Goldman Sachs

Investment Research

June 8, 1987

Digital Equipment Corporation

Just Removed from Buy List

Momentum Tougher to Maintain

Lack of Positive Surprises?

Stock to Underperform Group

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(3) Because margins are near their peak, rising earnings estimates will probably be linked to a more positive revenue outlook than anything else. The primary impetus for higher revenue growth would be a stronger U.S. economy. If the economy begins to pick up considerable momentum, earnings estimate increases should be far more pronounced for other minicomputer companies that possess significantly more operating leverage than DEC. Thus, while a better economy would probably cause DEC's stock to outperform the market, we believe DEC's stock will lag the overall group.

(4) On a valuation basis, DEC's stock still looks cheap. It trades at a 10% discount to the market and at parity to IBM. We believe that the stock could sell at a higher valuation given its 15% or so long-term growth rate, 20% ROE, and excellent industry position; however, we find it very difficult to pinpoint what multiples investors will eventually pay for a company like DEC that only recently has become viewed as a cyclical, more than a growth, company.

Our fiscal 1987 and fiscal 1988 estimates are $8.35 and $10.50 per share. Given the stock's quadrupling over the past two years, 60% gain this year, and the reasons above, which we believe point to a slowing in DEC's relative momentum compared with the industry, we believe that DEC's stock will have trouble outperforming the group from this point forward.

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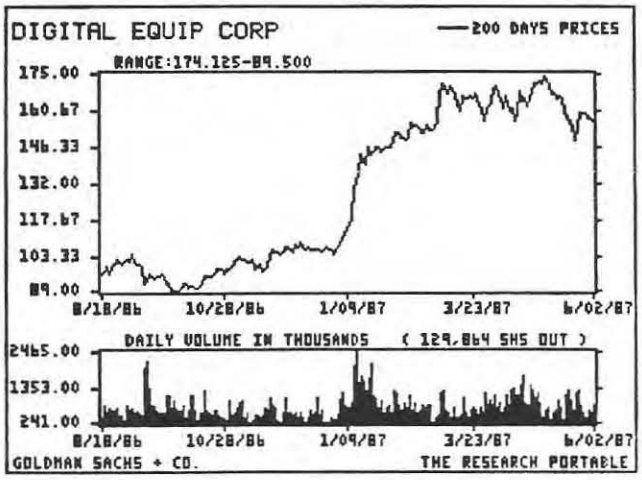
Investment Research

Price Data		52-Week Price Range	EPS 1987E	EPS 1988E	P/E on C1987E	Rel. P/E	Ind. Div.	Yield
DEC	162	175 - 81	$8.30	$10.50	17.1X	0.9X	--	--

Price Performance/ Other	% Change in Price from 52-Week High	% Change in Price from 52-Week Low	Fiscal Yearend	Shares Outst. (millions)	Avg. Mo. Trading Volume (millions)	Opts/ Convts
	-7%	100%	Jun	134.3	15.8	O/C

Profitability/ Capitalization	Est. 1987 Book Value	Price to Est. Book Value	5-Year ROE Average	5-Year ROE Range	Est. 1987 ROE	Debt to Equity
	$56.40	2.9X	11%	17% - 7%	18%	5%



DJIA: 2326
S&P 400: 341

June 8, 1987

Investment Summary

We recently removed Digital Equipment from our Recommended for Purchase List after over three years of its being our favorite minicomputer stock (see our May 22nd Brief). We believe that while the shares may continue to outperform the general market, it is doubtful that they will continue their outperformance of the computer group. The stock is up fourfold in the past two years and up more than 50% this year, much higher than the minicomputer group and the overall stock market. It is likely that our investment shift is early both in time and stock price. In fact, we would suspect that we could be at least ten points too early with regards to our investment shift on the stock. Given the stock's volatility and the nearly unanimous favorable investor sentiment toward the company and stock, however, we would much rather be a bit early than late. Beyond trading positions, we would not add to existing or establish new positions at this time. Furthermore, if and as the stock continues to do well, we would use strength to decrease (not necessarily eliminate) exposure to the stock.

The reasons behind our change in opinion are as follows:

1. After several years of having the industry's best product momentum and gaining market share (particularly from IBM), DEC's product momentum is slowing relative to its chief competitors. We believe this will make it more difficult for the company to gain market share over the next 12-18 months. During the second half of 1987, IBM, Hewlett-Packard, Prime, Sun, Apollo, and others will ship exciting new products which are apt to make it tougher competitively for DEC. Clearly the most important competitor is IBM, which this summer ships its 9370, a product likely to curb DEC's inroads into IBM's customer base of the past couple of years.

2. DEC's operating profit margins are now 18.5%, up more than threefold from two years ago, the best in ten years, and better than IBM's for the first time ever. We see nothing to suggest that margins will deteriorate any time soon, although we expect positive margin surprises, which have been a key element to the stock's success over the past two years, to be very limited in the future.

3. As margins are near their peak, rising earnings estimates will probably be linked to a more positive revenue outlook than anything else. The primary impetus for better revenues is a stronger U.S. economy. If the economy begins to pick up considerable momentum, estimate increases should be far more pronounced for other minicomputer companies which possess significantly more operating leverage than DEC. Thus, while a better economy would probably cause DEC's stock to outperform the market, we believe DEC's stock will significantly lag that of the overall group.

4. On a valuation basis, DEC's stock still looks cheap. It trades at a 10% discount to the market and at parity to IBM. We believe the stock could sell at a higher valuation given its 15% or so long-term growth rate (albeit cyclical growth), 20% ROE, and excellent industry position; however, we find it very difficult to pinpoint what multiples investors will eventually pay for a company like DEC that has only recently been viewed as a cyclical rather than a growth company.

Our fiscal (June) 1987 and 1988 estimates remain $8.35 and $10.50-$10.75, respectively. Currently, the June quarter looks quite good: DEC may beat our $2.65 estimate as orders are particularly strong. As our reasoning suggests, our change of viewpoint is not based on a belief that there are problems near term. What we do anticipate is a recognition by investors that DEC's fundamental performance relative to the industry is not going to be as spectacular as it has been over the past couple of years. Before explaining how we see the future, we look back over the past couple of years to establish a foundation from which to look forward.

A Look Back For Perspective on DEC's Success

During the past three years, DEC has gained share from many companies and has probably made greater inroads against IBM than any other competitor has in at least the past 20 years. Gains against IBM were achieved not by nibling market share around the corners of IBM's forte, but by competing head on against IBM in many sectors of the commercial market, the heart of IBM's business. Over the past several years, a number of elements have changed at DEC all combining to yield its spectacular turn-

around in market share and investor perception. While a complete list is too long to detail, we note the primary following points:

1. DEC's product line was vastly improved, particularly at the low end with the MicroVAX II.

2. The company underwent a major marketing reorganization that left it better focused on the needs of enduser customers.

3. As a result of the new products and marketing, DEC has gained considerable market share compared with most competitors.

4. DEC's margins nearly quadrupled from a very low rate.

5. DEC has noticeably improved its size, not only in revenues but also in employment, relative to its primary competitors.

6. DEC significantly changed its cost structure (i.e., where it spends its money). It used this period of prosperity to build a better foundation for the future.

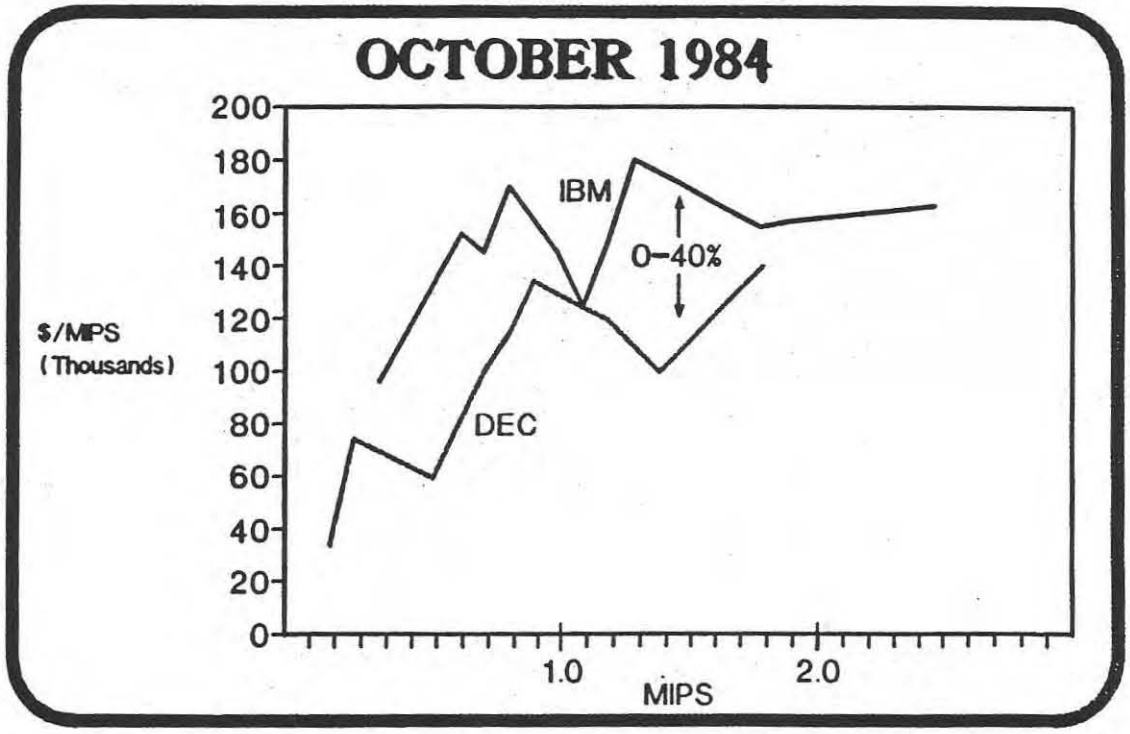
We review each of these points briefly here; our intent is not to document DEC's turnaround in and of itself, but to give an understanding of how things are changing.

