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## CAD/CAM INDUSTRY SERVICE Personal CAD: Markets at the Low End

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# Personal CAD Industry Overview

## THE PC CAD MARKET IN 1988

PC CAD flourished in 1988, continuing another year of record growth. Revenue rose 24 percent, which was above the industry average. (See Tables 1 through 9 at the end of this document for a complete overview of the PC CAD market from 1988 through 1993). The 1988 market leaders featured well-known brand names: Apple, Autodesk, and Compaq. By the end of the year, Compaq had unseated IBM for the number one market position in two important categories:

- Total CAD/CAM/CAE revenue on the PC platform
- Number of seats shipped in the entire CAD/CAM/CAE market

In software, Autodesk's number one market position appears untouchable for the foreseeable future. Among the second tier companies, PC products from large traditional CAD companies grew faster than those from the small unknown vendors. Few companies entered the PC CAD market in 1988.

The revenue of PC CAD vendors of all sizes generally grew or held steady in 1988. Our PC CAD data represent revenue from a very large sample: 175 vendors and their subsidiaries, some of which are miniscule. While the CAD industry as a whole experienced mind-numbing consolidation, the small PC CAD software vendors generally neither left the market nor were acquired in 1988, with the notable exception of Autodesk's purchase of Generic Software.

Typically, vendors were busy either developing products for the Macintosh, or wringing higher performance from existing software. The scrappy, upstart nature of the PC CAD market has not vanished, but cost-conscious innovation has shifted from improving application software to wresting better CAD performance from hardware and system software.

## The PC CAD Platform

The Intel 80386 processor deserves significant credit for PC CAD growth in 1988, because its power was just what existing CAD software needed. More than any other PC-based application, existing CAD software provided the showcase for 80386 performance. Buyers saw existing PC software change from being a "make-do" product on the 286 CPU to being an "almost-workstation" product on a 386-based system. By midyear, it was clear that CAD is a key driver of the high-end PC market, and vendors of PC CAD system components began cooperating to produce more powerful systems.

During 1988, relationships strengthened among CAD software suppliers, computer manufacturers (especially Compaq), graphics hardware suppliers, and operating system suppliers. PC hardware manufacturers focused on CAD as a key driver of their high-end products and worked steadily to drive up product performance. Thus, the CAD software supplier is no longer working alone to deliver the highest performance on a PC system.

Vendors supplying any component of a high-end PC CAD system typically tweak their products toward boosting CAD software performance.

### **Where Do PCs End and Workstations Begin?**

PC and technical workstation vendors achieved significant overlap in 1988, with PC hardware vendors relentlessly driving up performance and options while technical workstation vendors pushed their products toward the commodity arena by lowering prices and adding DOS compatibility. For several years, Dataquest had been predicting the merger of the PC and low-end technical workstation CAD markets, and 1988 was the year it became measurable.

### **PC and Workstation Definitions**

#### *Personal Computer*

This is a single-user computer that is distinguished from a technical workstation by its features and by the user's potential range of expansion on the platform. Features found in technical workstations (such as a virtual operating system, networking, high-performance graphics, and multiuser/multitasking capability) are optional, rather than integrated by the manufacturer. Many users reach a migration path ceiling at the high end of the PC product line, both in computer performance and sophistication of available application software (for example, a Mac II or Compaq 386 user is operating at the platform ceiling; the next move upward is to the technical workstation platform).

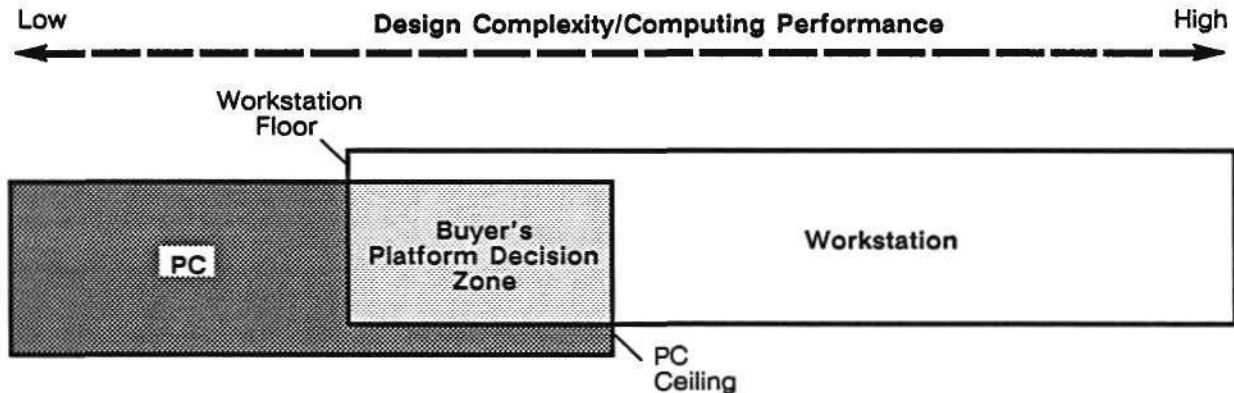
#### *Technical Workstation*

This is a single-user computer that is distinguished from a personal computer by its features and by the user's potential range of expansion on the platform. Its features include a virtual, multitasking operating system (UNIX, VMS, or DOMAIN). The computer is designed by a manufacturer to run high-performance graphic applications in a multiuser/multitasking environment. Many users reach a migration path limit at the low end of the workstation product line (for example, the Sun 386i user is operating at the platform floor; the next move downward is to the personal computer platform).

Although Dataquest's glossary definition clearly distinguishes between the two platforms (see Figure 1), computer manufacturers are working overtime to claim every feature possible, and distinctions blur a little more each week. As a result, we expect long-term distinctions between the two platforms to eventually become more a function of intended use than of performance. "PC" will continue to describe a product bought by the price-conscious user to solve design problems limited to the lower end of the design complexity spectrum. "Technical workstation" will continue to describe a product bought by the user who must be able to solve—or grow to solve—the more complex design problems, at an admittedly higher cost per system seat.

Figure 1

Personal Computers versus Technical Workstations



**PC Advantages**

- Price-conscious image
- Wide range of low-cost business software
- Low system overhead cost
- Model upgrades easy to justify by passing castoffs downward throughout organization
- Future platform for software with "80% of the function at 20% of the price."

**Workstation Advantages**

- Prestige image
- Wide range of design and analysis software
- High graphics/computing power
- Integrated multitasking/multiuser work-group environment
- Future platform for leading edge design software

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Source: Dataquest  
June 1989

**CURRENT INDUSTRY TRENDS**

The trends driving the low-end CAD market in 1988 and 1989 are as follows:

- Moving up—Growth is occurring at the high end of PC systems, which means that the trend to grow or at least maintain average selling prices on this platform will continue.
- Wait and see—Uncertainty over the future of low-end operating systems appears to have discouraged entrants, innovation, and investments in both PC CAD/CAE software and third-party hardware.

- Look-alike PCs and workstations—Now that PCs and low-end technical workstations are converging toward becoming one market, they will start offering more and more of each other's features, much like diners at a potluck sampling one another's entrees.
- Maturing vendor distribution strategies—For CAD software suppliers, developing effective distribution strategies in a consolidating dealer channel will be as important as the product itself.
- Challenges for resellers—Technical workstations will start to actually ship through dealers and VARs, and may sorely test the resellers' abilities to grow to meet new and more sophisticated support requirements.
- Power for Apple—Increased market presence for Apple in 1989, as Autodesk's presence legitimatizes the Mac as a CAD platform.

## MARKET SHARES

Table 4 illustrates the position of CAD/CAE in the overall PC marketplace. The percent of 386-based units shipped to CAD/CAE applications reaches as high as 20 to 25 percent for computers offering a brand name recognized for CAD performance (such as Compaq) or products packaged for dealer needs (such as Everex). Still, the industry average of 12 percent of 386-based machines shipped to CAD applications emphasizes the importance that CAD now has to high-end PC manufacturers.

Software unit prices stabilized and actually rose somewhat in 1988. Autodesk, which sets the pace, has driven its Autocad factory revenue up to a worldwide average of \$1,550 (\$1,400 in the United States) per unit during the past five years. These are now the price points against which other high-end PC CAD vendors negotiate.

Facing the fact that low prices produce low revenue, several vendors of software list priced at less than \$500 also worked to boost factory average selling prices (ASPs), with a small net gain in the marketplace. In 1988 the less than \$500 software accounted for 8 percent of software revenue and 56 percent of the units sold, up from 6 percent of PC CAD software revenue and 56 percent of units sold in 1987.

## Autodesk

Every year of Autodesk's existence has been remarkable, and 1988 was no exception. Autodesk's 20.7 percent market share in PC-based CAD software understates the company's influence. Autodesk, Mentor Graphics, and Prime/Computervision all have approximately equal software revenue. These companies also have approximately equal influence in CAD/CAE, but each in very different market segments.

Autodesk has no close, direct competition; instead, it has hundreds of small competitors worldwide. Today, Autodesk's financial strength, large installed base, and control of the DXF file format means that its products are perceived as the safe buy in many PC-based mechanical and AEC applications.

Despite its soaring revenue, Autodesk did experience frustrations in 1988, particularly with the delay in shipping Autocad for the Macintosh. Autodesk's push to move up in performance with AutoSolid was another disappointment, as the product captured little attention. However, Autocad itself is now so popular that 5 percent of Autocad revenue comes from workstation- and host-based products.

### **Compaq**

Compaq, with its emphasis on system engineering, met market demand for PC-priced high-performance systems precisely. The company reaped its reward in revenue, unseating IBM for the number one position in total PC CAD revenue. It is now fair to say that both Compaq and Autodesk represent the leading vendors influencing PC-based CAD, even though Compaq only manufactures computers.

During 1988, Compaq drove its product line upward with its leading-edge 80386 systems. Just as important, the company also reached out to influence a wide variety of third-party developers. The company is now functionally operating as "glue" in the high-performance PC market by serving as an information and coordination resource to any supplier that can make the Compaq computer look good in high-end applications. Compaq's well-coordinated activity contributed significantly to the PC challenge to workstations.

### **IBM**

IBM's position on its Micro Channel Architecture cost the company its number one position in PC CAD revenue in 1988. In 1988, demand in CAD was at the high end of all PC product lines, at a time when the high end of IBM's PS/2 line emphasized OS/2 and the Micro Channel Architecture, features for which there were no available CAD products. Although IBM shipped slightly fewer personal computers in 1988 than in 1987—in all applications—the drop was especially acute in CAD.

### **Apple**

In 1988, Apple shipped record numbers of Macintoshes into technical and engineering environments (19 percent of Mac IIs, at last count), and established a clear market awareness of its potential as a serious CAD platform. However, few CAD software vendors actually shipped packages for the Mac in 1988. Thus, we place much of Apple's revenue in the general-purpose technical application category, rather than in the CAD category.

However, after a year of frantic development by independent software vendors, Apple is exquisitely positioned this year for a drive in CAD. A reasonable selection of CAD software is finally available, and the product is already selling briskly into engineering environments. The Mac has enormous potential to meet the demand from the legions of architects, engineers, and designers who either do not like computers or want the machine to explain itself.

### **MARKET OUTLOOK FOR THE 1990s**

Major growth opportunities we see in the low-end CAD market over the next five years include the following:

- High-end, PC-based CAD systems will continue to win price-conscious buyers by offering low-end workstation performance at a substantially lower system cost per seat.
- Products will incorporate ease of learning for casual users (the Macintosh is the only example of this).
- Distribution channels will be developed as competitive weapons.
- AEC prospects will be more willing to make purchases now that CAD is a known quantity and as PC-based CAD becomes even easier to learn.

### **Application Forecast**

AEC, mapping, and mechanical applications represent the best opportunities for growth during the next five years (see Table 5). Electronic applications on the PC have already begun to drop, and the future looks even dimmer. We believe that, because of

both the current level of sophistication in the application and the demand for integrated design environments, technical workstations will be the machine of choice in most future EDA sales.

### **Regional Forecast**

Dataquest's regional PC CAD forecast is shown in Table 6. Compared with the rest of the CAD/CAE industry, the North American market is forecast to remain substantially larger than the other regional markets, primarily because of the more developed CAD dealer channel in the United States and Canada.

### Average Selling Prices

Dataquest's forecast for average selling prices of PC-based CAD products is shown in Table 7. PC prices in both hardware and software are expected to hold relatively steady during the next five years (particularly compared with the sharper drop in ASPs we predict for technical workstations).

### Revenue Source Forecast

We expect PC CAD software to increase as a percent of system revenue, as software vendors continue to focus on moving workstation-based software features down to personal computers, in order to grow average selling prices (see Table 8).

### Distribution Forecast

The last of the turnkey PC CAD markets crumbled in 1988, as the larger CAD companies became increasingly committed to selling PC-based products through dealers. The temptation to have the best of both worlds is strong, however. Vendors of both software and hardware still claim rights to sell direct to high-volume accounts, so a small amount of turnkey sales may persist for a few years (see Table 9).

Distribution is PC CAD's battle zone. The entire PC dealer/distributor industry appears to be entering a period of consolidation, and CAD applications will be taken along for the ride. Two factors are pushing this consolidation:

- The easiest way for a dealer to grow is through acquisition.
- The one constant in the vendors' shifting reseller policies has been a bias toward volume-based discounts, which rewards the biggest buyers in the distribution chain.

