disk drive industry, Quantum has exceeded expectations in both sales and earnings. . . . We believe Quantum has an excellent strategy for continuing its growth into next year and beyond. . . . It is well managed, has positioned its manufacturing in a low-cost area (Puerto Rico), and continues to develop an industry reputation for delivery and quality."

Brook Byers, chairman of the ENCORE selection committee, said the outstanding point about Quantum and the main reason why it was selected this year is that it is "considered the best managed company in the disk drive industry; it is consistent and very professional. The Winchester drive industry looks up to Quantum management as an example of professionalism and the way a company should be run." Quantum places great emphasis on its people from the most senior to the most junior. They believe in each other's ability to perform the job well. Jim Patterson emphasized this in his annual report message: "Most important of all to our continuing success is the conviction we've shared from the beginning that the quality of our products is a direct result of the quality of our people."

PROGRAM

Welcome

Ayse Manyas Kenmore, President
Peninsula Chapter, SBSAA

Introductory Remarks

Robert K. Jaedicke, Dean
Stanford Graduate School of Business

Recognition of Previous Recipients

Ayse Manyas Kenmore

1977 Rolm Corporation
1978 California Microwave
1979 Qume Corporation
1980 Tandem Computers, Inc.
1981 Apple Computer, Inc.
1982 Dysan Corporation
1983 Genentech Inc.
1984 Seagate Technology

The Award

Glenn M. Mueller, General Partner
Mayfield Fund

Award Presentation

Ayse Manyas Kenmore

Remarks

James L. Patterson, President
and Chief Executive Officer
Quantum Corporation

Quantum

First Quarter Report 1985

Death Valley Days: Prospects In The Disk Drive Marketplace

By David K. Moy
Morgan Stanley & Co. Inc.

Even though end-user demand for personal computers is firming, OEM demand for disk drives, short and long term, may be weaker than one would expect due in part to inventories and other factors.

IBM might source some drives internally and is using a Japanese supplier for floppy drives—an ominous break in a formerly all-U.S. mass-storage hegemony for IBM. Apple continues to toy with internal sourcing and might become more serious with Sony as a partner. Its floppy suppliers have been Japanese anyway. Hewlett-Packard will source some of its needs in-house and will try to sell its 3.25-inch, 10-Mbyte drive to other OEMs. Longer term, shared disk drives through networking will moderate growth as well. The demand picture now and further out continues mixed at best.

Compounding demand uncertainties is a product cycle toward 20-Mbyte products and up, with a sub-5.25-inch product cycle apparently delayed until perhaps late 1985. Hopefully, there will be just one product cycle in 1985 that will be painful enough.

In the disk drive group, the safe investment pick continues to be Quantum, although Tandon is often touted as a disk drive survivor due to its "low-cost" position. We note that other companies are mimicking its offshore vertical integration tactics and that Japanese companies have lower cost of capital on average.

Wall Street Week In Review

Foreign companies often have more modest profitability goals. Even if Tandon had a lower direct-cost structure, it could be underpriced by a company with superior asset management—financing inventories and receivables is a legitimate cost of business—and by a company with access to cheap cash.

Several successful companies have not stressed low price but rather a combination of competitive price and high quality. Seagate, Quantum and Fujitsu are companies with solid market shares and reputations for quality. Fujitsu, in fact, is usually underbid by rivals in very-high-capacity drives.

Seagate has most of the best OEM customers and is either the benefactor or victim of those customers' order trends. For the short term, Seagate will probably continue to be the victim. It faces major product transitions, but its technical capabilities are probably better than commonly thought. Unfortunately, product cycles are typically painful, and Seagate investors are likely to share that pain.

MiniScribe will probably lose as much money this quarter as last. It has tapped about half of its credit line as well. It is usually regarded as having good engineering capacities and downsizing that will stress engineering skills more than in the past. If MiniScribe has a present, it may also have a future.

Computer Memories swallowed the IBM PC AT business, which helped CMI weigh in with a $30.2 million quarter in September. However, non-IBM sales fell from about $10.1 million to $8.8 million between June and September.

There are ramblings about poor disk quality, but CMI is not aware of any problem. Hungry competitors believe they can price an AT-type drive at about $400, or $100 less than CMI, and since IBM accounted for 71 percent of CMI sales in September, this underpricing could hurt CMI. The Quantum patent infringement lawsuit against CMI was rescheduled for March, and CMI will probably be running out of cash this quarter or very soon thereafter. Otherwise, everything is just fine.

Rodime's straits are less dire than some of its competitors. It has demonstrated that it can ramp up new products, and the less competitive higher-capacity segment of the market comprises 40 percent of sales. Longer term, rivals will challenge its 3.5-inch dominance, and some of its customers might become fond memories. The dollar continues to edge higher, which lowers the translated sales and earnings-per-share numbers. Its prospects are less bleak than some other low-end brethren, but less bleak is not a typical rallying cry for a portfolio-manager buying stampede.