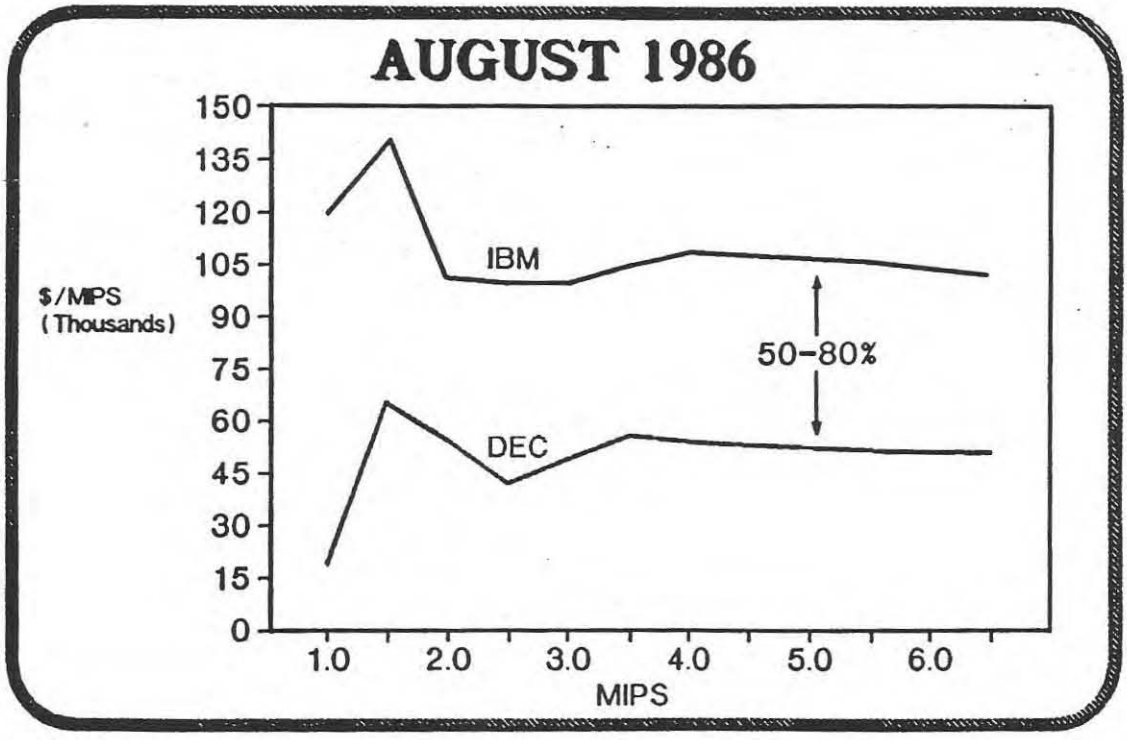
Improved Product Cycle

We will use various price and performance graphs to demonstrate how the competitiveness of DEC has changed over time relative to IBM's midrange offerings. As seen in Figure 1, in October 1984 DEC's processors held an advantage of between zero and 40% versus IBM.* In retrospect, this is not much of an advantage at all over IBM because in the

*Our price and performance lines are based on list prices of CPUs (excluding main memory) and basic operating systems only. Prices do not include peripherals, software, communications, or service. The value in comparing price/performance as we do in this and other reports, is to see how the relative price/performances of vendors' products change over time.

Figures 1 and 2





MIPS (Millions of Instructions Per Second) is a General Measure of Computer Power.
Prices are for CPU (Excluding Main Memory) and an Operating System Only.

early 1980s, DEC's processor prices were half of IBM's or lower. Particularly important to note is that in October 1984, DEC's one MIPS (VAX 780) product, the workhorse of its product line at the time, had tough competition from IBM's 4300 series because IBM had CPU pricing roughly equal to that at DEC. Also, at this time, DEC had a relatively stale product line. IBM's maximum performance out of its 4300 series was higher than that of DEC's, and its products were considerably newer.

As we show in Figure 2, in mid-1986 DEC held a price/performance advantage of between 50% and 80% on its CPUs. DEC accomplished this through the MicroVAX II at the lowend and the VAX 8600 and follow-on mid-range and highend machines delivered thereafter. Both the MicroVAX II and the VAX 8600 were the breakthrough products for DEC; beyond being important technologically, they set the stage for DEC's turn of fortune. It is important to note that the dramatic improvement of DEC's price/performance competitiveness as shown in Figure 2 occurred after a one-third price/performance boost by IBM's 4300 series in 1986. Similarly, DEC improved its competitiveness versus all other minicomputer competitors during this time.

Marketing Force Expanded and Focused

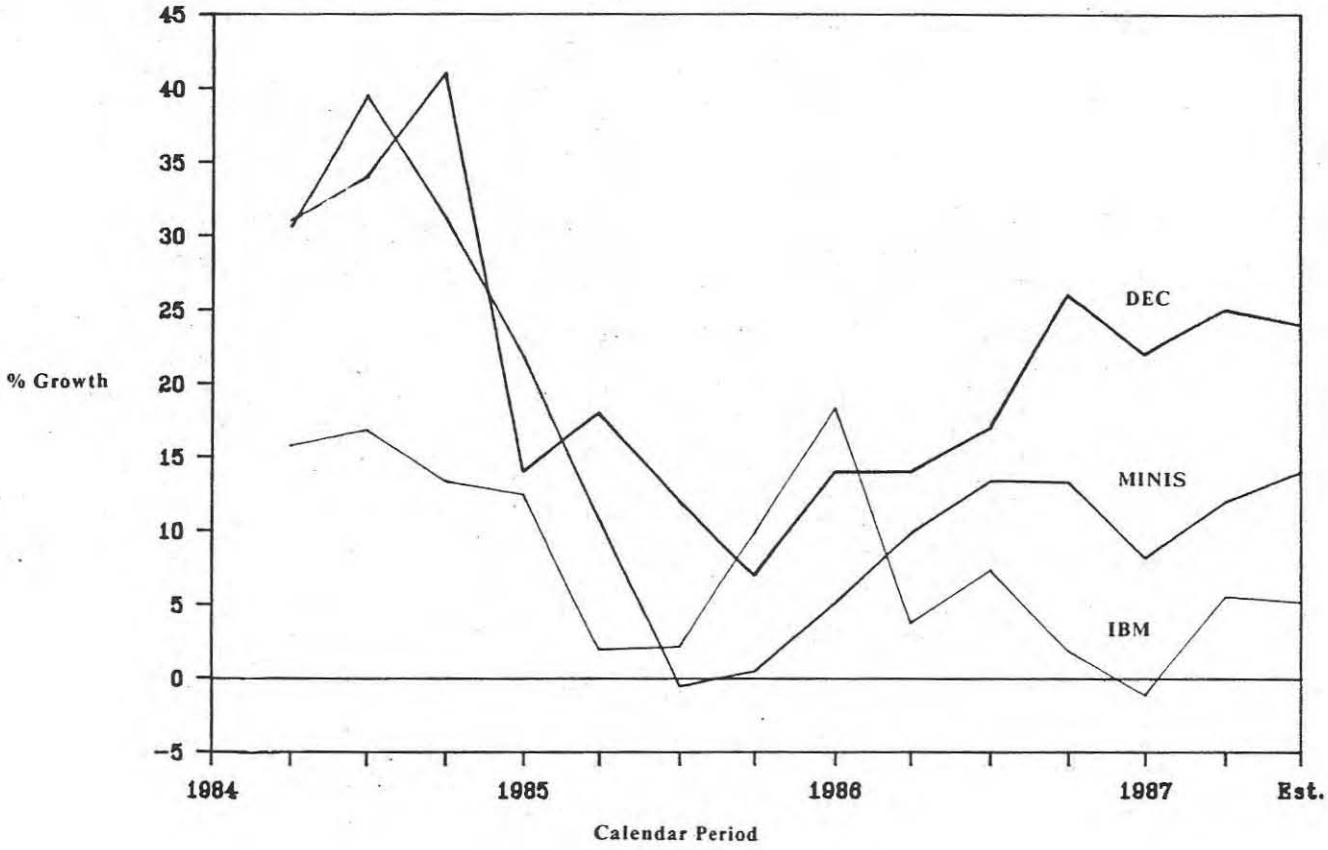
While DEC's product cycle rejuvenation was occurring, the company had just begun to emerge from a major marketing reorganization that made it far more market-focused than before. DEC began to "market" rather than nearly "take orders" for its popular products, targeting many Fortune 500-class companies as major accounts for the first time ever. The salesforce all told a consistent and convincing story of "one company, one product line, one operating system." Concurrently, DEC began a concerted effort to expand its salesforce and technical support staff greatly.