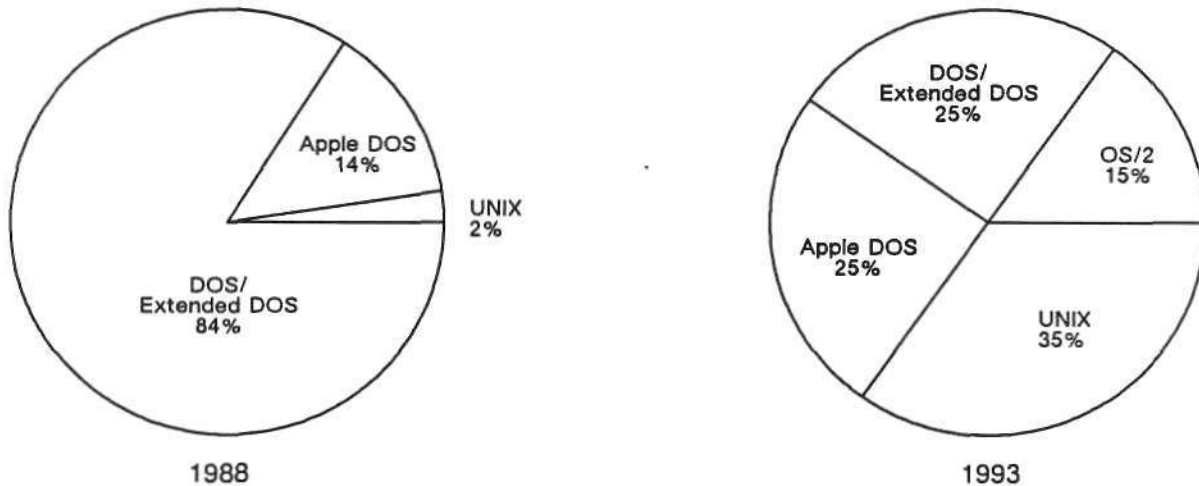
Generally, distribution of PC-based products has operated as a cutthroat business, and discounting—with its accompanying pressure on profits—will likely continue to plague PC CAD resellers. We believe that distribution in the 1990s will be much more competitive—for the vendors. Distribution of computers is at a much more rough-and-tumble state than distribution of more mature industries, such as foods or automotive. The early 1990s should produce considerable experimentation in the search for a stable and economically efficient division of labor in distributing personal computers and low-end technical workstations. One fact is clear: The pool of skilled technical application resellers is painfully small. Vendors will likely be forced to grant more concessions and give more support to distribution channels.

Some of the most important PC CAD software changes in the last year have had more to do with operating systems than with CAD/CAE features and functions. Because the future of low-end operating systems is vital to every participant in this market, Dataquest completed a forecast for low-end operating systems in CAD applications, and its results are shown in Figure 2. This document presents our forecast and discusses some of the changes and challenges facing PC CAD operating systems.



Figure 2

PC CAD Operating System Forecast



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Source: Dataquest  
June 1989

THE FUTURE OF LOW-END CAD OPERATING SYSTEMS

The anticipated success of several operating systems reflects our conviction that software vendors that commit to one operating system are taking a significant business risk. Forecast growth in Apple DOS reflects our positive outlook for the Macintosh. The growth in UNIX indicates our expectation that, when engineering users leave the DOS operating system, they will go to UNIX, where their more computer-sophisticated peers are. OS/2 is generally perceived as a high-overhead office-oriented product that limits CAD performance. We believe that a single-user, lower-overhead UNIX will take hold among PC CAD users, and that Santa Cruz Operations' Open Desktop (a device-independent, standards-oriented UNIX for 386-based computers) will be the principal contender.

Dataquest believes that OS/2 will achieve virtually negligible penetration in PC CAD unless and until it first achieves compelling success in business application software, which is not available under DOS. This is unlikely to occur before 1992 or 1993. Although OS/2 is forecast to have the lowest penetration in CAD in our five-year forecast, IBM is holding the card that could turn the tables. OS/2 is seen universally as a product that is tied to the Micro Channel Architecture. If IBM were to drastically reduce or eliminate royalties on its Micro Channel Architecture, it is likely that the major developers would enthusiastically commit to OS/2. But as long as IBM continues to demand payment for a proprietary specification in a market that was built on an open bus, the thrifty, and the canny, are likely to find other alternatives.

## **TRACKING THE DOS TRAIL: AN EXPANDED FUTURE**

While DOS use is forecast to shrink considerably in the next five years, this operating system will be tough to kill, because it still has much to offer. The gap across DOS, OS/2, and UNIX (and between PC and workstation) performance was quietly but considerably reduced in 1988 by two small bridge product suppliers, Phar Lap Software and A.I. Architects. These companies expanded DOS so that it functions as a demand-paged virtual operating system that runs programs of up to 4GB (the limit of the 80386 processor), while still appearing to the user as ordinary DOS.

Very few high-end DOS-based PC CAD programs exist that do not either offer, or have waiting in the wings, a product based on a DOS extender (including products from Autodesk, CAD Software, Cadam, Cadkey, Fluid Dynamics International, Futurenet, Hewlett-Packard, Integrated Silicon Systems, Intusoft, MacNeal-Schwendler, MCS, SMOS, SRAC, Swanson Analysis, Versacad, and Viewlogic). DOS programs larger than 640K first arrived in CAD/CAE, but will begin appearing in more mainstream software, such as Lotus 1-2-3.

To achieve the highest performance with a DOS extender, the typical application software developer rewrites the product to run in the 80386 32-bit protected (unsegmented) mode. Completing this task creates more portable software, thus reducing the amount of work required later that is ported to either UNIX or OS/2. In the meantime, programs can grow under DOS, and success stories are accumulating.

Cadkey represents a good example of a company that is upgrading its bridges one step at a time by first extending DOS performance for its mechanical CAD software, and then moving easily to the UNIX-based Silicon Graphics workstation. Cadkey is now able to offer a product with files that are compatible without translation across both operating systems, thus creating a cost-conscious, sophisticated product line where design and analysis tasks can be assigned to a Silicon Graphics workstation and drafting to a PC.

Conversely, Cadam is moving an increased percentage of its mainframe-based product down to the DOS-based Microcadam Plus, because space is now available. This move should significantly expand Cadam's presence among suppliers to the automotive industry, which now can buy more functional, but still low-cost, compatibility with Cadam.

## **THE MISSING LINK**

By creating a bridge that allows DOS-based software to grow, Phar Lap and A.I. Architects helped the PC CAD industry evolve during a period of high uncertainty about the future of low-end operating systems. At the other end of the bridge, Santa Cruz

Operations organized industry participants to specify a smaller, friendlier Intel-based UNIX that is primarily focused on the single user. However, there is an important—and needless—gap. Although almost all purveyors of UNIX tout their “DOS window,” these windows will not accommodate a program written with DOS extenders. Thus, sophisticated DOS programs will not run in a UNIX “DOS window.”

Unfortunately, users that buy extended DOS programs are the very users we would expect to move up to an Open Desktop-type product. While UNIX suppliers naturally have little interest in making DOS look good, accommodating only the lowest-level DOS products may prove shortsighted.

### **DATAQUEST CONCLUSIONS**

Dataquest believes that it is a relatively simple matter for industry participants to create a specification allowing extended-DOS products (ideally in multiple windows) to run on Open Desktop. To ignore this issue will leave the leading-edge PC users only partway over an unfinished bridge, inviting them to jump to the traditional technical workstations, thus reducing the overall market for Intel-based products. Resolving the issue will help grow the PC CAD market.

Table 1

Personal CAD 1988 Worldwide Market Share  
(Millions of Dollars and Actual Units)

	Revenue	Units	Revenue Share	Units Share
	*****	*****	*****	*****
Compaq	250.0	48,000	14.0%	19.9%
IBM	170.6	26,966	9.6%	11.2%
Apple Computer	150.0	35,000	8.4%	14.5%
Autodesk	111.4	0	6.3%	.0%
NEC	93.0	9,978	5.2%	4.1%
Mutoh Industries	56.8	1,355	3.2%	.6%
Hewlett-Packard	50.0	10,000	2.8%	4.1%
Fujitsu	44.5	2,031	2.5%	.8%
Nitachi	38.5	700	2.2%	.3%
Prime Computer	35.8	257	2.0%	.1%
Nakuto	26.2	298	1.5%	.1%
Zenith	23.6	8,000	1.3%	3.3%
Recal-Redac	22.6	0	1.3%	.0%
CADAM	16.9	0	1.0%	.0%
Olivetti	16.7	2,992	.9%	1.2%
Daisy Systems	14.8	265	.8%	.1%
Intergraph	14.2	0	.8%	.0%
Ziegler Instruments GmbH	14.1	0	.8%	.0%
Everex	13.5	6,750	.8%	2.8%
Futurenet	12.8	0	.7%	.0%
Other	605.3	88,531	34.0%	36.7%
All Companies	1,781.4	241,122	100.0%	100.0%
All U.S.-Based Companies	1,341.4	219,155	75.3%	90.9%
All Asian-Based Companies	326.6	16,672	18.3%	6.9%
All European-Based Companies	113.4	5,295	6.4%	2.2%
All Hardware Companies	989.8	225,519	55.6%	93.5%
All Turnkey & SW Companies	791.6	15,603	44.4%	6.5%

Source: Dataquest  
June 1989

Table 2

Personal CAD 1988 Software Market Share by Revenue

	Software Revenue *****	Software Units *****	Revenue Share *****	Units Share ****
Autodesk	111.4	94,194	20.7%	19.8%
Prime Computer	28.7	15,880	5.3%	3.3%
Racal-Redac	22.5	5,760	4.2%	1.2%
Mutoh Industries	20.3	2,317	3.8%	.5%
CADAM	15.9	3,037	3.0%	.6%
Intergraph	13.4	8,645	2.5%	1.8%
Ziegler Instruments GmbH	13.3	1,000	2.5%	.2%
Hitachi	11.6	1,171	2.1%	.2%
Futurenet	10.8	3,613	2.0%	.8%
Fujitsu	10.6	2,760	2.0%	.6%
Hakuto	10.4	582	1.9%	.1%
CADKEY	10.3	7,360	1.9%	1.5%
Xilinx	9.7	1,900	1.8%	.4%
Daisy Systems	7.2	319	1.3%	.1%
Generic Software	7.1	66,000	1.3%	13.9%
View Logic	6.7	2,625	1.2%	.6%
Wacom	6.5	1,000	1.2%	.2%
Olivetti	6.4	901	1.2%	.2%
Andor	6.3	2,130	1.2%	.4%
EESOF	6.1	610	1.1%	.1%
All Companies	538.4	476,094	100.0%	100.0%

Source: Dataquest  
June 1989

Table 3

Personal CAD 1988 Software Market Share by Units

	Software Revenue	Software Units	Revenue Share	Units Share
	*****	*****	*****	*****
Autodesk	111.4	94,194	20.7%	19.8%
Generic Software	7.1	66,000	1.3%	13.9%
Evolution Computing	1.8	35,750	.3%	7.5%
American Small Business Comp.	3.3	21,667	.6%	4.6%
Innovative Data Design	2.5	18,000	.5%	3.8%
Prime Computer	28.7	15,880	5.3%	3.3%
Foresight Resources	3.1	15,500	.6%	3.3%
Drcad	4.9	13,514	.9%	2.8%
Micrografx	3.0	13,333	.5%	2.8%
Omaton	3.5	11,666	.7%	2.5%
Superdraft	2.6	8,944	.5%	1.9%
Intergraph	13.4	8,645	2.5%	1.8%
CIVILSOFT	1.1	8,000	.2%	1.7%
CADKEY	10.3	7,360	1.9%	1.5%
Racal-Redac	22.5	5,760	4.2%	1.2%
ISICAD	5.2	5,200	1.0%	1.1%
Accel Technologies	2.0	5,000	.4%	1.1%
Strategic Locations Planning	2.3	5,000	.4%	1.1%
Robocom	4.1	4,925	.8%	1.0%
Design Automation	5.4	4,000	1.0%	.8%
All Companies	538.4	476,094	100.0%	100.0%

Source: Dataquest  
June 1989

Table 4

PC CAD/CAE Share of Total PC Market  
(Thousands of Units)

	All PCs	CAD Applications	Percent in PC CAD
80386-based	1,124	135	12%
80286-based	6,147	73	1%
Macintosh	878	35	4%
PCs in Scientific/ Technical Applications	889	243	27%
All PCs (excluding home/hobby)	6,509	243	4%

Source: Dataquest  
June 1989

Table 5

Personal CAD Worldwide Forecast by Application  
(Millions of Dollars and Actual Units)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
<b>All Applications</b>							
Revenue	1,782	2,071	2,259	2,334	2,308	2,292	5.2%
Systems	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
Workstations	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
<b>Mechanical</b>							
Revenue	970	1,079	1,115	1,135	1,083	1,024	1.1%
Systems	143,354	164,320	177,310	188,970	192,810	191,920	6.0%
Workstations	143,354	164,320	177,310	188,970	192,810	191,920	6.0%
<b>AEC</b>							
Revenue	385	513	636	711	755	803	15.8%
Systems	61,867	83,730	104,870	121,970	136,730	150,940	19.5%
Workstations	61,867	83,730	104,870	121,970	136,730	150,940	19.5%
<b>Mapping</b>							
Revenue	78	118	168	214	256	310	31.7%
Systems	4,977	6,780	8,450	9,190	9,430	9,580	14.0%
Workstations	4,977	6,780	8,450	9,190	9,430	9,580	14.0%
<b>Electronic CAE</b>							
Revenue	179	178	163	127	95	63	-19.0%
Systems	15,873	15,830	16,000	13,420	11,240	7,530	-13.9%
Workstations	15,873	15,830	16,000	13,420	11,240	7,530	-13.9%
<b>IC Layout</b>							
Revenue	14	18	19	13	9	6	-14.4%
Systems	358	600	700	490	400	280	-4.5%
Workstations	358	600	700	490	400	280	-4.5%
<b>PCB Layout</b>							
Revenue	156	165	158	133	109	86	-11.1%
Systems	15,606	17,390	17,270	14,260	11,600	9,140	-10.1%
Workstations	15,606	17,390	17,270	14,260	11,600	9,140	-10.1%

Source: Dataquest  
June 1989



Table 6

Personal CAD Worldwide Forecast by Region  
(Millions of Dollars and Actual Units)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
<b>Worldwide</b>							
Revenue	1,782	2,071	2,259	2,334	2,308	2,292	5.2%
Systems	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
Workstations	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
<b>North America</b>							
Revenue	826	971	1,079	1,132	1,146	1,162	7.1%
Systems	139,164	163,750	180,250	191,380	198,830	200,480	7.6%
Workstations	139,164	163,750	180,250	191,380	198,830	200,480	7.6%
<b>Europe</b>							
Revenue	455	545	595	605	591	575	4.8%
Systems	61,484	74,770	85,230	90,920	94,410	95,760	9.3%
Workstations	61,484	74,770	85,230	90,920	94,410	95,760	9.3%
<b>Far East</b>							
Revenue	475	528	553	559	530	510	1.4%
Systems	37,210	45,850	53,910	59,440	61,570	64,250	11.5%
Workstations	37,210	45,850	53,910	59,440	61,570	64,250	11.5%
<b>Rest of World</b>							
Revenue	26	27	32	38	40	45	11.6%
Systems	4,178	4,270	5,220	6,560	7,390	8,910	16.4%
Workstations	4,178	4,270	5,220	6,560	7,390	8,910	16.4%