Micropolis and Priam fall into the same category. The market they address could be very strong. They must prove they can deliver product. Priam may have bought itself a product with its recent Vertex acquisition, although making enough money to pay for the deal remains to be seen. These companies are being monitored, but it is difficult to give an opinion one way or the other about their prospects.

Quantum has performed well but faces more challengers than before as well as new product development challenges internally. It is differentiated by a high level of profitability and a more stable customer base than the low-end drive companies. These customers are likely to be harder to woo away from Quantum than is commonly believed. A subsystem product could do very well, and next year should be another good year. Its valuation is very modest, and it probably has more upside potential and less downside risk than any of the other drive companies.

David K. Moy is an analyst covering the data communication and data storage industries for Morgan Stanley & Co. Inc., New York.

Street Talk

David A. Brown
Executive Vice President Operations
Plus Development Corporation

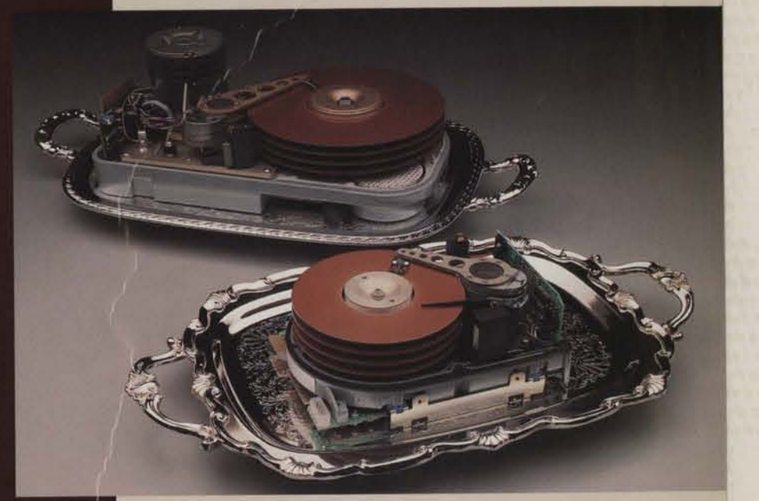

VISUAL

Medium, well-done.

We not only do medium-capacity Winchester disk drives extremely well, we do more of them than anybody.

Our 5¼" drives are now as popular a choice as the 8" drives that served as our entree.

The ability to deliver in large volumes is vital to the OEM customers we cater to. When you order, you expect to get as much as you want, exactly when you want it. It had better be there, on time, and it had better be good. Every time.



When you're trying to get as many systems as possible out the door, the last thing in the world you need is a rare disk drive.

5¼" drives, from 20 to 40 megabytes. 8" drives, from 10 to 85 megabytes.

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We've increased our lead to 5¼".

The clear lead we established with our 8" medium-capacity Winchesters has now been extended. Our 5¼" drives are out front now, too. With both 8" and 5¼" drives leading the field, we now make more medium-capacity disk drives than anybody.

If there's a lot riding on your disk drive decision, you may want to consider our record as a consistent winner.

5¼" drives, from 20 to 40 megabytes. 8" drives, from 10 to 85 megabytes.

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QUANTUM

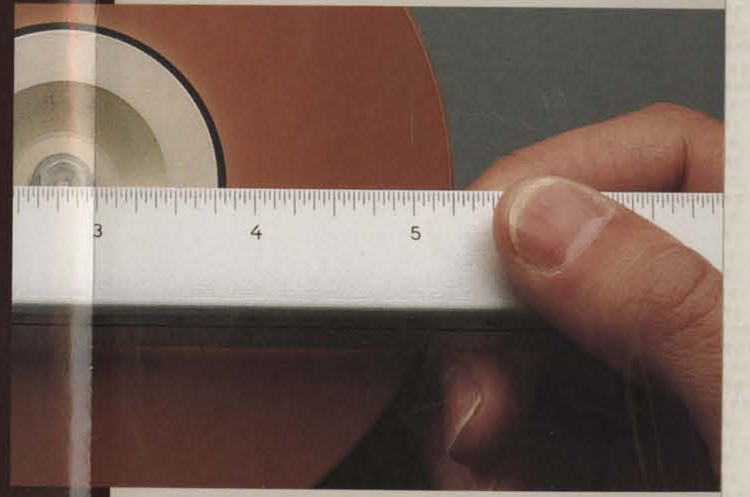
Our 8" customers are now demanding less of us.

Our 5¼" drives are now very much in demand by the same customers who keep our 8" drives at the top of the charts. Since our 8" customers include the biggest, toughest OEMs in the world, we think it's noteworthy that our existing customers have given our smaller drives such a big reception.

So big, in fact, that we now make more medium-capacity Winchester disk drives than anybody.

If you've been thinking of us as the people who make the most reliable 8" Winchesters on the market, great. But in the future, we hope you'll think less of us, as well.