Market Share Gained Since Early 1985

The year-over-year revenue growth during the mid-1980s for DEC, IBM, and the other minicomputer companies (see Figure 3) shows that in 1985 DEC began to grow faster than its minicomputer competitors, and in 1986 began to dwarf IBM in terms of revenue growth. Currently, DEC's revenue growth is in the mid-20s compared with IBM's overall 0% growth and is better than all minicomputer competitors' except Tandem's. Two factors are largely responsible for DEC's growth: first, the lower dollar has helped DEC (as well as others) do well overseas, and

Figure 3

Total Revenue Growth, 1984-1987E



second, DEC's MicroVAX II contributed the majority of DEC's growth over the past 18 months.

MicroVAX II Spurs Growth

MicroVAX II, the minicomputer industry's first microprocessor-based (i.e., very cheap) product compatible with an established vendors' existing product line, was hailed as an industry breakthrough. Indeed, it has been an extremely popular lowend departmental processor that has done wonders for DEC's growth. As Table 1 shows, the MicroVAX II has primarily been responsible for the company's revenue growth during the two years since its introduction; the balance of DEC's product revenues has been growing very slowly, not vastly different from that of the rest of the industry. It is in many ways unfair to "back out" MicroVAX II revenues and make comparisons to other companies because if the MicroVAX II were not available, DEC would probably sell other products. Nonetheless, doing so affords a valuable perspective.

Table 1

Estimated MicroVAX II Revenue Contribution
(millions)

	Fiscal 1986				Fiscal 1987				Fiscal Years		
	SEPT	DEC	MAR	JUN	SEPT	DEC	MAR	JUN-E	1985	1986	1987E
MicroVAX	$152	$266	$323	$418	$418	$494	$570	$656	$0	$1,159	$2,138
Other Sales	904	966	946	987	973	1,042	1,104	1,234	4,534	3,803	4,352
Service	568	630	659	771	648	736	736	810	2,152	2,628	2,931
Total Revenues	$1,624	$1,862	$1,928	$2,176	$2,038	$2,272	$2,410	$2,700	$6,686	$7,590	$9,420
	As a Percent of Total Revenues										
MicroVAX	9%	14%	17%	19%	21%	22%	24%	24%	0%	15%	23%
Other Sales	56	52	49	45	48	46	46	46	68	50	46
Service	35	34	34	35	32	32	31	30	32	35	31
	Year to Year Growth										
MicroVAX	NA	NA	NA	NA	175%	86%	76%	57%			
Other Sales	2%	11%	11%	13%	8%	8%	17%	25%			
Service	18%	22%	20%	27%	14%	17%	12%	5%			

Revenue Growth Nearly Isolated to International Sector

As Table 2 shows, the international rather than the U.S. sector has been largely responsible for the corporation's solid growth overall. In fact, the international sector has been growing two to three times faster than the U.S. sector since 1985. There are two influences worth noting here, both related to the positive effects of the lower dollar. First, since 1985 translation of foreign revenues into U.S. dollars alone has contributed

Table 2

Revenue Growth, Fiscal 1983-1987E

	1983	1984	1985	1986	1987E
U.S.	11%	31%	12%	10%	13%
Int'l	9	30	33	20	43

15%-20% to international revenue growth. Second, the fact that DEC is a large exporter of products has allowed it to reduce prices overseas, thereby gaining market share from foreign competitors and IBM, which manufactures overseas most of the products it sells overseas. This trend is particularly evident in Europe, where all European vendors have seen a sharp revenue slowdown since early 1986. DEC's revenue acceleration has been in large part due to its strength overseas and is largely dollar-related. By the way, the same trend is evident at virtually every computer company except IBM, which exports very little of its overseas revenues.

International Profitability Buoyed DEC

The near quadrupling of DEC's operating profit margins in seven quarters makes it the most spectacular phoenix story of this decade in the computer industry. Figure 4 shows that DEC's margins have improved from a level equal to about half that of the minicomputer average and only one-third that of IBM's to nearly double the profitability of the average minicomputer company and surpassing IBM's for the first time ever. (Our index of minicomputer companies excludes all unprofitable companies during the periods they were unprofitable.)

As with revenue growth, it is interesting to look geographically at the trends in profitability. Because of tax, currency, and transfer pricing issues, it is impossible to ascertain the exact levels of profitability by geographic segment. Nonetheless, we believe that Table 3, which contains the data derived from DEC's annual report, accurately reflects an important trend. The data show that the international sector has been far more profitable than the U.S. division during the 1980s. Last year it was nearly three times as profitable as DEC's domestic business. Also important to note, the international sector now accounts for 47%, up from 35% in 1983, so the positive

Figure 4

Operating Margins, 1984-1987E

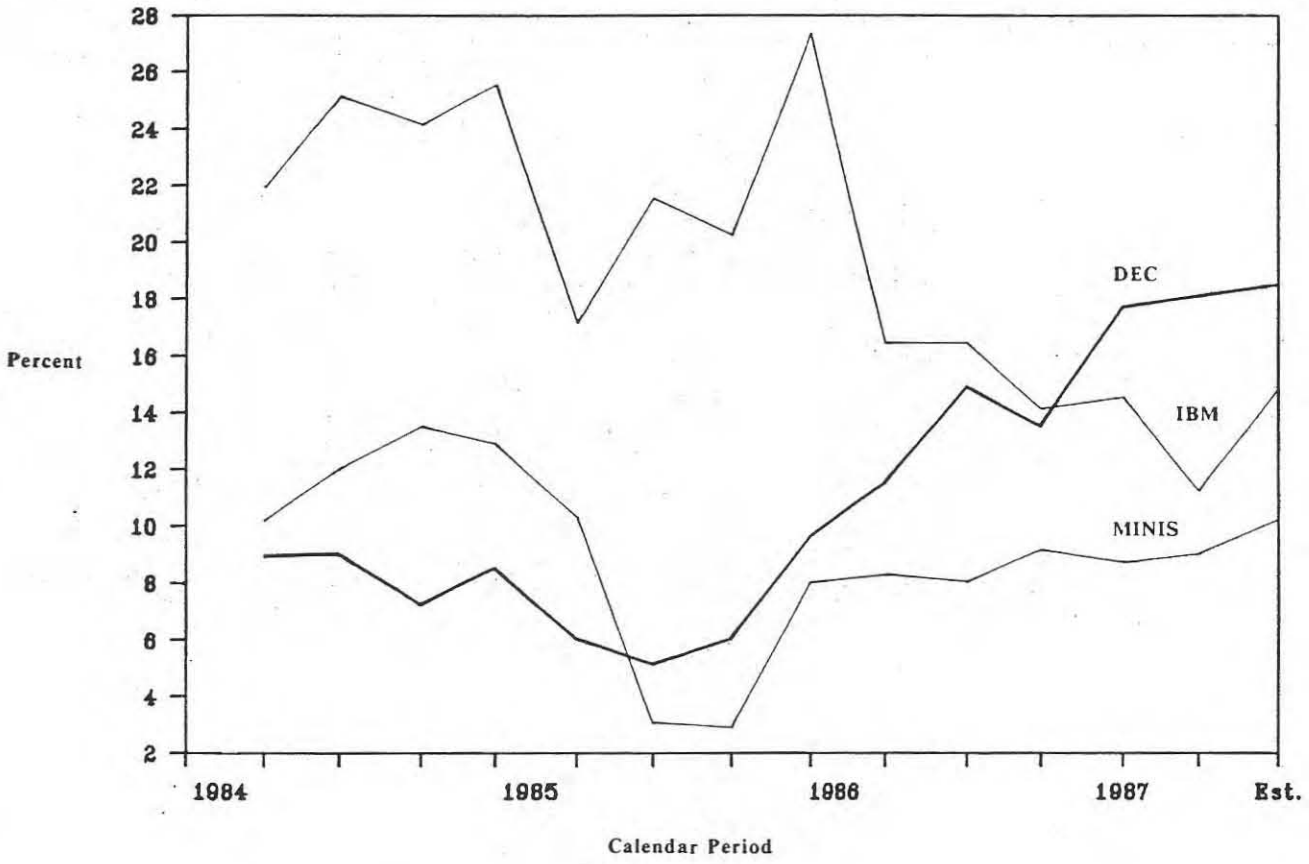


Table 3

Approximate Operating Profitability, 1983-1986

	1983	1984	1985	1986
U.S.	5%	5%	4%	6%
Int'l	10	10	10	16

influence of a more profitable overseas sector is far greater today than previously. Foreign earnings accounted for about two-thirds of fiscal 1986 earnings and are bound to increase considerably this year. Beyond the obvious positive effect that new products have had on the company's overall profitability, the lower dollar was the primary reason for the improvement overseas. Since DEC is a major exporter, its gross margins have been buoyed by the lower dollar.