Source: Dataquest  
June 1989

Table 7

Personal CAD Worldwide Average Selling Price Forecast  
(Thousands of Dollars)

	1988	1989	1990	1991	1992	1993	CAGR
	***	***	***	***	***	***	***
Turnkey & Hardware-Only	5.3	5.1	4.8	4.5	4.1	3.9	-6.0%
Turnkey	18.5	18.8	17.3	16.1	15.1	13.7	-5.8%
Hardware-Only	4.3	4.4	4.3	4.1	3.8	3.6	-3.5%

Source: Dataquest  
June 1989

Table 8

Personal CAD Worldwide Forecast by Revenue Sources  
(Millions of Dollars)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
Hardware	1,214	1,346	1,451	1,466	1,400	1,337	1.9%
Software	534	654	734	794	835	883	10.6%
Service	67	71	73	74	73	72	1.5%
Total	1,782	2,071	2,259	2,334	2,308	2,292	5.2%

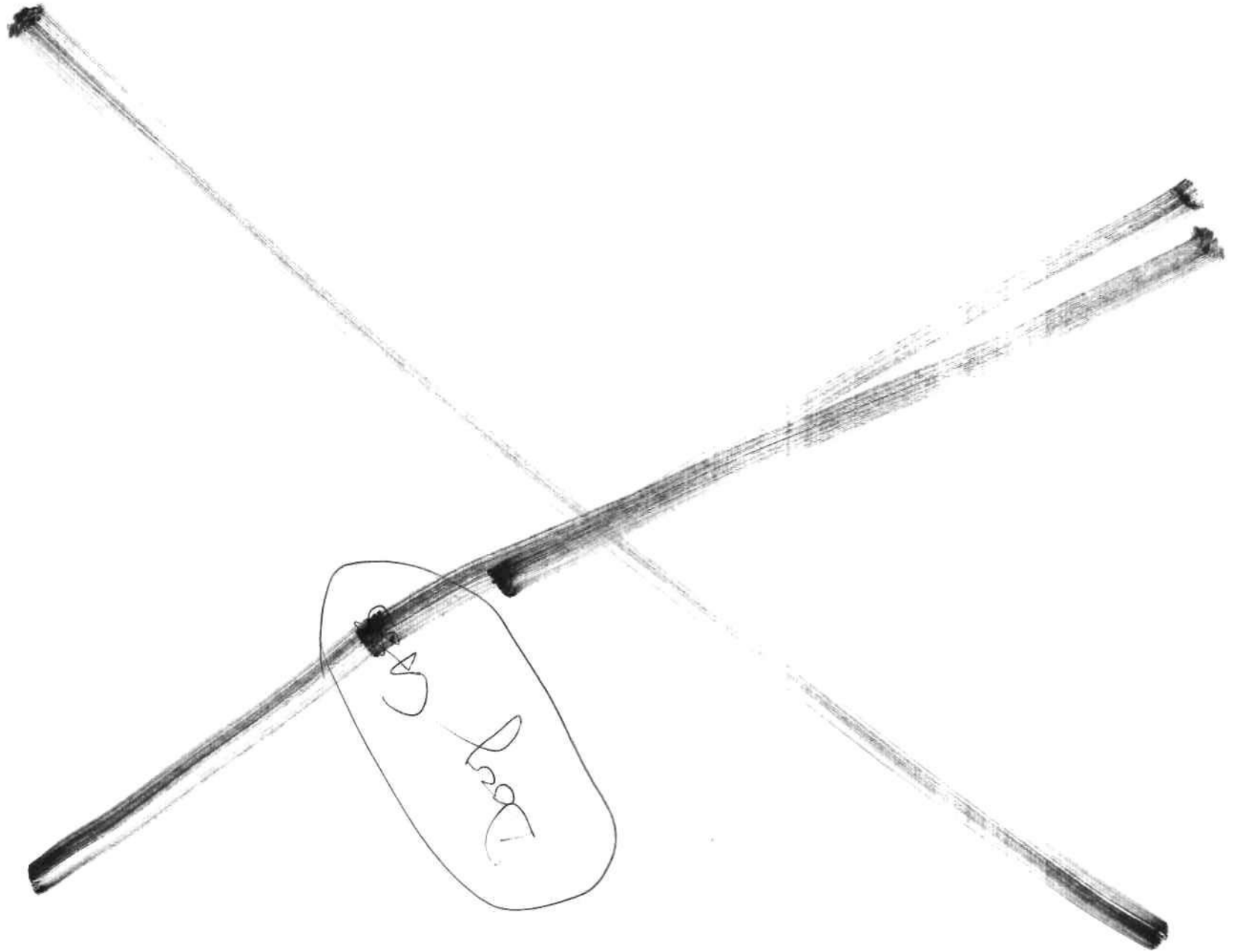
Source: Dataquest  
June 1989

Table 9

Personal CAD Worldwide Forecast by Distribution Class  
(Millions of Dollars and Actual Units)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
<b>Total Hardware and Software Revenue</b>							
Turnkey	280	306	250	227	202	173	-9.2%
Unbundled	1,468	1,694	1,936	2,033	2,033	2,047	6.9%
Total	1,748	2,000	2,185	2,260	2,235	2,220	4.9%
<b>Hardware Revenue</b>							
Turnkey	184	183	138	119	103	83	-14.8%
Unbundled	1,030	1,163	1,313	1,347	1,297	1,254	4.0%
Total	1,214	1,346	1,451	1,466	1,400	1,337	1.9%
<b>Software Revenue</b>							
Turnkey	96	123	112	108	99	90	-1.1%
Unbundled	439	531	622	686	736	793	12.6%
Total	534	654	734	794	835	883	10.6%
<b>Workstation Shipments</b>							
Turnkey	16,518	14,375	11,876	11,177	10,379	9,346	-10.8%
Unbundled	225,519	274,280	312,730	337,120	351,820	360,040	9.8%
Total	242,037	288,650	324,610	348,300	362,200	369,390	8.8%

Source: Dataquest  
June 1989





This chapter on PC CAD end users will be provided in the near future. Most of this chapter will be based on a survey mailed to 6000 PC CAD users in the second quarter of 1988, from which we received 1347 replies, a 22 percent response rate.

Summary statistics from this survey follow, presented as results to the questions asked. There are separate reports available for each vendor, available on request.

#### METHODOLOGY

Ten participating vendors each supplied mailing labels from approximately 500 names who were registered as end users at approximately the same time in late 1987. Time of registration was used as the selection criterion in order to obtain a fairly unbiased sample of users who:

- have a reasonably current version
- have had enough time to get to know their systems, and
- are likely to still be active users

Participating vendors included American Small Business Computers, Autodesk, Computervision, Generic Software, Innovative Data Design, Isicad, Orcad, Vector Automation, Versacad, and Viewlogic.

DATAQUEST END USER SURVEY: LOW-COST CAD PRODUCTS

JULY 1988

Participating Vendor: All Vendors

Number of Respondents: 1347



Following are responses to selected questions from Dataquest's 1988 PC CAD user survey. Questions are in bold type.

In the questions that follow, the focus will be on the low-cost CAD system that you own. In order to correctly tabulate the responses, we need to understand the setting where the system is used.

**Where is the system located?**

14% Personal Residence  
80% Business  
7% Both

**If located at residence, what percent of the CAD work done there is for:**

36% Personal use  
64% Business use

**Please check which one of the following industries best describes your business focus:**

4% Aerospace  
14% Architecture  
2% Automotive  
3% Chemical/Petroleum  
4% Civil Engineering  
7% Computers/Peripherals  
5% Construction  
9% Design Service  
3% Education--high school  
4% Education--post high school  
15% Electrical/Electronics  
7% Fabricated Metal Parts  
5% Government  
3% Medical  
2% Semiconductor  
16% Other (please specify) \_\_\_\_\_

**How many workstations and personal computers does your site have for CAD-related work?**

Total number of PCs:           74% - 5 or less;  
  90% - 18 or less

Total number of Workstations: 64% - 0  
  80% - 2 or less,  
  90% - 7 or less

**How many people use low-cost (or PC-based) CAD systems at your site?**

41% - 2 or less  
82% - 10 or less  
96% - 50 or less

What is the number of potential CAD users at your site?

53% - 6 or less  
85% - 40 or less

What is the total number of employees at your site?

25% - 6 or less  
51% - 40 or less  
66% - 100 or less  
90% - 1000 or less

Which one of the statements below best describes your low-cost CAD system configuration?

<u>Percent</u>	<u>Task</u>
4%	Standalone, no hard-copy output device
78	Standalone, hard-copy output device
5	Local area network, no server, shared hard-copy output
9	Local area network, server, shared disk and hard-copy output
2	Local area network, gateway to mainframe
3	Other _____

If you mentioned that your site has PC CAD systems, what percent of use on these systems falls into the categories below?

<u>Percent</u>	<u>Task</u>
14	Word Processing
6	Spreadsheet
2	Accounting/Payroll
2	Project Management
62	CAD/CADD
1	Cost Estimating
5	Eng. design/calculations--nongraphic
4	Data Base Management
4	Other: please specify _____

**THE FOLLOWING QUESTIONS CONCERN THE SPECIFIC LOW-COST CAD PRODUCT(S) THAT YOU ORDERED**

**Is your low-cost CAD system your first experience with CAD?**

62% Yes  
38% No

**Please choose the category that best describes the CAD products you use:**

Percent

73 Primarily off-the-shelf CAD software  
17 CAD software has been enhanced by in-house development  
9 Software has been enhanced by third parties  
(VAR, dealer, consultant, etc.)

**Which of the following buying channels did you use? (Check all that apply)**

Percent

45 Dealer/Retail Store  
18 Salesperson from the software company  
9 Value-Added Reseller (VAR)  
17 Mail Order  
28 Distributor  
8 Other ("Direct" is most common response here)

**If you were buying a low-cost CAD product today, would you buy from the same channel?**

88% Yes  
10% No

**What was the price paid per copy for your most frequently used, low-cost CAD software package?**

Percent

5 \$0 - \$99  
20 \$100 - \$499  
5 \$500 - \$999  
3 \$1,000 - \$1,499  
8 \$1,500 - \$1,999  
56 \$2,000 and up

Please select the statement below that best describes how you bought low-cost CAD products:

Percent

- 37 I usually ordered software for an existing computer
- 30 I usually ordered software and hardware as a system, from one source
- 30 I usually ordered software and hardware at the same time, from different sources, and created a system
- 3 Other (describe)

When you were selecting CAD software, the following sources may have influenced you. Please choose the top 5 sources that influenced your buying decision, and rank your 5 choices using

#1 = most important through  
#5 = least important, among the top 5.

- 3 Colleagues and/or other end users
- \* Directives from higher authority or company policy
- \* Conferences and trade shows
- Advertisements
- 4 Articles in publications and periodicals
- 5 Price met my budget
- Low price let me buy it and try it
- 2 Product capability in specific tasks
- 1 Overall product performance
- Product reputation
- Popular product with large group of users
- Compatibility with existing hardware or software
- Upward/downward growth path of the product line
- \* Reputation and/or viability of the product manufacturer/publisher
- \* Reputation or viability of the third-party supplier--VAR, dealer, consultant
- Support from product manufacturer/publisher after purchase
- \* Support from third-party supplier after purchase
- Other

(\* = lowest rankings)

THE FOLLOWING QUESTIONS FOCUS ON YOUR CAD/CAM APPLICATIONS AND ON YOUR OVERALL EVALUATION OF LOW-COST CAD PRODUCTS.

Which of the applications below are you considering adding in 1988?

Percent

- 10 Basic drafting/documentation
- 8 Architectural details
- 14 Technical Publications/Illustration
- 7 Architectural design
- 12 Mechanical design and analysis
- 9 Space planning/facilities
- 7 Manufacturing applications
- 7 Structural design
- 10 Electronics design (boards/ASICs/ICs)
- 7 Electrical engineering
- 8 Schematics/Flowcharts, nondimensional/nonscaled
- 4 Piping design
- 7 Mapping
- 3 HVAC design
- 23 Other ("none" is most common response)

For the CAD output that you generate, please indicate below both the appropriate category and the percent of total output:

<u>Percent</u>	<u>Category</u>
32	Conceptual design
54	Production drafting and documentation
6	Manufacturing process output--photoplot, NC
7	Other--please specify _____

Do you transfer CAD data between your low-cost CAD system and any other CAD system?

- 33% Yes
- 66% No

Before you purchased the low-cost CAD system, how would you best describe your expectation of its impact on your design or drafting work load? (Choose one)

Percent

- 7 No expectation, just trying it out
- 3 Very limited effect
- 14 Moderate effect on some of the work
- 16 Moderate effect on most of the work
- 27 Major impact on some of the work
- 32 Major impact on most of the work

Please choose the statement below that most reflects your opinion of how your CAD software has met your expectations:

Percent

- 3 Far below expectations
- 11 Slightly less useful than expected
- 41 Just about what I expected
- 20 Slightly more useful than expected
- 24 Far better than expected

If you were buying a low-cost CAD product today, would you buy the same software product?

- 83% Yes
- 16% No

Do you expect to buy CAD products in 1988?