5¼" drives, from 20 to 40 megabytes. 8" drives, from 10 to 85 megabytes.



Quantum Corporation, 1804 McCarthy Boulevard, Milpitas, CA 95035, (408) 262-1100, TWX 910-338-2203. Eastern Regional Sales Office: Salem, NH (603) 893-2672. Western Regional Sales Office: Santa Clara, CA (408) 980-8555. European Sales Office: Frankfurt, West Germany 611-666-6167.

QUANTUM

Data Flow

Dutch electronics giant **N.V. Philips** has signed a contract to purchase workstations from **Apollo Computer Inc.**, Apollo president Thomas A. Vanderslice told stockholders last week. "One of the most exciting things to happen in the last week or so is Philips has just adopted Apollo as their standard workstations for their VLSI projects. That to us will be another **Siemens**-type customer," he said. Apollo earlier valued its agreement with Siemens AG in excess of $30 million over 18 months and $100 million over three years. *—Gary McWilliams*

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Remaining true to its word, **Hewlett-Packard Co.**'s Design System's Group is expected to begin a media blitz within the next two to three weeks to unveil the first in a series of RISC-based HP 9000 engineering workstations. Built around HP's new Spectrum "Precision Architecture," the first 9000 offering is expected to be a high-end workstation server and not replace any existing products, some of which are built around the 68020. *—Susan Kerr*

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After six years in the **Quantum Corp.** family, **Plus Development Corp.** executive vice-president Dave Brown in June will start a three-month leave of absence to be with his own family this summer. Brown said he feels he's accomplished what he set out to do in developing the Hardcard product for the Quantum subsidiary and will discuss his next assignment with Quantum president James Patterson and Plus president Steve Berkley during his summer recess. However, he said Quantum isn't currently planning another spinout. Brown also said he intends to return to Quantum and has no interest in starting a company independently. *—Mary Brisson*

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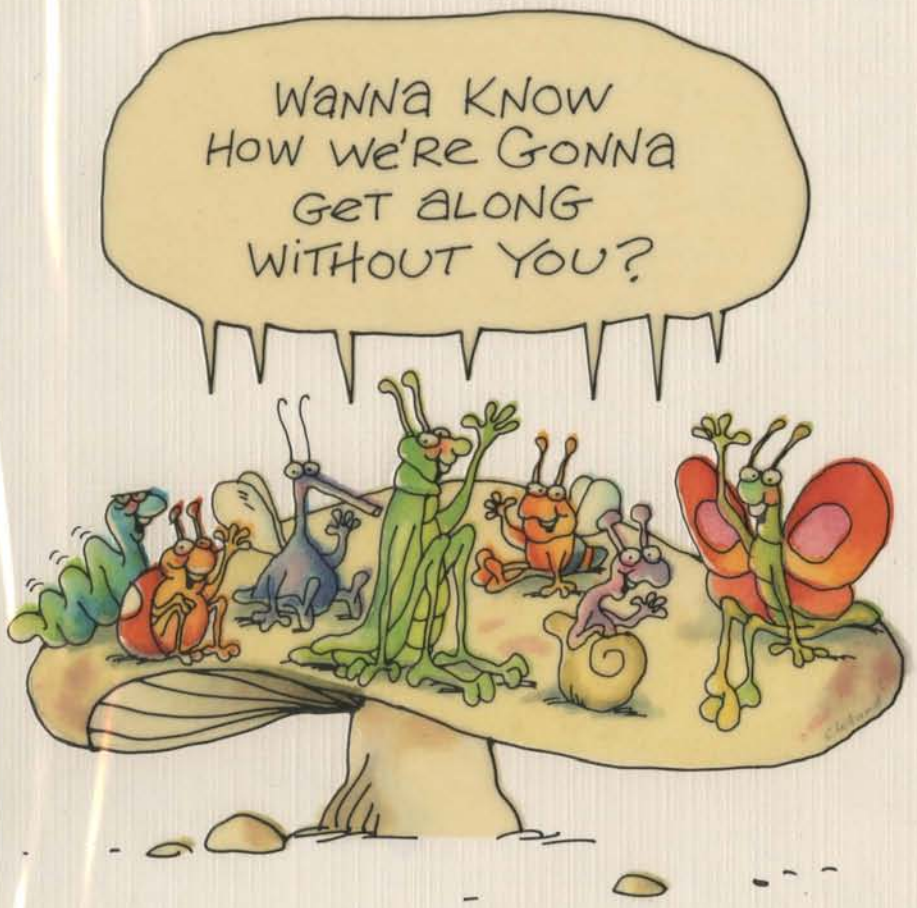
WANNA KNOW
HOW WE'RE GONNA
GET ALONG
WITHOUT YOU?

Stanford Memorial Church

April 11, 1994

5:00 pm

In Memoriam

Glenn Martin Mueller

February 21, 1942 - April 4, 1994