Cost Structure Markedly Improved

As Table 4 shows, DEC's cost structure has changed considerably over the past five years. Its gross margins improved by 13 percentage points, improving the company's overall operating profitability by 10 points and perhaps even more importantly, at the same time fueled 3 points of incremental SG&A spending. By pumping those incremental dollars into marketing, DEC established, among other things, better geographic coverage, a number of industry focus teams, and an extensive pre-sales support organization. Three percentage points more in SG&A spending in 1987 mean $280 million incremental dollars spent on marketing in 1987 -- a level itself roughly equivalent to 1986's SG&A budget at Tandem or Prime.

Table 4

DEC's Cost Structure, Fiscal 1984-1987E

	1984	1985	1986	1987E
Cost of revenues	61%	61%	56%	48%
SG&A	21	21	22	24
R&D	11	11	11	11
Operating Margin	7%	7%	11%	17%

In simple terms, DEC has used its product-driven success over the past two years to establish a far stronger longer-term position. It has beefed up its commitment to service, marketing, and applications software -- all areas bound to become more important in the future.

Although DEC seems to have a newly strong commitment to marketing, the value of that commitment can only be understood when DEC is compared with its competitors in this respect. We do not have accurate data on the size of sales, marketing, and support organizations of computer companies. Nonetheless, we do receive total employment data on a quarterly basis. Figure 5 shows a notable phenomenon indeed. Since early 1983, IBM, the minicomputer group, and DEC have all significantly expanded their employment levels. However, since 1985 neither the average minicomputer company nor IBM have grown in size, while DEC has added some 15% to its employment roles. Recent hiring rates have also been brisk at DEC, and the company will probably increase its employment roles by another 10%-15%, or 10,000-15,000 people, over the next year or so. This is yet another measure of how DEC has used its prosperity to sow the seeds of a more solid future.

Missed Opportunities in Some Key Areas

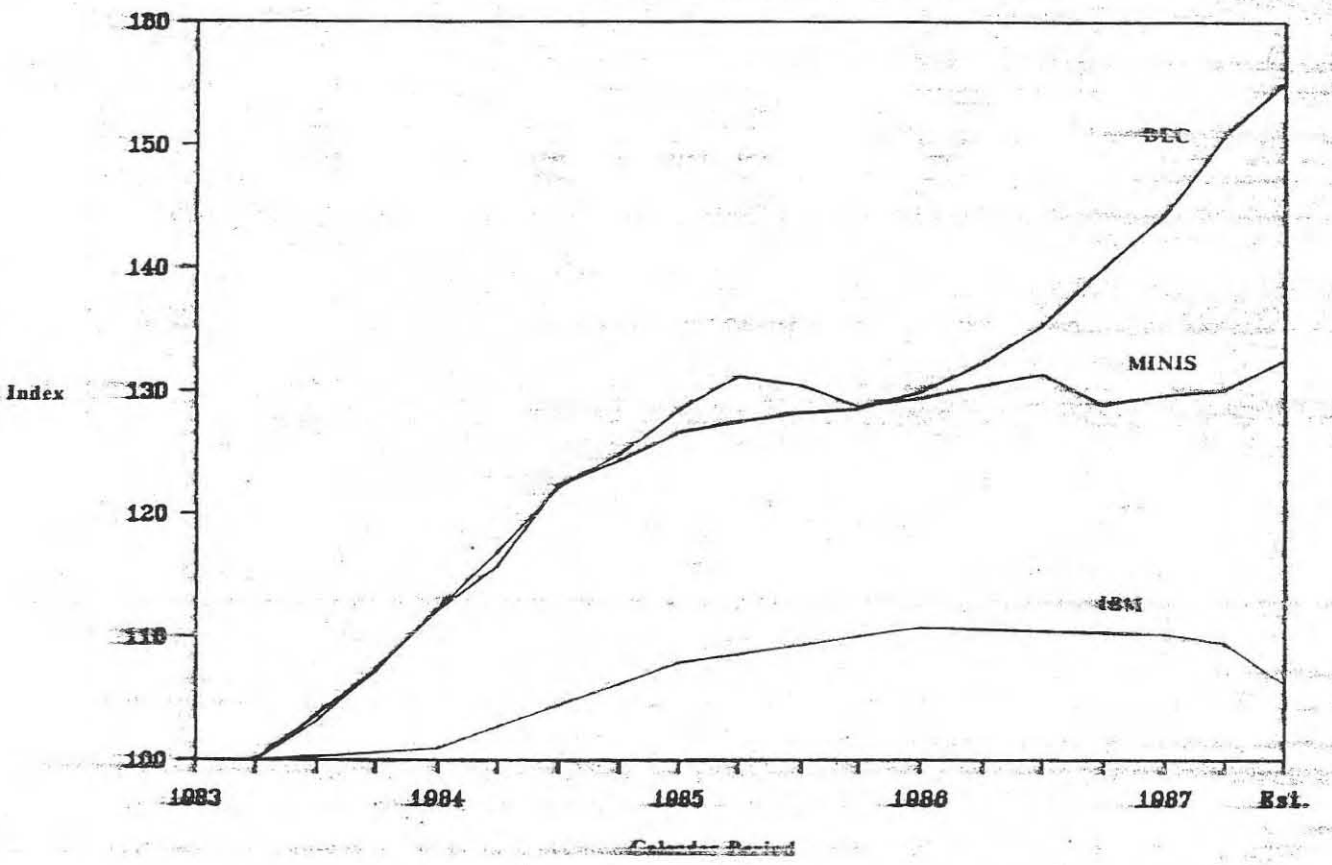
Although DEC has done so well, certainly no company can do everything right. Let us look at what DEC did not do during the past two to four years. We said before that DEC made inroads into IBM on IBM's home court -- the commercial market. During the same period, DEC was not as successful in certain areas on its own home court. DEC still reigns as king of the technical market, but many companies have used DEC's product and marketing focus on the commercial market to establish themselves with better products in some key technical markets. We point to three important areas where DEC did not fare so well -- engineering workstations, minisupercomputers, and networked PCs. The first two are in the technical sector; networked PCs have appeared in both the commercial and technical sectors.

The Fringe Market: Workstations, Minisupercomputers

The past several years saw Apollo and Sun thrive in the workstation market by offering terrific workstation products with sophisticated networking technology. At first primarily "hotbox vendors", now each offers rich environments of applications

Figure 5

Employment Growth, 1983-1987E



and systems software, networking, workstations, accelerators, database machines, etc. Their networked workstation-based solutions epitomize an alternative method of computing that is simply better for many applications than minicomputer- and mainframe-based solutions. DEC's proposed workstation alternative, the VAX Station II was a flop, achieving unit shipments of only 10%-15% of Apollo's or Sun's. A surprise to many, Hewlett-Packard has done a far better job than even DEC in the workstation marketplace and approaches Sun and Apollo in unit shipments.

Second, Convex and Alliant, the two most successful minisupercomputer vendors to date, were born over the past several years. While both were founded prior to two years ago, each has shown solid growth in 1986 and is doing quite well currently. These two companies, as well as perhaps six others in this market, primarily exist to run compute-intensive VAX Fortran programs faster than DEC. Most of the software they have running on their computers was simply ported over from the VAX. These minisupercomputers, or Crayettes as they are often called, run vector programs four to ten times faster than DEC's products. A good vector processing computer remains a hole in DEC's overall product set.

These two areas can be viewed as niches, and some would argue that they are not really important to DEC given the company's broader product strength. We believe they represent very high growth and important market segments for DEC. They are at the fringe of the company's bread and butter technical marketplace, and we think that they must be addressed more aggressively in the near future.

How big was the missed opportunity? Table 5 shows revenue streams from each of the four leaders in these fringe markets. While even collectively these four vendors had "meaningless" levels of revenues several years ago, they now account for a sizable $1.4 billion revenue base, or 15% of DEC's current size.