- 57% Yes
- 41% No

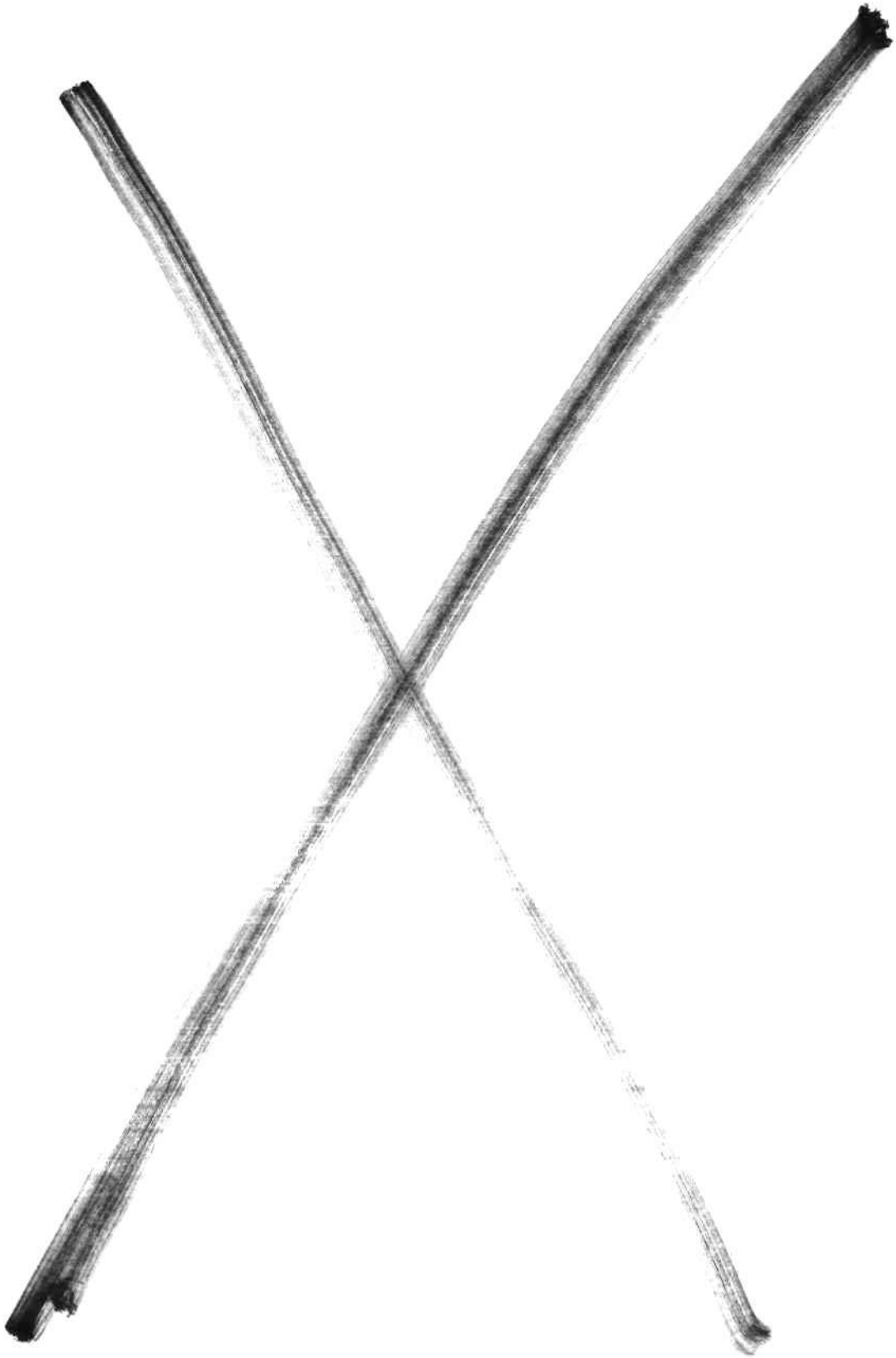
If you expect to buy CAD products in 1988, please indicate the number of products you intend to buy:

	<u>Number of CAD Units</u>	<u>Percent Planning Any Buy</u>
<b>Hardware:</b>		
Personal Computers	3.7	40
Workstations	3.4	13
<b>Software:</b>		
Drafting/Documentation	3.3	23
Technical Publication/Illustration	2.2	9
Solids Modeling	1.7	9
Mechanical Applications	3.2	8
Electronic Applications	3.2	10
Mapping Applications	1.1	5
AEC Application	1.9	5
Other: _____	1.2	5

Which of the following periodicals do you rely on to learn about products?

Percent

10 Architectural & Engineering Systems  
2 AEC Automation Newsletter  
22 Byte  
19 CAE - Computer-Aided Engineering  
17 Computer Graphics World  
7 Computerworld  
4 Datamation  
1 Datapro  
6 ENR - Engineering News Record  
12 Infoworld  
9 Mac World  
6 Mini-Micro Systems  
45 PC Magazine  
24 PC World  
17 Personal Computing  
37 Other: Cadence 9%  
          Cadalyst 6%  
          PC Week 4%





# PC CAD Distribution

## **EXECUTIVE SUMMARY**

Distribution channels are now a strategic weapon in marketing CAD/CAM/CAE products. A continuing drop in system selling prices combined with Autodesk's phenomenal success building a worldwide CAD dealer network have caused the entire CAD/CAM/CAE industry to begin focusing on more efficient ways to sell products. Still unknown is whether the existing dealer channel has the capacity to meet the potential demand. This newsletter analyzes today's CAD VARs and dealers, based on a recent Dataquest survey.

## **DEFINITIONS**

A few quick definitions are necessary: a VAR (value-added reseller) is a vendor that primarily resells another company's product. In the CAD market, the terms VAR and dealer are interchangeable, because only a small portion of (typically low-priced) CAD is sold through classic storefront dealers counting on walk-in trade.

These resellers, the VARs and dealers, are fundamentally different from the ISV (independent software vendor), which owns the software copyright, or the OEM, which takes ownership by relabeling another vendor's product before sale.

## **THE GROWING VAR/DEALER CHANNEL**

In 1989, VARs and dealers sold approximately 13 percent of all CAD/CAM/CAE products. Although vendors vary in their dependence on VARs and dealers (from 100 percent of both Autodesk's and Compaq's sales to less than 5 percent each of sales from Intergraph and Sun Microsystems, Inc.), all CAD vendors are looking to the VAR/dealer channel for increased future support.

CAD/CAM/CAE is now an established component within the entire VAR/dealer channel, with an estimated 10 percent of all VARs claiming to sell design automation products. While CAD is a finite market, the application offers dealers higher profit margins and less competition than would be found reselling mainstream business applications. Most existing CAD dealers began as PC-based Autocad dealers, but many have expanded their range of products within the design automation market.

## **TODAY'S CAD DEALERS**

Dataquest recently completed another comprehensive survey of the US CAD VAR/dealer channel (a similar survey of European dealers is under way). The most obvious change from last year is that many dealers had a tough year: 20 percent dropped out of the CAD business, as shown in Figure 1.

Most of the vendor failures were those dealers that began early as CAD resellers, typically as Autocad dealers. This group of dealers represented a cross section of human ability, some with more technical knowledge than business sense. As market conditions tighten, dealers with the weakest business sense have begun to drop off.

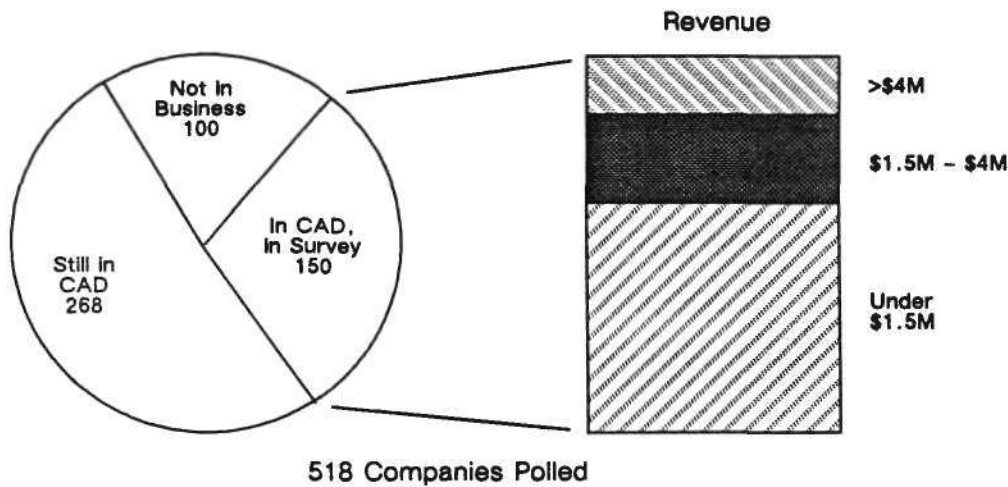
This section analyzes those dealers still selling CAD/CAM/CAE, based on an in-depth survey of 150 sites. These dealers were selected to emphasize successful operations, but even successful dealers are not large: the average dealer reports \$1.5 million in annual CAD revenue, and only the exceptional dealer reaches as much as \$4 million.

Similar to the CAD industry as a whole, hardware is the biggest contributor to the typical dealer's revenue, although the dealers derive higher percentages of revenue from software and service than the CAD industry average (see Table 1).

Most dealers carry more than one computer brand, with 46 percent of dealers selling the market leader, Compaq (see Figure 2). Traditional workstation vendors have begun to make strong inroads on Compaq in this channel, with Hewlett-Packard and Sun each carried by 20 percent of the VARs.

The typical dealer sells to smaller enterprises than the CAD industry average, with 44 percent of sales coming from small companies with less than 100 employees (see Figure 3). With CAD vendors targeting the major accounts, these small sites are just the sort of customers that turnkey CAD companies are trying to reach through dealers.

**FIGURE 1**  
CAD/CAM/CAE VAR/Dealer Survey



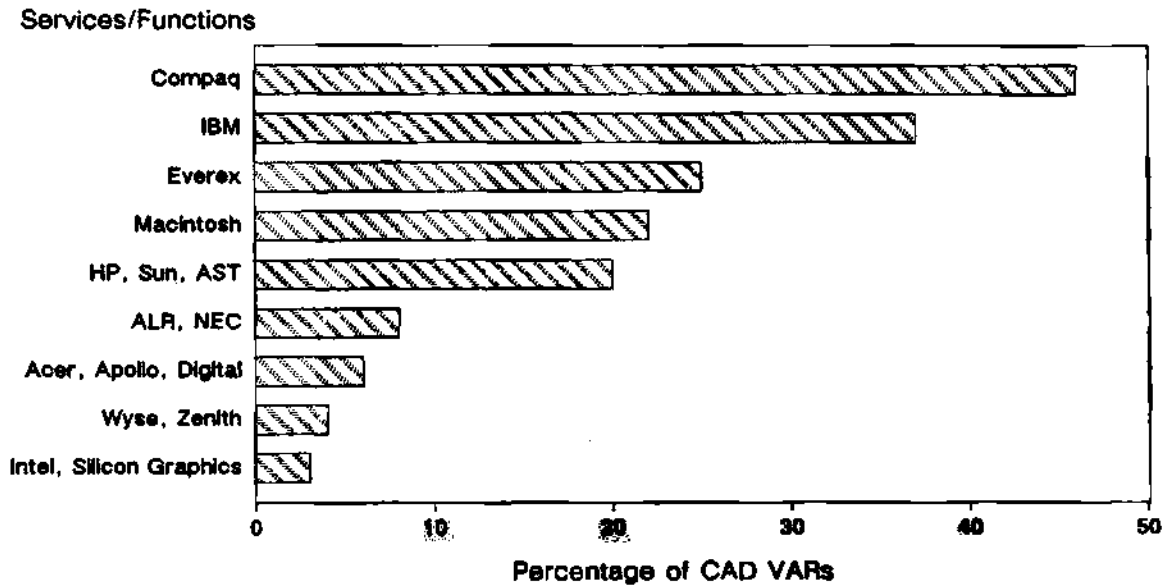
Source: Dataquest (July 1990)

**TABLE 1**  
Product Mix Comparison—CAD Dealers versus CAD Industry  
(Percent of Revenue)

	Dealers	Industry
Hardware	47%	59%
Software	35%	27%
Service/Support/Training	18%	14%

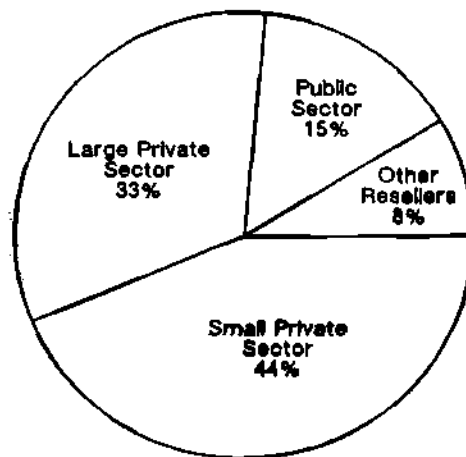
Source: Dataquest (July 1990)

**FIGURE 2**  
**Computer Manufacturers' Lines Carried by CAD Dealers**



Source: Dataquest (July 1990)

**FIGURE 3**  
**CAD VAR Customers**



Source: Dataquest (July 1990)

Dealers sell a broad range of CAD applications, but with greater emphasis on AEC (see Table 2). AEC, being less complex and lower in cost than other applications, captured 32 percent of dealer sales compared with 14 percent of the entire CAD market. Of course, dealer sales in all applications tend to emphasize less complex and lower-cost, PC-based solutions.

The typical dealer's favorite supplier is Autodesk. Dealers complain in chorus about competition in selling Autocad—in the next breath they report that Autocad is their favorite product, not only because of the vendor's good support structure, but primarily because customers want to buy the product. Market pull has created some very grateful dealers.

**ANALYZING SUCCESS**

We divided these dealers into three categories of success: "winners"—those with more than \$3 million in revenue; "trying hard"—to represent the vast middle ground; and "limpers"—designating those who have been in business for several years and still have revenue of less than \$500,000. A fourth group, "distributors," makes their primary business selling to other resellers. Figure 4 compares the number of businesses in each category with the revenue each category generates. The winners and distributors bring in 75 percent of the revenue, while making up 31 percent of the companies. These winners and distributors also sold 64 percent of the CAD software.

Figure 5 shows that successful dealers are actually selling more brands of software. Often, considerable functional overlap exists among software brands sold, suggesting that vendors should expect good dealers to carry competing software.

On the surface, successful and unsuccessful dealers often look alike. Both appear to be operating their businesses in similar ways, and they subscribe to similar beliefs about how to sell CAD. For example, all dealers believe that service and support are keys to success, that their business is being ruined by other dealers cutting both prices and support, and that it is hard to keep up with the range and complexity of CAD products.