In short, DEC has not responded well to the two major product innovations on its home court over the past four years. Surely DEC has product plans in these areas. The VAX Station 2000 and Local Area VAXClusters are important improvements in the

Table 5

DEC's Fringe Market, 1983-1987E
(millions)

	1983	1984	1985	1986	1987E
Sun Microsystems	$ 9	$ 69	$147	$341	$ 675
Apollo Computer	81	216	296	392	550
Convex Computer	0	0	14	40	75
Alliant	0	0	4	31	75
Total	$90	$285	$461	$804	$1,375

workstation area and are bound to help DEC become a more serious contender in the workstation arena. In the minisupercomputer area, DEC's strengthened ties with Floating Point System (DEC is joint marketing FPS's array processor) indicate that a truly competitive DEC product in this market will not appear for some time. In our opinion, DEC should have never let these two very high growth markets expand so substantially without being a major participant, particularly given its "home court advantage."

Networking PCs

Over the past three years, an entire industry has sprung up to network the ever-growing base of stand-alone PCs. Companies such as 3Com and Novell have thrived by networking previously installed PCs together into a "work group" -- in other words into a "departmental computer system." Networked PCs are a true alternative to minicomputers and have taken some of the incremental growth from them as applications software richness for networked PCs has greatly improved.

We expect this trend to accelerate given new, more powerful PCs and network products. It is ironic that DEC has virtually no presence in this market since it has always been a major proponent of distributed computing and of Ethernet, the most popular networking scheme for linking PCs. DEC would claim, in its own defense, that it is a leader in networking given its success with VAXClusters and its VAXMate PCs, which are sold almost exclusively in a networked environment. We agree that DEC is a leader in these areas -- our point, however, is that DEC has done virtually nothing to tap the market for networking the base of already installed

(non-DEC) PCs. It is not an issue of product set -- DEC has the capability; it is an issue of mind set. DEC still wants to sell networked minis and PCs to large customers, but appears uninterested in networking existing PCs. This leaves DEC vulnerable to the networked micros offered by others, which collectively are beginning to have an impact on minicomputer-based solutions.

Market Share Gains and Margins at a Peak?

Before reviewing our forecast, we review the primary elements that are apt to affect DEC's ability to gain additional market share and continue its high level of relative profitability. We summarize these factors in Table 6 and discuss them below.

Table 6

Factors Influencing DEC's Market Share and Margins Gains

Negative	Positive
IBM's 9370/HP's Spectrum	Lower dollar
More powerful micros	U.S. economic improvement
UNIX is for real	Revenue/fixed cost growth
Competition for VARs	More new products

Momentum of the type DEC has had relative to most competitors for the past two years is likely to change very gradually. Chances are quite high that DEC's momentum will actually slow well before it is evident in its reported numbers or reported in the press. This is just what happened with IBM's momentum -- it had slowed well before that fact became obvious just over a year ago. DEC has gained market share from IBM and its traditional minicomputer competitors for over two years. These past several years have demonstrated a remarkable convergence of a major product cycle improvement throughout DEC's primary product line, spectacular reception for the MicroVAX II, a visionary focus on what customers want (a compatible set of network solutions), the strongest financial controls exhibited by DEC in decade, and a marketing change that has left the field organization focused on customers and with a single clear strategy of "one company, one product line, one operating system."

These elements came together while the curtain was dropping on IBM's positive and seemingly unstoppable product and marketing cycle of the early 1980s. Inevitably, DEC's relative momentum cannot continue forever. Our judgment is that peak in this relative momentum is very close simply because competitors are improving their product positions faster than DEC.

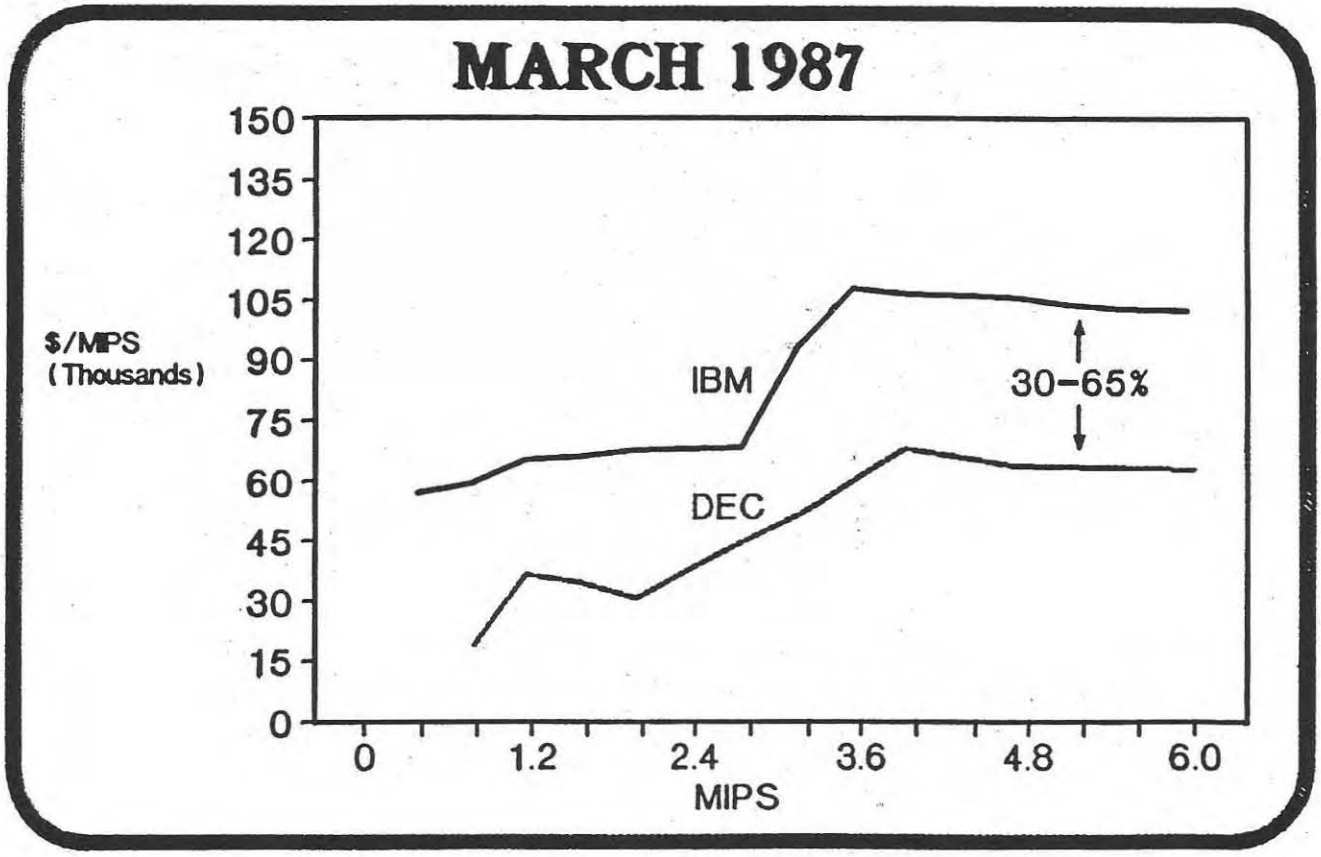
New IBM and Hewlett-Packard Products

We view the 9370 as a far better IBM product offering in the 0.5-2.7 MIPS range than ever before. It is more "open" than previous offerings, is an office environment (non-computer room) product and is 40% cheaper than the IBM 4361 line it replaces. In essence, while DEC used to have a 50%-80% price/performance advantage over IBM as shown in Figure 2, it now has what appears to be a 30%-65% price/performance advantage (see Figure 6). While our enthusiasm for the 9370 is tempered for a host of technical reasons (e.g., poor communication and unavailability of MVS/XA), we believe the 9370 will make it far tougher for DEC to take market share from IBM's installed base. The 9370 begins shipping this summer. Also shipping this summer will be Hewlett-Packard's long-awaited Spectrum product targeting the commercial market and a host of additional Spectrum products for the technical/scientific market. These products offer what we believe is truly breadthrough price/performance; Hewlett-Packard's Spectrum computers are less than half the price of DEC's VAXs, while Hewlett's minis have traditionally been priced on par with DECs. We expect Hewlett-Packard to gain share from most competitors with these products, including DEC (for details see our April 10th Hewlett-Packard Report).

Micros Eclipsing Mainframes in Performance

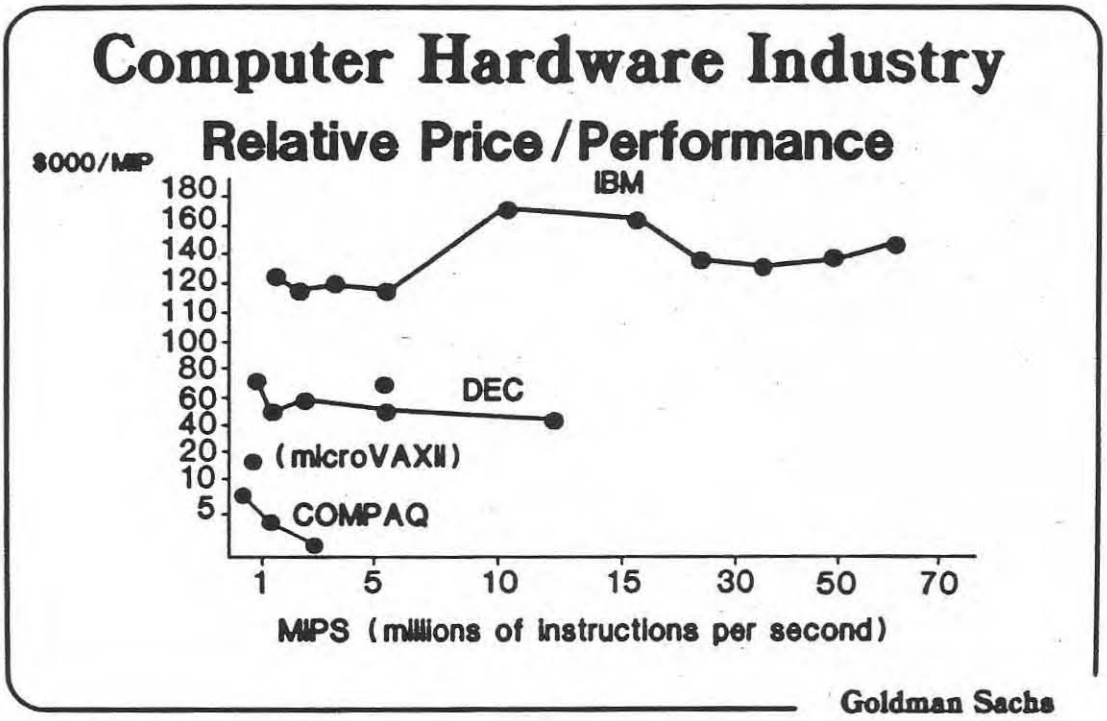
The second challenge for DEC, and in fact all the established minicomputer and mainframe companies, is the growing capability of microprocessors. Figure 7 shows the great differences in what we call the economics of microprocessor, minicomputer, and mainframe-based products. The tremendous price/performance advantages of micros over minis, and minis over mainframes are not signigicant as long as micros stick to lowend, minis to midrange, and mainframes to highend markets. However, 1987 will mark the first time that microprocessors offer performance equal to midrange and even highend minicomputers. In the 1970s, the 1.0 MIPS minicomputer was introduced, about five years ahead of the Motorola 68010, one of the first 1.0 MIPS

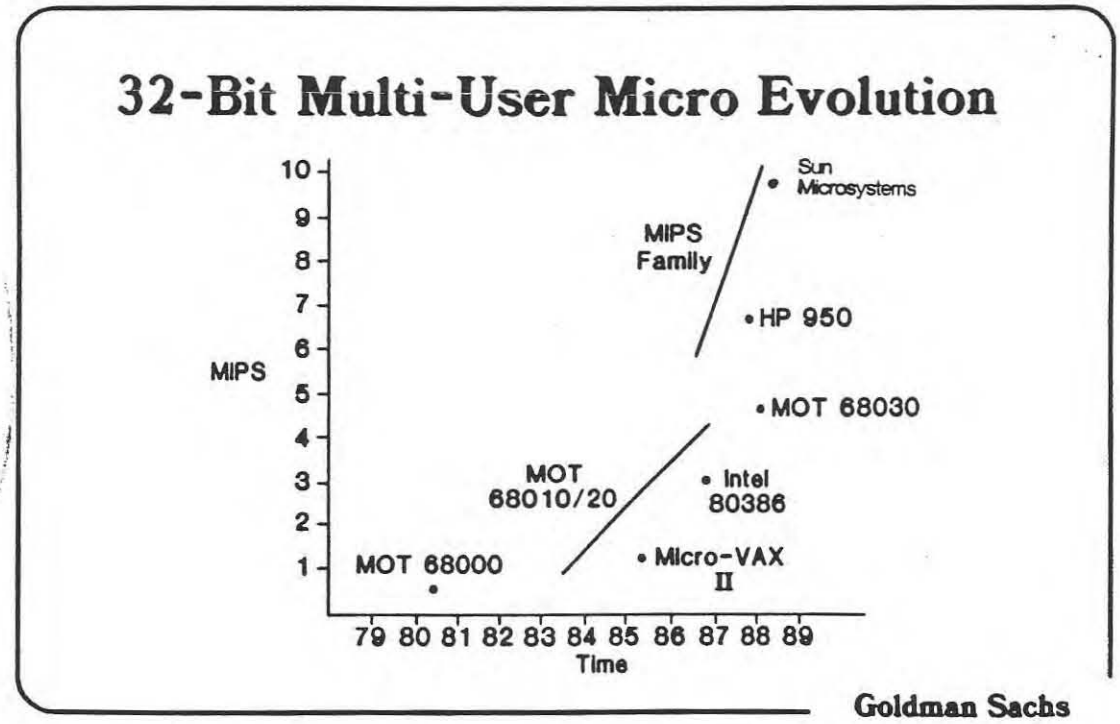
Figure 6


MARCH 1987
$/MIPS (Thousands)
150
135
120
105
90
75
60
45
30
15
0
IBM
DEC
30–65%
0
1.2
2.4
3.6
4.8
6.0
MIPS

Figures 7 and 8

Relative Price/Performance and 32-Bit Multi-User Micro Evolution





microprocessors. As Figure 8 shows, each year in the 1980s so far has seen microprocessor performance improve sharply. These performance figures are for single or uniprocessor products. In late 1987 and 1988, semiconductor-based products from Motorola, Intel, Hewlett-Packard, the Silicon Valley startup MIPS, Sun, and others will easily offer five and probably more than ten MIPS of power. This compares to the six MIPS uniprocessor performance available from DEC's highend machines. Basically, despite the five-year lead they once held, highend minicomputers will shortly see their performance eclipsed by commonly-available micros.

In addition, many promising companies such as Sequent Computer and Bolt Beranek and Newman have begun successfully to implement new architectures such as multiprocessing and parallel processing, which use these increasingly powerful micros as building blocks for far more powerful systems. For example, Sequent recently announced a product based on the Intel 80386, which spans the performance range of 3-80 MIPS.

During the rest of this decade, the two most important trends affecting DEC are microprocessors surpassing minis in their performance and more importantly, architectural innovations such as multiprocessing, which allows startup computer companies to use micro-based technology to compete vigorously with established minicomputer and even mainframe products. We are aware that DEC has had a number of programs in parallel processing and RISC technology, both aimed at expanding the capability of the highend VAX product well beyond the current level. As far as we can tell from our industry contacts, its success is mixed in these areas.

UNIX Gains Momentum

The elements are in place for the great expansion of applications programs written for UNIX for both the technical and the commercial marketplace. First, some major U.S. customers are saying "Give me UNIX or give me nothing." Certainly customers such as GM, Boeing, Ford, the U.S. Government, Schlumberger, and AT&T have not abandoned their non-UNIX computers, but increasingly these and other customers are purchasing UNIX-based products for new applications. Second, every major European vendor, including Nixdorf, Olivetti, Bull, and ICL, now offers UNIX-based product lines. Importantly,

these companies are currently pushing their UNIX products as their primary entre into new markets. Thus, we have a group of companies with over $10 billion in European revenues, over twice that of DEC in Europe, giving UNIX a major distribution push this year. Tandem and Prime both have just announced departmental UNIX systems, which they plan to push into new markets with as well. These two elements -- more customers demanding UNIX and large computer vendors pushing UNIX-based products -- will greatly increase the breadth and availability of UNIX software this year. Soon UNIX will be considered a clear fourth to IBM's 370, DEC's VAX and MS DOS-based products in applications software richness. The popularity of UNIX will siphon off the flow of new applications software from VAX and take incremental market share.

Stiffer Competition for VARs and VADs

Finally, we would like to mention a marketing challenge in the area of third-party distribution. With the increasingly high performance of inexpensive micro-based solutions, the new scaleable architecture is making upgrades easier and less expensive, with UNIX gaining momentum in an array of markets, and with IBM pushing its new 9370 and Personal System 2 products through the VAR/VAD channel, competition for third-party distribution will escalate this year. This new competition comes at a time when DEC's salesforce is focusing almost exclusively on Fortune 500-class accounts and relying more on third parties to reach the smaller OEM and enduser customers. We see the increasing competition for this all-important channel as a major risk and believe it bears close watching. In all likelihood, DEC will have to accept lower rates of return in this distribution channel to hold its current position.