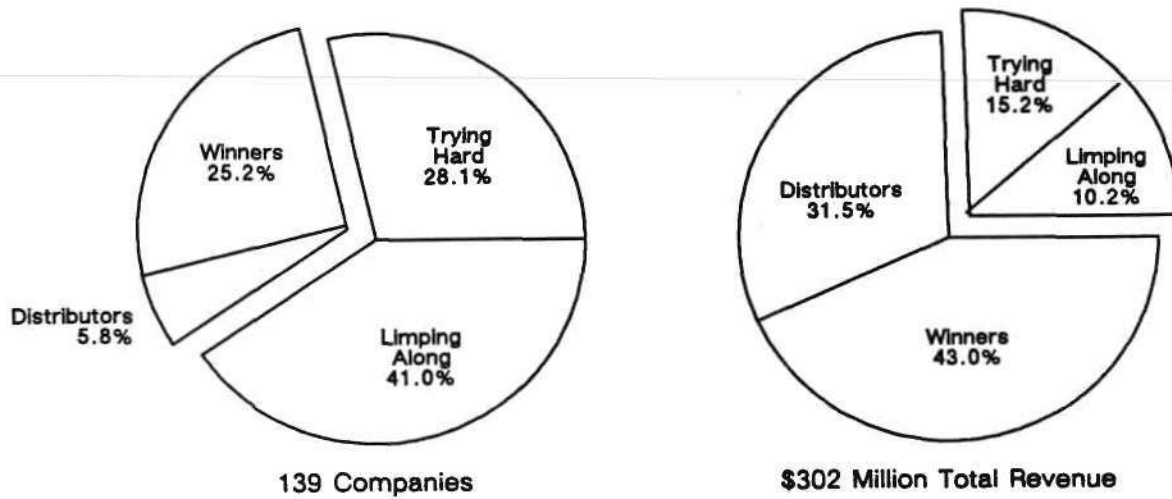
The single best objective predictor of success as a dealer turned out to be commitment to CAD/CAM/CAE, with winners reporting that 86 percent of their business is CAD, compared with the 53 percent of CAD business reported by the limpers. Less objectively, we can say that in interviewing the most successful dealers, we would usually be talking to a focused, articulate, and ambitious personality—someone who was able to lead the company's growth personally.

**TABLE 2**  
**Application Comparison—CAD Dealers versus CAD Industry**  
**(Percent of Revenue)**

	Dealers	Industry
Mechanical	41%	58%
AEC	32	14
EDA	16	22
Mapping	11	6
Total	100%	100%

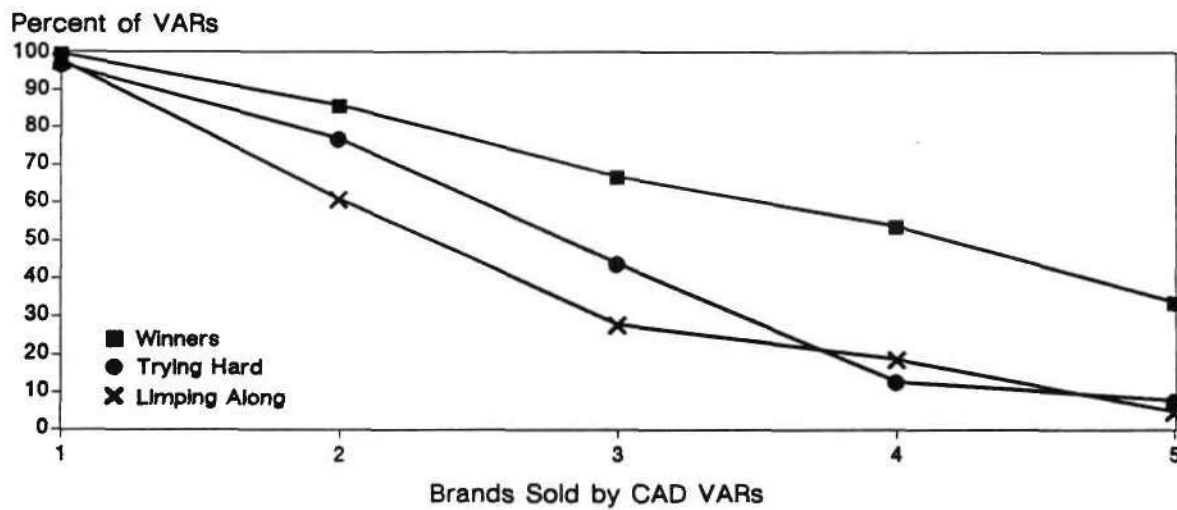
Source: Dataquest (July 1990)

**FIGURE 4**  
Distribution of Sales among CAD/CAE VARs



Source: Dataquest (July 1990)

**FIGURE 5**  
Software Brand Lines Sold



Source: Dataquest (July 1990)

## **THE CAD DEALER IN THE EARLY 1990s**

We believe that the typical successful dealer in the early 1990s will be part of a regional or national enterprise. Many of the individual operators of today will either have left the business or have been acquired by larger dealers, usually because they lack the business acumen to operate independently. A steady stream of dealers are leaving the market; very few dealers are entering. Competition for the small group of successful dealers is intense and can only become worse. The undercapitalized dealer pool of today is the inadequate raw material for the dealers which will be available in the future, unless substantial investment is made by vendors or others.

Tomorrow's dealer also will be ruthlessly conscious of brand names—in terms of computers, software, and peripherals. A vendor's ability to generate market demand will become increasingly important, as dealers pare back offerings to focus further on meeting vendor quotas, simplifying an already complex business, and making every product offering profitable.

The more successful dealers will continue to focus intensely on products that improve margins. Several top dealers have committed themselves to workstation sales (typically sold with Autocad software), primarily because the shift improved their profit margins. Manufacturers of PC computers have begun to lose the attention of many of the best dealers.

In terms of specific applications, the most successful dealers told us they see their best growth opportunities in mechanical CAD and manufacturing environments, in addition to fairly strong prospects among architectural customers. These dealers appear to be relatively unaware of what Dataquest believes to be a good opportunity in desktop mapping CAD applications.

## **THE CHALLENGES AHEAD**

Over the next few years, Dataquest expects to see significant increases in the complexity of methods to move CAD products from production to consumption. Success will depend on meeting key challenges—but the problems that need solving depend on where one is in the distribution chain.

### **The Hardware Vendor's Challenge**

The computer manufacturer's challenge is to develop distribution programs that build in profits for dealers. We believe that manufacturers must provide dealers with specific direction, increasingly, and that the most successful manufacturers will be telling their dealers exactly how to make a profit.

The second challenge facing computer manufacturers is to develop distribution programs that help their ISVs sell software. Compared with computer manufacturers, ISVs have far fewer resources for supporting a worldwide direct sales staff. Like manufacturers, ISVs must sell through resellers.

As computer manufacturers grow their volume sales channels, there is real danger that price-shopping users will increasingly bypass engineering resellers for hardware purchases, confining purchases from CAD VARs to software and support only. However, CAD resellers depend on hardware revenue for both cash flow and profit: we believe that they generally are unable to survive on software-only sales. Successful computer manufacturers will help create business models in which their engineering ISVs can sell software profitably—because, in the long run, there is a limited future in CAD markets for a computer that few companies make a profit writing or selling software for.

## **The Software Vendor's Challenge**

The company that writes engineering software faces the challenge of building more training and support into the product itself. This investment is the best defense against both inept dealers and the spiraling costs of human-based technical support. We believe that there are three key product features here: easy to learn, easy to use, and bulletproof (hard to break and no bugs). These features are in demand from both sets of customers: the users and the dealers.

The CAD software vendor using resellers faces another significant issue: Autocad. Autocad has become the safe buy—the brand name buy—among the customers that CAD dealers usually encounter. Almost every dealer carries the product. Other software vendors must accept this and work to counteract the fact that their product will be compared with it, no matter how ludicrous the comparison seems.

## **The Dealer's Challenge**

The CAD dealer's challenge is to adapt to certain change. Either the dealer will grow through acquisition or alliance to become a larger geographic presence, hide in a small but favored niche application, or go out of business.

## **The Challenge for Everyone**

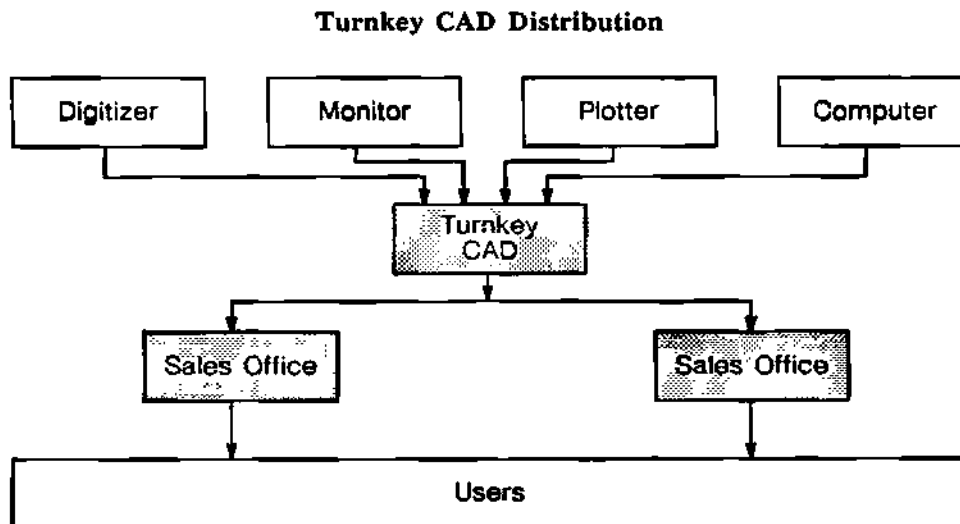
CAD/CAM/CAE has a somewhat lurid reputation of pushing market growth through a highly paid sales force selling, in some cases, more promises than delivery. In the maturing CAD/CAM/CAE market, there is a need for creating customer demand through regular publicity, through standardized and repetitive advertising messages, and through the urgency created by sales promotions. Dealers want to sell products profitably that customers already want to buy. There is a tremendous need for better cooperative strategies that enhance each contributor in any particular selling chain. Hardware vendors, software vendors, and dealers today are, through their interdependence, allies by necessity.

## 4.1 Distribution Market Models

### TURNKEY CAD MARKET MODEL

Historically, turnkey CAD is primarily an industry in which hardware resellers add value to sales by integrating proprietary design software with computer components. Although some CAD vendors have developed and sold both hardware and software, that approach is less typical. The flow of product in turnkey CAD sales is shown in Figure 4.1-1, with shaded areas indicating ownership of design software. In this model, the turnkey CAD vendor is both a focal point of system organization and the primary user contact. The turnkey CAD company is often free to relabel hardware, and hardware vendors rely on the CAD company as a key source of OEM sales.

Figure 4.1-1



Source: Dataquest  
July 1988

### MIXED CAD MARKET MODEL

As users became more experienced in the 1980s, many found that they could save money by buying the computer portion of a CAD system directly from the manufacturer. This task was made easier as computer manufacturers began making systems that, off the shelf, could be used for CAD. Although many CAD vendors resisted the trend away from system sales, customer demand eventually forced many of them to sell their

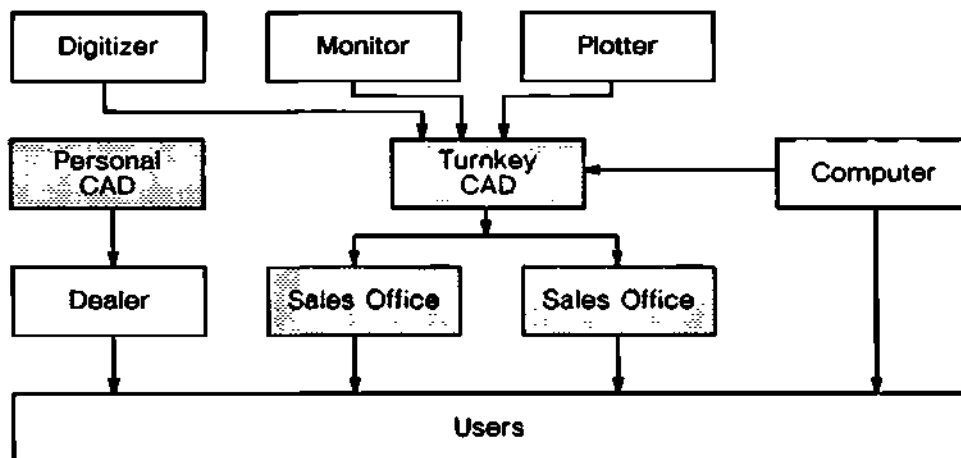


products as unbundled software. At the same time, Autodesk was demonstrating considerable success in marketing a low-cost software product exclusively through independent dealers. Figure 4.1-2 shows this more complex buying arena, where CAD users have the following:

- A wider choice of hardware platforms
- More buying channels from which to choose
- More contact with sellers who do not have a vested interest in proprietary CAD software
- Greater awareness of the CAD software publisher as primarily a supplier of design software

Figure 4.1-2

### Multiple-Channel Distribution



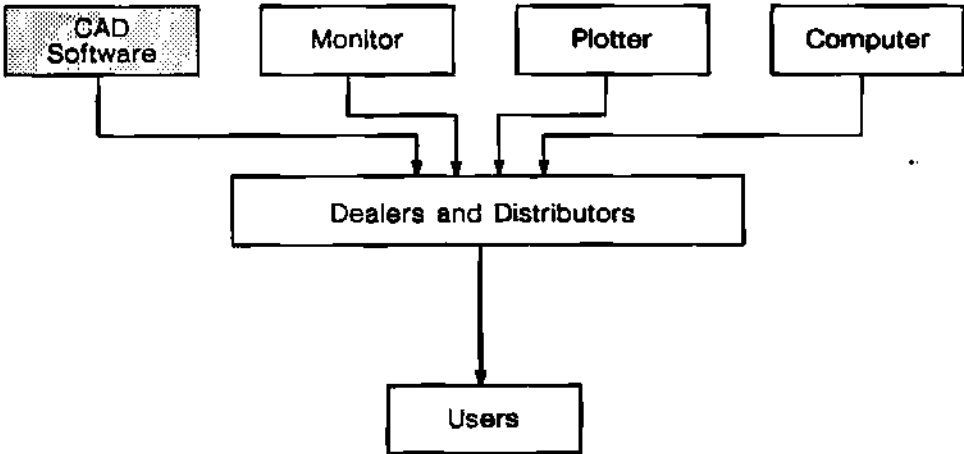
Source: Dataquest  
July 1988

### PERSONAL CAD MARKET MODEL

A distinguishing feature of personal CAD is the sale of software through resellers. Figure 4.1-3 shows the flow of personal CAD systems from manufacturers, to distributors, and ultimately to market. Independent dealers are the users' most frequent direct contact, and the CAD software publisher is one of several possible suppliers.

Figure 4.1-3

Personal CAD Distribution



Source: Dataquest  
July 1988

As the dealer channel has evolved, dealers have begun to specialize, generally by price of system sold. A rule of thumb for economic efficiency in the distribution channel is this: High-priced systems (greater than \$40,000) go through a direct sales force that serves to educate and train the market. Midrange systems (\$15,000 to \$40,000) are sold by value-added resellers (VARs)—specialty dealers who take over the role of the direct sales force in educating the market and also sell training and consulting packages. As products drop below the \$15,000 price, they are sold by dealers, or commodity resellers, who are order takers with limited ability to educate the customer or support the product. A software product must be widely accepted and have an educated customer base to be successful with this distribution strategy.

## 4.2 Channel Dynamics

### **BACKGROUND**

Today's channels for low-cost CAD distribution have been shaped by the precedent set by Autodesk over the last five years. Although several personal CAD suppliers championed the cause of low-cost software, it was Autodesk that anticipated the importance of establishing an extensive dealer channel. Most of today's resellers are the product of self-funded, boot-strapped efforts that began close to AutoCAD's introduction in 1983. However, resellers' early growth was limited by funds available to fuel expansion. Before most of them had grown large enough to qualify as hardware dealers, manufacturers had closed the door on new authorizations, leaving many of the growing CAD specialists to find other sources of hardware.

### **RESELLING HARDWARE**

Traditionally, personal computer manufacturers have restricted distribution of their products to authorized storefront retail operations and have required a minimum commitment (typically \$250,000) to establish a dealership. After the explosive growth in computer dealerships in the early 1980s produced an oversupply, computer manufacturers took steps to avoid continued overdistribution. In 1985, IBM announced a freeze on new dealership opportunities, resulting in essentially no growth in the dealer base during the last three years.

Few CAD dealers are large enough to meet the requirements for maximum discounts from computer manufacturers (usually hundreds of units per month). As a result of these restrictive dealer policies among most manufacturers, CAD dealers rarely establish strong ties to individual computer manufacturers. Performance is often the primary factor in selection of a compute platform, sometimes taking precedence even over profit margin.

With the exception of a few brand names that have entered the U.S. market in the last three years, there has been little expansion of the dealer base by any of the major computer manufacturers. A limited number of manufacturers (including Wyse and TeleVideo) distribute through a two-tiered channel that contains both the distributor and the dealer as two intermediaries between the vendor and the buyer.

CAD resellers can attempt to establish themselves as hardware dealers through several alternative paths, usually known as MAP, VAR, DAVAR, and gray market. MAPs (Marketing Assistance Programs) essentially establish the reseller as a source of sales leads for an authorized dealer. The retail dealer is responsible for the sale of the computer and pays a fee to the CAD dealer in turn. MAPs are defined and administered by the authorized dealer.

VAR (Value-Added Reseller) programs are established between the manufacturer and the CAD dealer. They require the reseller to add significant value to the computer,

often by the addition of proprietary hardware or software. In many cases, they are indistinguishable from OEM agreements. Discounts are based on volume.

DAVAR (Dealer-Assisted Value-Added Reseller) agreements are struck between the manufacturer and an authorized reseller. When approved, a DAVAR agreement authorizes a dealer to resell through a designated VAR, with the authorized dealer retaining primary responsibility for support of the computer. DAVAR discounts are negotiated between the authorized dealer and the VAR (in this case, the CAD dealer).

Most manufacturers' dealer agreements prohibit dealers from selling to other resellers. Authorized dealers who do so are in violation of their dealer agreements and run some risk of losing their authorizations. The CAD dealer who buys from an authorized dealer for resale has no agreement with the manufacturer; therefore, the CAD dealer does not violate any agreement or law. Some CAD resellers find this gray market to be the most attractive of all.

### **RESELLING SOFTWARE**

Most software products are distributed directly to resellers by the developer or publisher. By avoiding distributors, the developer maintains quality control of the channel and maximizes profits. For the same reasons, computer manufacturers, like software developers, encourage sales to dealers.

Resellers categorize themselves as dealers or VARs depending on the products carried and the amount of value added. Dealers sell commodity products that are sold by virtue of price, availability, and brand awareness. Little or no technical support is required or offered for commodity products. Any support must be provided by the product's developer. VARs try to add value to every system sold; frequently, they focus on advanced products that are differentiated by technical superiority, often with a specific subapplication focus. In some cases, resellers classified as dealers for CAD systems may add value for other vertical markets, thereby being considered VARs for other markets.

### **DISTRIBUTION**

#### **The CAD Distributor**

Many developers of low-cost hardware and software products distribute products through a two-tiered distribution scheme by selling to regional distributors who in turn sell to dealers. Intermediate distributors are used by most suppliers of peripheral devices, as well as by some computer and software suppliers. Distributors stock products and offer quick delivery to dealers, allowing dealers to minimize inventory and therefore conserve capital. In addition, distributors offer new vendors an established sales

organization with experience in selling to dealers. In some cases, distributors also provide technical support and training to end users. As a trade-off, dealers receive smaller discounts from distributors than from manufacturers, and vendors give up a certain amount of control when using distributors.

CAD distributors also add value through selection and knowledge of the products that they stock. Resellers who may be unfamiliar with the latest offerings in high-resolution monitors and graphics cards rely on the distributor for technical support that ranges from configuration assistance to special interface software.

### **The Commodity CAD Dealer**

CAD dealers sell on the basis of price and availability. They are most often storefront, retail, or mail order operations selling personal computer equipment for general business applications. Storefront operations offering CAD products include large chains, such as Businessland; franchises, such as ComputerLand; or independent retail stores. Within a chain, staff expertise at individual sites sometimes allows dealers to add value to CAD products sold.

Key product selection considerations for a commodity dealer are brand awareness, price, and support requirements. Brand awareness is important because salespeople in such an operation will not be able to differentiate competing products; therefore, the customer must recognize and ask for a specific product. Most commodity software products are priced below \$1,000. There are exceptions; for example, many dealers consider AutoCAD, VersaCAD, and CADKEY to be commodity products because of their broad distribution and market recognition. Finally, dealers expect any required product support, especially for software, to be provided by the publisher. Clearly, ease of use and ease of learning contribute to minimizing dealer support, a plus for both the vendor and the commodity dealer.

### **The VAR**

VARs may be nonstorefront businesses with full sales, service, and support staffs or they may be smaller companies with as few as one or two employees operating as consultants to a limited client base. Most of their sales are made by an outside sales force. In addition, some storefront retail operations employ a staff dedicated to sales and support of CAD products, qualifying them as VARs.

Many VARs consider their sales process an added value in itself. In order to provide the consultation required, the VAR must employ a more knowledgeable and thus more expensive sales and support organization, resulting in a requirement for higher margins. Most VARs indicate that a 30 percent gross margin is the minimum required to provide the level of necessary support. VARs generally believe that commodity dealers have an unbeatable advantage in selling commodity CAD products because they require a minimum of only 15 percent gross margin.

## **WHAT DO CAD SUPPLIERS GET FROM CAD RESELLERS?**

Many CAD vendors who previously have concentrated on direct sales are now developing a stronger dealer channel. As hardware and software product prices fall and CAD suppliers find it increasingly difficult to justify a direct sales effort, particularly for low-priced business, dealers begin to represent an attractive channel for low-cost products.

By establishing a dealer channel, a vendor can expect to expand the effective size of its sales force without using its own capital. For the developer of a new product, the reseller channel offers an unbeatable opportunity: a ready-made sales force.

In addition to offering a broader channel, dealers also frequently offer local technical support through training classes and hot-line phone support. In order to differentiate their offering, many dealers customize systems, often with special software or offer special system integration services, including installing communications software or networks. High-level resellers offer CAD vendors an excellent resource for off-loading the development of "specials," which may appear undesirable to the CAD vendor's staff.

Finally, by building a dealer channel, vendors benefit from being able to buffer inventory requirements. This situation allows them to operate with smaller inventories themselves.

Establishing a reseller channel is not without pitfalls. For a vendor with an established direct sales force or a manufacturer's representative program, channel conflict seems inevitable. By using dealers, vendors give up account control. Dealers are free to offer alternative products and may reduce the perceived value of a product by discounting. Maintaining dealer quality is another burden that must be carried; managing marginal dealers may require an inordinate amount of time. The risk of dealer mortality must also be weighed. Finally, few dealers will be loyal to a single supplier.

Despite these drawbacks, resellers now are seen as the primary vehicle for selling personal CAD products economically. At this point, few other viable options have been identified.

## 4.3 Dealer/Distributor Survey

### INTRODUCTION

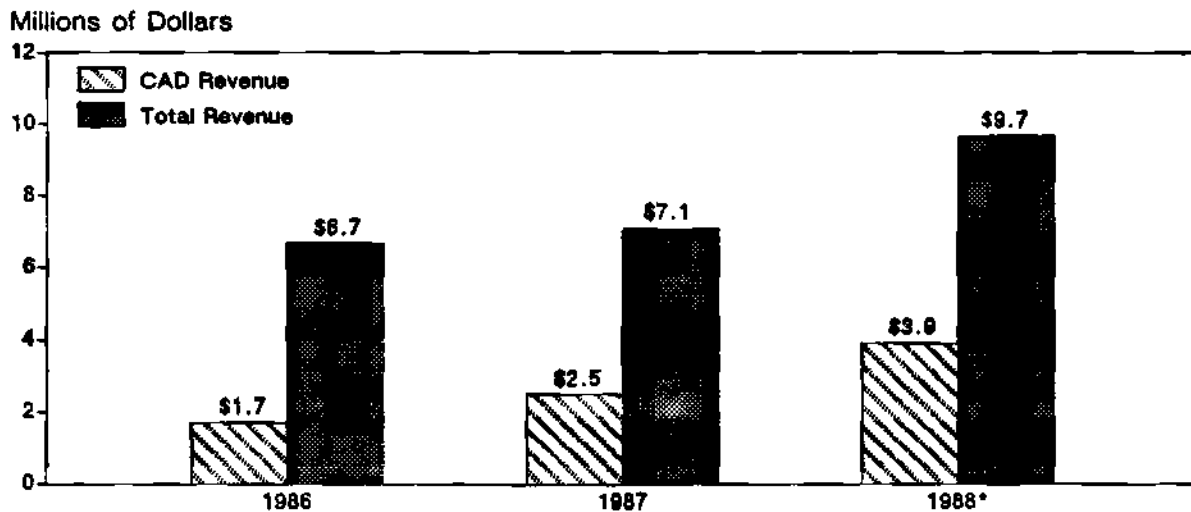
To identify what makes a good CAD reseller, Dataquest conducted in-depth interviews with 30 highly successful PC CAD value-added resellers (VARs), dealers, and distributors. Of these, 24 interviewees were VARs. The following is a discussion of significant characteristics of today's most successful PC CAD VARs. The "typical" VAR presented in the discussion is actually the mean response from all VARs on any particular question. The survey itself, with detailed findings, can be found in this binder under "Dealer/Distributor Survey Detail."

### THE TYPICAL SUCCESSFUL CAD VAR

Although successful CAD VARs have shown strong sales revenue growth in the last three years, the average reseller estimates that total 1988 company revenue will be just slightly less than \$10 million, with CAD sales of less than \$4 million (see Figure 4.3-1). CAD VARs are generally relatively small, independent operations that are focused on local users.

Figure 4.3-1

Average Reseller Revenue  
CAD versus Total



\*Estimated

Source: Dataquest  
July 1988

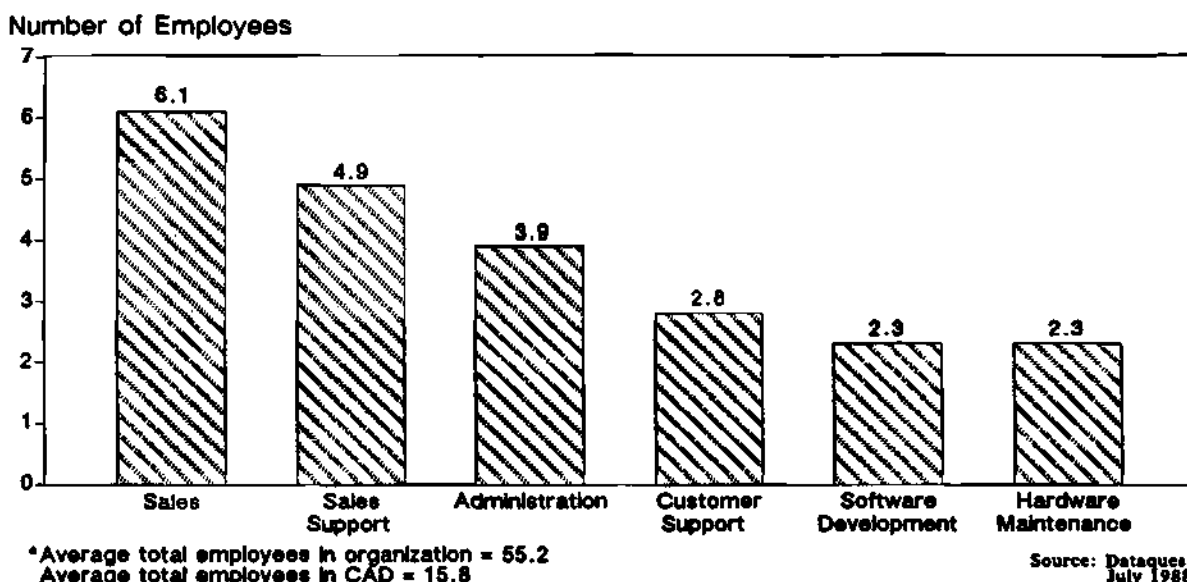
### Organizational Structure

In addition to the defining characteristics cited in the preceding section ("Channel Dynamics"), CAD VARs have a number of other attributes in common. The typical VAR had a background in CAD prior to becoming an AutoCAD dealer about four years

ago. In addition to a technical grounding in CAD, some prior sales and management experience is also typical. The CAD dealer staff is not unlike that of a turnkey CAD company, with experienced salespeople backed by degreed engineers providing pre- and postsales support. Major account sales experience is lacking in many, but certainly not all, cases. Figure 4.3-2 shows the typical staff composition in a PC CAD reseller organization.