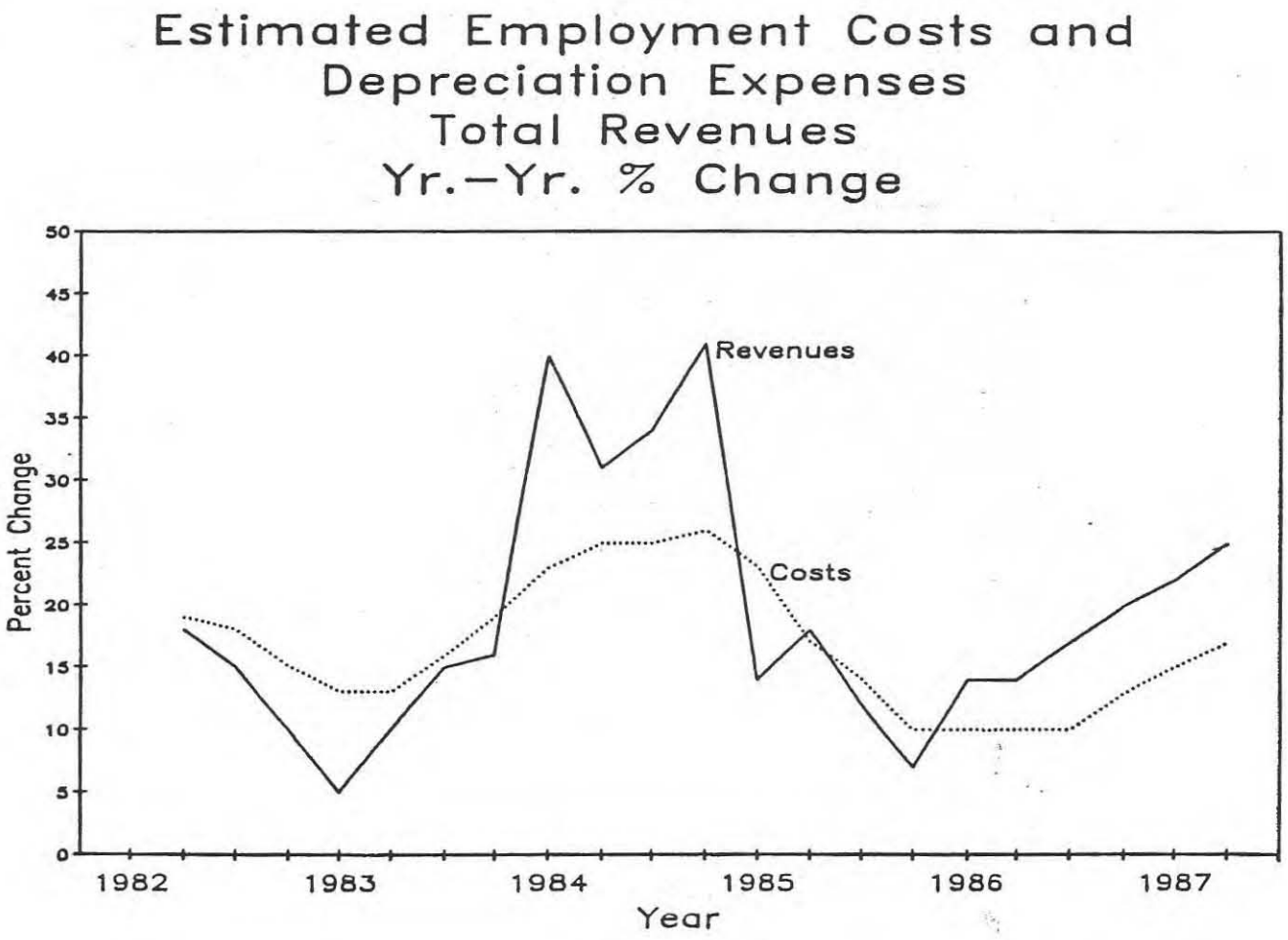
The Positive Forces

On a positive note, assuming the dollar stays weak, DEC could see its overseas profitability and the contribution of the international sector expand even further. An improvement in the U.S. profit margins would be even more influential, although we believe this could be spurred only by a sustained pickup in U.S. demand.

We illustrate an additional positive for margins in Figure 9, which shows the growth rate in revenues and in employment and depreciation costs. Tracking the relationship between these two items is very important since employment plus depreciation costs

Figure 9

Estimated Employment Costs and Depreciation Expenses



account for the majority of DEC's fixed costs, or about 65% of DEC's total cost. As shown, the rates of revenue and cost growth have moved roughly in parallel since late 1985. Importantly, revenue growth has exceeded the growth of these costs by about ten percentage points; this has been one of the primary factors behind DEC's margin expansion. Given our forecast of the growth in these variables, we foresee little reason that margins should decline. In fact, given this positive relationship, it appears that DEC could absorb some price pressure without much, if any, margin impact.

Finally, DEC will certainly have several significant new product announcements this year. The most important ones are apt to be new low- and highend products. The MicroVAX III, as we will call the new lowend product, should be seen sometime early in fiscal 1988. We believe it will perform roughly twice as well as the MicroVAX 2000 and sell for a slight premium. The MicroVAX 2000 will likely see a price cut and be positioned against new multiuser systems based on Intel's 80386 processor. At the highend, we expect DEC to announce a product to boost its highend performance to 10-12 MIPS from the current 6 MIPS VAX 8700. This would be competitive with Prime's new 6350 product and push DEC's uniprocessor performance close to that of IBM's entry level mainframes. These two products plus others should help DEC maintain its solid product cycle, and top line growth. (We hasten to add that even with these new products DEC's product momentum relative to others is bound to slow down.)

Outlook for Fiscal 1987 and 1988

Table 7 details our forecast for fiscal (June) 1987 and 1988. The primary conclusion to draw from the above discussion is not a definitive answer on whether DEC's market share gains and profit margins are precisely at peak levels -- indeed a reasonable case can be made one way or the other. The important point is that should DEC's margins improve much further, in all likelihood the increase will be fueled by events such as a weak dollar, a

Table 7

Income Statement, 1986-1988E

(millions)	Fiscal 1987				Fiscal 1988				Fiscal Years		
	SEPT	DEC	MAR	JUN-E	SEPT-E	DEC-E	MAR-E	JUN-E	1986	1987E	1988E
Sales	$1,391	$1,536	$1,674	$1,925	$1,732	$1,905	$2,058	$2,346	$4,962	$6,525	$8,041
Service	648	736	736	810	770	846	847	932	2628	2931	3395
Total Revenues	$2,039	$2,272	$2,410	$2,700	$2,502	$2,752	$2,905	$3,278	$7,590	$9,420	$11,436
Cost of Revenues	$1,027	$1,095	$1,150	$1,269	$1,213	$1,293	$1,365	$1,540	$4,281	$4,540	$5,412
SG&A	498	539	566	645	625	674	726	787	1665	2249	2812
R&D	238	233	255	284	275	303	305	344	814	1010	1227
Operating Profit	$276	$404	$439	$502	$388	$482	$508	$606	$830	$1,621	$1,984
Operating Margin	13.6%	17.8%	18.2%	18.6%	15.5%	17.5%	17.5%	18.5%	10.9%	17.2%	17.3%
Net Interest	$18	$20	$21	$22	$23	$25	$25	$27	$29	$81	$100
Pretax Profit	$295	$424	$460	$524	$411	$507	$533	$633	$859	$1,703	$2,084
Pretax Margin	14.5%	18.7%	19.1%	19.4%	16.4%	18.4%	18.4%	19.3%	11.3%	18.1%	18.2%
Taxes	$112	$154	$153	$168	$131	$162	$171	$203	$239	$586	$667
Tax Rate	38.0%	36.3%	33.2%	32.0%	32.0%	32.0%	32.0%	32.0%	27.9%	34.4%	32.0%
Net Income	$183	$270	$307	$356	$279	$344	$363	$431	$620	$1,116	$1,417
EPS	$1.37	$2.02	$2.29	$2.64	$2.07	$2.55	$2.69	$3.19	$4.82	$8.32	$10.50
Avg. Shares Outstanding	133	134	134	135	135	135	135	135	130	133	135
	As a % of Revenues										
Sales	68.2%	67.6%	69.4%	71.3%	69.2%	69.2%	70.8%	71.6%	65.4%	69.3%	70.3%
Service	31.8	32.4	30.6	30.0	30.8	30.8	29.2	28.4	34.6	31.1	29.7
Cost of Revenues	50.4	48.2	47.7	47.0	48.5	47.0	47.0	47.0	56.4	48.2	47.3
SG&A	24.4	23.7	23.5	23.9	25.0	24.5	25.0	24.0	21.9	23.9	24.6
R&D	11.7	10.3	10.6	10.5	11.0	11.0	10.5	10.5	10.7	10.7	10.7
Net Interest	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.4	0.9	0.9
Net Income	9.0	11.9	12.7	13.2	11.2	12.5	12.5	13.1	8.2	11.8	12.4
	Year-Over-Year Growth										
Sales	32%	25%	32%	37%	25%	24%	23%	22%	9%	32%	23%
Service	14	17	12	5	19	15	15	15	22	11	16
Total Revenues	26	22	25	24	23	21	21	21	14	24	21
Operating Profit	181	125	97	53	40	19	16	21	84	95	22
Pretax Profit	202	130	94	55	39	20	16	21	99	98	22
Net Income	152	97	80	49	53	28	18	21	62	80	27
EPS	129	86	73	46	51	26	17	21	51	73	26
	Sequential Quarter-to-Quarter Growth										
Sales	-1.0%	10.4%	9.0%	15.0%	-10.0%	10.0%	8.0%	14.0%			
Service	(16.0)	13.6	0.1	10.0	(5.0)	10.0	0.1	10.0			
Revenues	(6.3)	11.4	6.1	12.0	(7.3)	10.0	5.6	12.8			
SG&A	5.1	8.2	5.1	13.9	(3.1)	7.8	7.7	8.3			
R&D	6.6	(1.8)	9.4	11.0	(2.9)	10.0	0.8	12.8			

(a) Excludes benefit of DISC reversal.