Figure 4.3-2

**CAD Staff Composition  
Typical PC Reseller**



Most successful resellers have begun to build regional organizations. Maintaining multiple business sites allows the CAD dealer to leverage costly technical support and training development expenses. Application specialists can be based where the strongest demand exists and still be available to other sites. Some resellers aspire to build nationwide organizations, and at least one reseller has a program in place that provides national coverage under a single name.

**Products Offered**

According to our survey, the typical reseller, who started as an AutoCAD dealer, has expanded the software product line to include advanced packages, such as turnkey compatibles from Computervision or Intergraph. Computing platforms sold are almost exclusively 386-based MS-DOS machines. Compaq is a popular choice. However, because of limited distribution, it is unavailable to many CAD dealers. Acer, Everex, TeleVideo, and Wyse are popular alternatives that are available to the dealer from distributors.



Complete systems are configured using peripherals sourced from a distributor. Those peripherals include 19-inch high-resolution displays, graphics controllers, D- and E-size plotters, and digitizing tablets. Graphics controllers with display list memory are popular because of the near-instantaneous pan and zoom capabilities.

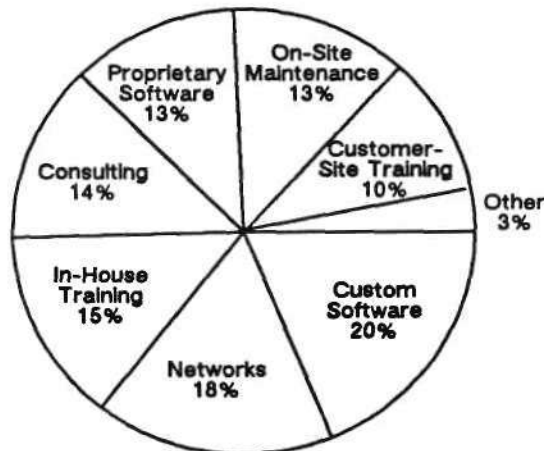
Networks, which can only be installed and configured by a very capable staff, have increased in popularity significantly in the past six months. Some experimentation with UNIX workstations is not uncommon, and the Sun 386i product has generated significant interest among dealers. Xenix experience is typical also.

VARs report that their average CAD system sells for between \$20,000 and \$24,000.

### The Value Added

Figure 4.3-3 illustrates what VARs say they sometimes or always add to sales of the products described above. In our survey, the responses are rather evenly divided among a wide variety of software, training, networking, maintenance, and general consulting. Responses total more than 100 percent because of multiple responses.

**Figure 4.3-3**  
**Value Added to**  
**Personal CAD Sales**



\* Total is over 100% because of multiple responses

Source: Dataquest  
July 1988

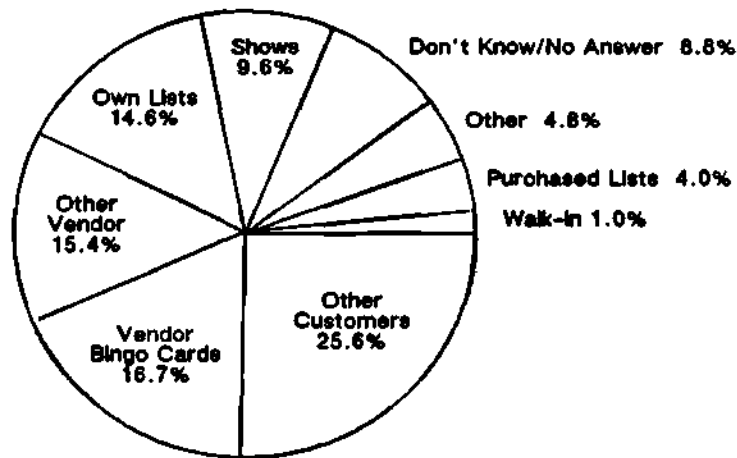
### The Sales Process

The typical CAD VAR generates sales leads from a wide variety of sources, as indicated by Figure 4.3-4. Each of these leads may be introduced at a different point in an ongoing sales cycle. The typical CAD dealer starts with direct mail to maintain contact with a typical prospect base of several thousand, most often within a radius of

100 to 200 miles. Direct mail is not used as a means of getting orders; rather, it is used as a means of creating awareness and qualifying leads. Leads, whether from vendors (considered an important source) or from local advertising done by the dealer, are fed into the direct mail program and are often followed by telephone contact. Interested prospects are invited to seminars—presentations and demonstrations to groups of 10 to 100 people. Further telephone follow-up identifies qualified prospects, and a typical face-to-face sales process follows. Exhaustive benchmarks are rare, but prospects may be invited to enroll in a training class (for a fee) to become more familiar with the product of interest.

Figure 4.3-4

Source of Sales Leads  
Personal CAD Resellers



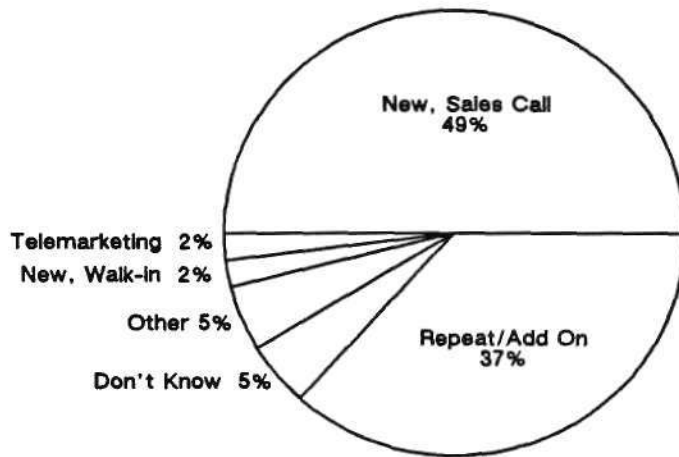
Source: Dataquest  
July 1988

Although CAD VARs report that sales leads come from many sources, Figure 4.3-5 shows that revenue itself comes from two primary sources: direct sales calls (49 percent) and repeat business (37 percent). Thus, 86 percent of VAR revenue comes from the traditional method of calling on new and existing customers.

The typical VAR sells to a variety of customers, as shown in Figure 4.3-6. Fully 85 percent of sales are to private industry, with both large and small companies contributing to the mix nearly evenly. Sales to government and education typically account for less than 10 percent of total revenue.

Figure 4.3-5

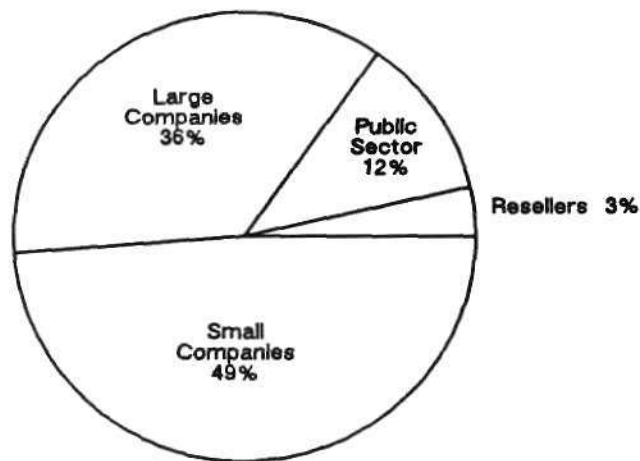
Sources of Buyers  
Personal CAD Resellers



Source: Dataquest  
July 1988

Figure 4.3-6

Customer Type, Personal CAD VARs



Source: Dataquest  
July 1988

### Dealer Strategies

As noted before, the personal CAD VAR takes pride in being able to offer expert consultation to the customer as part of the sales process. This consultation is provided without direct charge to the customer—and at significant expense to the reseller. The VAR providing this consultation must guard against being underbid by a commodity dealer when an order is finally placed. VARs employ a number of strategies to accomplish this, including the following:

- Consultative sell
- Service and support
- Custom systems
- Advanced products
- Exclusive products
- Supermarket

Each of these strategies has been successfully employed by resellers. A brief overview of these strategies follows.

#### *Consultative Sell*

In some cases, VARs find that the consultative selling approach establishes a rapport and a confidence between reseller and customer that cannot be broken by lower prices from competitive dealers. Often, this bond is strengthened by the customer's recognition that he or she will be relying on that reseller to provide postsales service and support.

#### *Service and Support*

Many VARs use service and support as their primary added value. Some report that customers, once trained, are lost to discount dealers for subsequent purchases (especially for AutoCAD). Others report that customers stay loyal, recognizing the need for continued support. Some even report that users who buy their first systems from discounters later turn to VARs for support and subsequent buys.

The most common form of support offered is training. At a minimum, VARs offer basic user training. Many offer additional courses, such as advanced users, menu modification, macro development, or user programming. In some cases, VARs offer custom training for each customer, with a focus on solving actual customer problems.

In addition to training, most resellers offer hardware maintenance. VARs handle the necessary transfer of hardware from user to manufacturer for warranty service. Some resellers sell third-party maintenance to their customers for those products that are covered by third party maintenance companies (such as Xerox or TRW).

### *Custom Systems*

Some resellers customize systems through software to differentiate themselves from the competition. Typical examples are the combination of drafting software with desktop publishing to create a technical publishing system, or the combination of surveying software with drafting to appeal to civil engineers. The added software may be in the form of a popular package, such as Ventura Publisher, or it may be one of many AutoCAD add-ons, such as Synthesis (a parametric parts modeler), or it may be proprietary or custom software developed by the dealer. Resellers that take this approach are few in number, but most report success with the strategy.

### *Advanced Products*

Some VARs seek to avoid price-based competition by continually moving to increasingly more complex product offerings. Engineering workstations are becoming the platform of choice for some of these resellers, though few of them have sold workstations long enough to report proven success. Software packages that are compatible with turnkey CAD systems are typical choices for this strategy. Computervision's Personal Designer and Intergraph's Microstation are examples of products of choice. PCB layout and finite element analysis packages often are sold also by these resellers. As noted elsewhere, resellers report mixed results with this strategy: Without exclusivity, even the presence of two dealers in a given territory leads to price competition and margin erosion.

### *Exclusive Products*

Territorial exclusivity is often stated as a goal by CAD VARs. These resellers state that they are willing to commit to quota performance in return for exclusivity. Some surveyed resellers feel that exclusivity is the only viable strategy for long-term success.

### *Supermarket*

The supermarket reseller offers the longest possible list of products so that any customer can be satisfied (or so that any competitor can be matched). Some resellers carry as many as 15 software packages (although they list only a few of them as their "top" products). Along with the obvious advantages, this strategy carries some disadvantages. Few, if any, resellers are large enough to establish and maintain credible technical depth in more than a few packages. In addition, software vendors are wary of resellers who carry competitive products. In most cases, the supermarket strategy is combined with one of those listed above.

## **ECONOMICS**

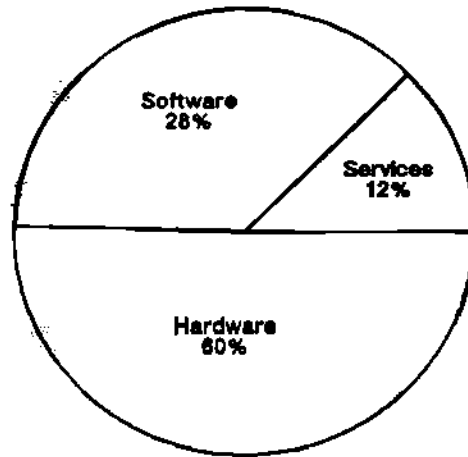
### **Revenue and Margin Sources**

Figure 4.3-7 compares hardware, software, and service as a source of revenue among personal CAD resellers. The most significant economic implication of this figure

is that the major contributor, hardware, is usually the most widely available—and therefore the most discounted. VARs believe that they must compete with computer stores that sell at 15 percent gross margin, while they themselves must sell at a minimum 30 percent gross margin to maintain a consultative selling capability.

Figure 4.3-7

Revenue Sources for  
Personal CAD Resellers



Source: Dataquest  
July 1988

Most of the VARs contacted sell AutoCAD, one of the most widely distributed CAD software packages. Nearly all AutoCAD resellers contacted believe that the product is overdistributed and, therefore, overdiscounted. This compounds the discounting problem already existing with hardware.

The final source of revenue is service, most often in the form of user training. Although training is not as widely available as hardware and software products, most dealers must compete for training dollars with other dealers, with trade schools, and with public institutions. Training revenue is further constrained by the fact that buyers assume that low-cost systems will require minimal training and therefore budget very little for training.

Personal CAD VARs operate in a narrow niche: They rely on low-cost products that cannot be profitably sold by the developer, yet they must sell products that are not sold by the commodity reseller. They compete both with commodity resellers and with turnkey CAD vendors, as well as other specialty CAD dealers. The net result is a continual squeeze on margins.

### **Operating Expenses**

Operating expenses to be covered by margin dollars include salaries, space costs, and interest payments. In order to offer consultative selling and effective support after the sale, the CAD dealer must employ a more costly sales and support staff than the average computer retailer—and that necessitates higher margins. Space costs for a CAD dealer may be lower, since a costly, high-traffic retail location is not required, but this does not offset the higher personnel costs.

### **Capital Requirements**

The CAD dealer must use capital to build inventories, to cover operating losses during start-up phases, to pay for the development of training and support products, and to provide working capital to cover the gap between accounts payable and accounts receivable. Building a multimillion-dollar dealership requires investment of several hundred thousand dollars in capital.

## **RESELLERS' ISSUES**

### **Profit Margins**

CAD resellers seem to be committed to differentiating themselves through service. That service begins with a consultative sell, followed by installation of a turnkey package, with continuing support and training. Customers often are attracted by this approach, but they are usually unwilling to pay a premium price for the benefits. This gap between what the VAR wants to provide and what the user wants to pay for represents a critical business model problem for both CAD vendors and resellers. The CAD VAR must often compete with large-volume retailers for a major portion of many sales. However, VAR, MAP, and DAVAR agreements do not result in margins that allow resellers to compete with large retailers on the basis of price. The resulting dilemma is this: On what basis does the CAD VAR compete? This issue is examined further in the chapters in this binder on end users and on future trends.