E-Estimated

sustained pickup in U.S. demand, or something else that affects all other companies quite favorably as well. In this scenario, the upside earnings surprises would probably be more frequent and dramatic with other (less profitable) computer companies that with DEC. It seems reasonable to expect new products and the continuation of solid revenue/cost relationships from DEC, although not improved margins; in short, IBM and other major competitors are now showing their best new product flow in several years and DEC is now hiring at a brisk pace (even though in line with revenue growth).

In Table 7, we estimate earnings of $8.35 and $10.50-$10.75 for 1987 and 1988, respectively. Because of the company's normal seasonality, operating margins will not remain in the high teens on a quarterly basis, though they should average 17%-17.5% in fiscal 1988. In addition to not expecting any major changes in operating margins next year, we doubt if DEC's cost structure will change much. We anticipate that gross margins will be about 52.5% and that spending on SG&A and R&D will approximate 24.5% and 10.7% of revenues, respectively. While higher gross margins are possible, any improvement is apt to trigger additional SG&A outlays, thus having no net effect on profitability.

Cash Flow Still Strong

The company's rebounding profitability and tight asset management -- particularly a dramatic improvement in inventory turnover -- led to a very powerful cash-flow story of the past two and a half years. Although we suspect that the positive story will remain intact, it will moderate given the following factors:

1. Inventory turnover has plateaued at about 3.5 times for the past year (see Table 8). We expect the turnover to remain at this very healthy rate and doubt it will improve. The strongest supporting evidence is the recent increase in raw materials levels after two years of sequential declines (see Table 9).

Table 8

Inventory Turnover, 1982-1987 to Date(a)

Year	Period Ending Mar	June	Sept	Dec
1982	1.84	1.92	1.96	1.97
1983	1.75	1.93	1.83	1.89
1984	1.81	1.82	1.79	1.81
1985	1.94	2.33	2.50	2.87
1986	3.12	3.57	3.56	3.43
1987	3.33			

(a)Trailing 12-month cost of revenues divided by quarter-end inventories.

Table 9

Inventory Trends
(millions)

	1986 March	June	Sept	Dec	1987 March
Raw materials	$ 349	$ 339	$ 313	$ 373	$ 387
Work in progress	549	524	508	489	512
Finished goods	476	337	401	407	441
Total	$1,375	$1,200	$1,221	$1,270	$1,341
	Quarter-to-Quarter Growth				
Raw Materials	- 2.3%	- 2.9%	- 7.9%	19.3%	3.9%
Work in Progress	9.4	- 4.6	- 3.1	-3.6	4.6
Finished goods	-23.0	-29.3	19.1	1.6	8.3
Total	- 7.0	-12.7	1.8	4.0	5.6

First increases after seven quarterly declines.

2. After almost one and a half years of declining production levels (see Table 10) and facilities consolidation, DEC has recently begun showing year-over-year growth in both production rates and capital spending, indicating that fiscal 1988 will be a year of investment in manufacturing facilities We expect capital spending to approximate $1 billion next year, up to 60% and the highest growth in years.

Table 10

Estimated Production, 1984-1987 to Date(a)

Year	Period	Beginning Inventory	(a) Production	Cost of Sales	Ending Inventory	% Change in Production Yr.-Yr.	% Change in Production Qtr.-Qtr.	Yr.-Yr. % Change in Capital Spending
1984	Mar	$1,202	$674	$558	$1,318	42 %	9 %	10 %
	Jun	1,318	743	665	1,396	36	10	45
	Sept	1,396	703	600	1,498	27	(5)	50
	Dec	1,498	633	632	1,499	3	(10)	32
	Year	$1,202	$2,752	$2,455	$5,710	26		34
1985	Mar	$1,499	$593	$670	$1,422	(12)	(6)	36
	Jun	1,422	586	764	1,244	(21)	(1)	4
	Sept	1,244	589	589	1,244	(16)	1	(8)
	Dec	1,243	550	672	1,121	(13)	(7)	12
	Year	$1,499	$2,318	$2,695	$5,030	(16)		10
1986	Mar	$1,121	$547	$642	$1,025	(8)	(1)	(17)
	Jun	1,025	486	651	861	(17)	(11)	7
	Sept	861	654	606	909	11	34	7
	Dec	909	605	617	897	10	(7)	4
	Year		$2,292	$2,515	$3,691	(1)		0
1987	Mar	$897	$727	$671	$953	33	20	40

Biggest gain in over 2 years.

Biggest gain in almost 3 years.

(a)Year-over-year change in quarterly cost of sales plus quarterly growth in finished goods and work in process inventories.

3. We do not anticipate any further improvement in receivable turnover. On the other hand, if we were surprised positively by fiscal 1988's cash flow, an improvement in receivable would likely be responsible.

Tables 11 and 12 show DEC's cash flow and balance sheet for the past three years plus our expectations through fiscal 1988. It appears that by next spring DEC could be flushed with well over $3 billion ($25 per share) in cash. Management has chosen recently to buy back stock, although only enough to fund employee stock purchase programs and hold sharecount at current levels. Given our cash forecast, we see little reason why management

Table 11

Cash Flow Statement, 1984-1988E

(millions)

	1984	1985	1986	1987E	1988E
OPERATING SOURCES					
Net Income	$329	$447	$617	$1,151	$1,427
Depreciation	253	315	384	420	510
Deferred Taxes	10	(58)	(5)	11	5
Total Operating Sources	$591	$703	$997	$1,583	$1,942
OPERATING USES					
Net Capital Expenditures	$424	$535	$520	$624	$1,000
Accounts Receivable	402	12	364	534	534
Inventories	498	(96)	(556)	176	283
Other Curr. Assets	60	36	30	113	95
Other Curr. Lias.	(258)	136	(131)	(739)	(430)
Total Operating Uses	$1,127	$623	$226	$708	$1,481
Operating Sources Less Uses	($536)	$81	$770	$874	$461
NON-OPERATING SOURCES					
Debt					
Short Term	($2)	($1)	$9	($7)	$0
Long Term	349	396	(504)	(63)	0
Total Debt	$347	$395	($495)	($70)	$0
Change in Common Equity	$109	$129	$556	($150)	$100
Total Non-Operating Sources	$456	$523	$61	($220)	$100
Beginning Cash Balance	$556	$476	$1,080	$1,911	$2,565
Total Sources Less Uses	(80)	604	831	654	561
Ending Cash Balance	$476	$1,080	$1,911	$2,565	$3,126

Table 12

Year Ending Balance Sheet, 1983-1988E

(millions)

	1983	1984	1985	1986	1987E	1988E
Assets						
Cash	$556	$476	$1,080	$1,911	$2,565	$3,126
Accounts Receivable,net	1,125	1,527	1,539	1,903	2,437	2,971
Inventories	1,354	1,852	1,756	1,200	1,376	1,659
Other Current Assets	166	226	263	292	405	500
Total Curr. Assets	$3,201	$4,082	$4,638	$5,306	$6,783	$8,256
PPE,net	$1,340	$1,511	$1,731	$1,867	$2,071	$2,561
Total Assets	$4,541	$5,593	$6,369	$7,173	$8,854	$10,817
Liabilities						
Short Term Debt	$16	$15	$14	$22	$15	$15
Other Curr. Lias.	808	1,066	930	1,061	1,800	2,230
Total Curr. Lias	$824	$1,081	$944	$1,084	$1,815	$2,245
Dfd. Tax Credits, net	$83	$92	$34	$29	$40	$45
Long Term Debt	93	441	837	333	270	270
Stockholders' Equity	$3,541	$3,979	$4,555	$5,728	$6,729	$8,256
Total Liab. and Equity	$4,541	$5,593	$6,369	$7,173	$8,854	$10,817

cannot expand its stock purchase programs or initiate a dividend. A nominal dividend of, say, $1 per share would have little impact on DEC's cash hoard and would broaden the pool of potential shareholders to include state funds and others that require that the stocks in their portfolios pay dividends. This is exactly the type of shareholder DEC would like to attract; for the most part, investment firms requiring dividends tend to be long-term holders of shares as opposed to those overly concerned with quarter-to-quarter performance. The stock's tremendous volatility during late 1983 and 1984 probably is still fresh in DEC's mind and is a reason that it would want to bolster relations with this potential group of shareholders.

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