Nearly all resellers contacted expressed concerns about margin pressures due to overdistribution. The majority of resellers considering additional or alternative products today are considering only vendors that offer some degree of exclusivity. In the past, technical complexity of products such as 3-D modelers or PCB layout products provided a de facto exclusivity because only those resellers with sufficient technical expertise could effectively sell them. Today, many resellers look for more than that de facto exclusivity. Margin pressures have increased to the point that resellers dread the appearance of even a second dealer in their sales area.

### **Sales Staff**

Hiring and keeping technical sales and support staff is a second critical problem for the personal CAD VAR. Despite the fact that Dataquest did not specifically query

resellers on maintaining their sales staffs, nearly all interviewees cited the problem as important. Although VARs want to acquire experienced salespeople from traditional turnkey CAD vendors, these salespeople are accustomed to higher incomes than VARs can usually provide. On the other hand, the time and cost involved in training one effective salesperson can require a substantial investment for the VAR. Based on informal comments from resellers, it also appears that relationships between VAR management and sales staff are not strong.

#### HOW TO FIND, ACQUIRE, AND KEEP GOOD RESELLERS

Vendors who venture into reseller channels for the first time often find themselves on a long learning curve. They frequently begin with a small, controlled test program that can be modified as experience dictates. The time required to launch, test, and modify a program can easily span a full year. Distributors can offer shortcuts to the process of establishing a reseller program. CAD specialty distributors understand the needs and capabilities of the dealers they sell to, and they have established relationships with dealers—often hundreds of them.

Resellers interviewed by Dataquest consistently identified three key requirements for a good dealer/vendor relationship, as follows:

- Resellers need responsive support from vendors.
  - This need encompasses both technical support to handle difficult problems (or even routine bug responses) and sales support to meet challenging sales situations.
  - Oftentimes, the bidder who comes up with the quickest answer for the prospect wins the order; if the VAR must wait for the vendor to respond to an inquiry, the order may be lost.
- Resellers rely on their vendors to establish market awareness and even excitement about a product.
  - Resellers do not have the marketing clout to push an unfamiliar product into the market. Many vendors who have been successful with high-end products have been surprised to learn that they are unknown in the low-cost market.
- VARs want products that are clearly differentiated from the established competition in the low-cost commodity market.



## 4.4 Future Trends

Dataquest believes that the low-cost CAD distribution channel today is highly unstable and that significant changes are likely to occur in the near future. We believe that this instability is primarily caused by the following:

- Price discounting among commodity CAD dealers (VARs are unable to both add value to a sale and meet discounted prices.)
- Lack of territorial protection for most CAD products

### **A LOOK TO THE FUTURE**

Trends in distribution are developing as a result of VARs scrambling to avoid competing with the commodity dealers and with one another. The first major trend is a change in products. A significant number of VARs plan to switch to higher-performance workstations, leaving the PC-based systems to commodity dealers. The survey indicated that many dealers either are already selling workstations or are considering adding workstations to their current product lines.

As workstations enter the low-end market, both the performance range and the number of options available to end users increases rapidly, thereby compounding the difficulty of configuring systems. Commodity dealers do not have the technical capability to sell or support higher-priced workstations. Many VARs see the complexity of UNIX-based workstations as compared with MS-DOS PCs as a plus, helping to justify the added value that they wish to provide. The commodity dealer cannot afford to give away the technical expertise required to configure systems.

This attempt at differentiation from the IBM clone commodity market will be successful to the extent that the workstation manufacturers can protect their positions from clones and not duplicate the commodity market that exists for the IBM PC-compatible products. Its success also will depend on how quickly the low-cost CAD market will change from DOS-based systems to UNIX. The IBM PS/2 represents the least desirable platform to VARs because of the following factors:

- The rush to clone the PS/2, thus reducing it to a commodity product
- The lack of peripheral devices and cards that interface through the PS/2 microchannel
- The uncertainty surrounding the future of OS/2
- IBM's restrictive distribution policies

Efforts among VARs to distinguish themselves from commodity resellers is further evidenced by the sophistication of the software products that they are offering now or are planning to offer. The movement is toward products that are newer to the market, are more sophisticated, and promise the additional advantage of territorial protection for the reseller. VARs actively seek the protection provided by a product that requires more support than commodity dealers can deliver.

Examples of the more sophisticated products that VARs are turning to are Aries and Parametric Technologies in the mechanical markets, and Arris in the architectural market. For distributors of electronics systems, the trend is toward adding more sophisticated simulation and layout tools. These products offer the opportunity to increase margins by targeting more sophisticated buyers who will pay close to list price for high-level products that include some ongoing support.

Special challenges await developers of new CAD products. New CAD software vendors offering high-end products in the personal CAD market recognize that they must create a distribution network among top VARs. Commodity dealers are either unwilling to carry new products without a strong market presence or are unable to effectively explain the benefits of new products to users. New CAD suppliers often offer their dealers exclusive territories in order to attract them away from their current product lines. There is an unanswered question: Can the combination of a superior new product plus reseller expertise win back sales of established products that have passed to commodity dealers? In the end, resellers will probably find that they serve the following two separate segments of CAD end users:

- Buyers who have a need for a higher-end product and are willing to pay for it
- Price-conscious buyers who opt for the commodity product

This raises the issue of how effectively the users' and suppliers' needs are being met by the commodity dealer channel. At a minimum, users are gaining the benefit of lower-cost tools. What they are losing are the benefits of using the tools in the most efficient and productive fashion, an understanding that comes with training and support. It is possible that the state of the market is such that the demand is mainly to get the tool into the hands of as many users as possible, as quickly as possible, without optimizing the use of the tool.

The typical VAR holds strongly to the belief that the "consultative sell" adds value needed by users and that users will not be satisfied by products bought off a store shelf based on price alone. Unfortunately, user buying behavior may be on a collision course with these beliefs. Dataquest's user survey (see Section 4.3) allows us to compare user buying decisions with what VARs say they have to sell. Our survey clearly indicates that users are very satisfied with their products (including products priced at less than \$500) and that they are not overly concerned with the quality of the dealer who sells the product.

The last trend in the low-cost dealer channel is the current attempt to increase the value added to the product through addition of training, proprietary software, and consulting. The problem with this attempt to leverage margins out of this portion of the business is that it represents only about 10 percent of total revenue. Some dealers are dropping the less profitable portions of their business, such as personal computer sales, and are concentrating on the software and support portions. Even if the margins are not available from selling the base product, they are finding that the software add-on and support business is attractive.

In a significant number of cases, specialty CAD dealers are indicating that they are giving up or that they do not know how to make a success out of this business. A number of dealers stated that they were getting out of the low-cost market. Several had no idea what to do to make their current CAD business viable; 4 out of 24 VARs indicated that they were in this type of circumstance. Dataquest believes that statements from some respondents that they are actually quitting the market and from other respondents to the effect that there are too many dealers and too much channel conflict are a clear indication that a major reduction will occur in the number of dealers.

The CAD revenue trend is strongly up, increasing on an average for resellers interviewed from \$1.7 million to \$3.9 million over the 1986 to 1988 period, representing a 51 percent compound annual growth rate (CAGR). This compares favorably to an increase from \$6.7 million to \$9.7 million, a 20 percent CAGR for total revenue in all applications. Viewed from this perspective, resellers are doing well, particularly in CAD. Their concerns, however, focus less on revenue than on profits and trends. We believe that one outcome of the changes taking place in the low-cost distribution channel is that resellers are beginning to offer higher-performance, higher-priced products in order to move their margins up to acceptable levels.

Commodity reseller channels in technology industries are a relatively new phenomenon. The personal CAD reseller channel is actively evolving, as CAD suppliers and resellers try to devise an economically effective and mutually viable means of delivering low-cost CAD products to end users. Resellers are searching for a plan that will allow them to make money over the next five years—and that plan has yet to crystallize. The uncertainty in this situation represents a significant opportunity for vendors who can develop and execute a business plan that will allow resellers to make a reliable profit. For those who wish further insight into personal CAD resellers, a more detailed analysis of Dataquest's survey of personal CAD resellers is included in the appendix titled "Dealer/Distributor Survey Detail."

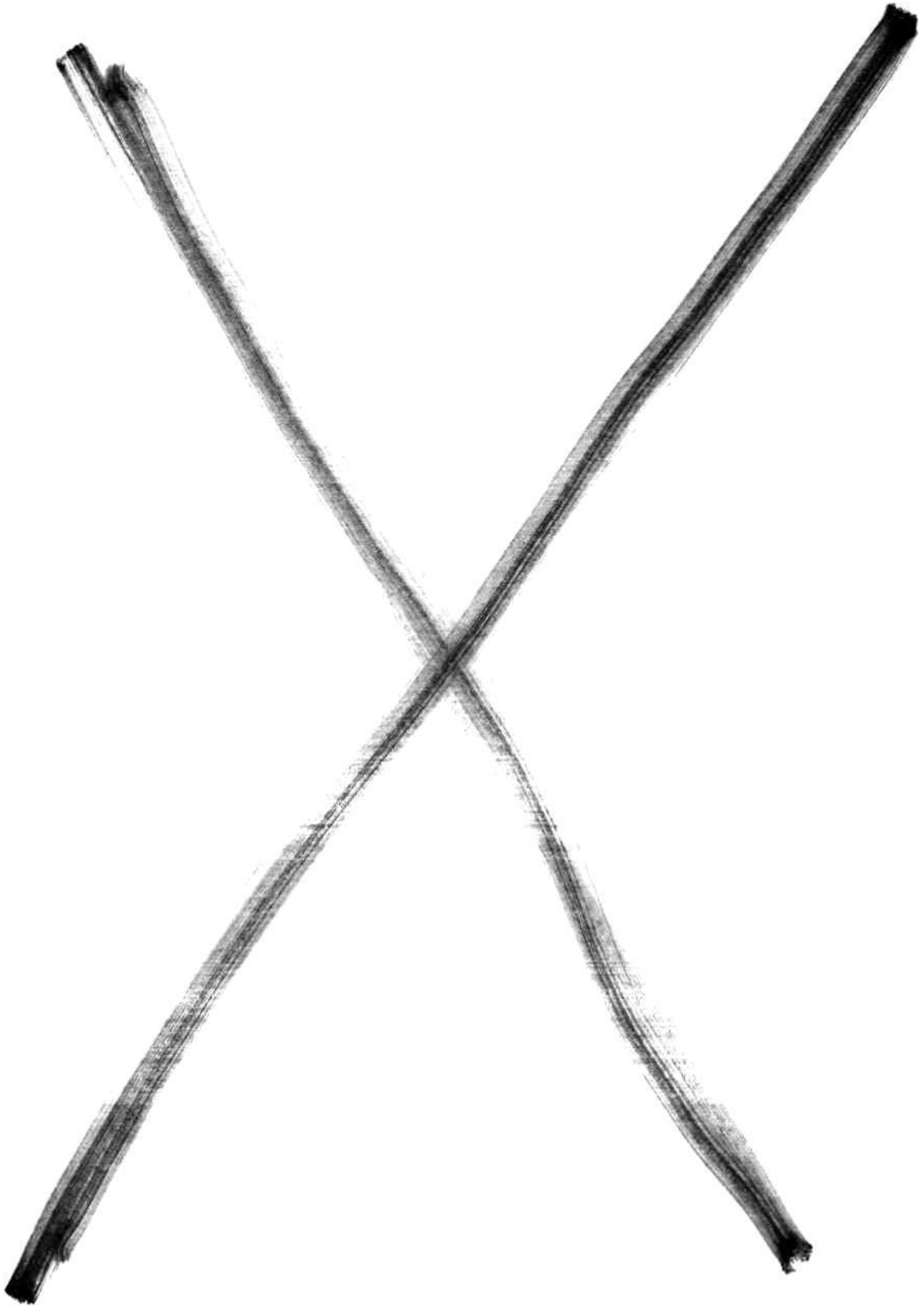


TABLE NUMBER: 1  
 TITLE: Preliminary History and Forecast  
 APPLICATION: All Applications  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	145,586	207,516	247,241	267,596	330,734	379,670	426,860	468,230	497,460	509,240	18%	9%
Workstation Shipments	145,586	207,516	247,241	267,596	330,734	379,670	426,860	468,230	497,460	509,240	18%	9%
CPU Installed Base	214,762	416,068	642,768	860,522	1,095,496	1,326,580	1,605,260	1,927,890	2,280,430	2,646,420	39%	19%
Workstation Installed Base	214,762	416,068	642,768	860,522	1,095,496	1,326,580	1,605,260	1,927,890	2,280,430	2,646,420	39%	19%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	24.7	15.4	20.4	17.5	18.5	19.7	19.9	19.8	19.8	19.8	-6%	1%
Hardware-Only ASP	5.0	4.3	4.7	4.8	4.6	4.6	4.5	4.5	4.4	4.4	-2%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	909	1,023	1,320	1,496	1,762	1,957	2,134	2,267	2,345	2,357	14%	6%
CPU Revenue	835	948	1,184	1,388	1,639	1,728	1,876	1,985	2,122	2,033	14%	4%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	74	75	136	108	123	229	259	281	223	324	11%	21%
Software Revenue	373	510	571	706	843	1,007	1,110	1,195	1,277	1,382	18%	10%
Bundled	145	133	111	137	145	205	204	197	188	196	-0%	6%
Unbundled	227	378	460	569	697	802	905	998	1,090	1,186	25%	11%
Service Revenue	59	71	87	120	138	154	166	175	181	186	19%	6%
Total Revenue	1,340	1,604	1,978	2,322	2,742	3,118	3,410	3,636	3,804	3,924	15%	7%
Increase over Prior Year	NA	20%	23%	17%	18%	14%	9%	7%	5%	3%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 2  
 TITLE: Preliminary History and Forecast  
 APPLICATION: All Applications  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	85,336	109,704	141,786	126,532	144,370	159,760	170,550	180,110	188,380	190,580	11%	6%
Workstation Shipments	85,336	109,704	141,786	126,532	144,370	159,760	170,550	180,110	188,380	190,580	11%	6%
CPU Installed Base	130,100	235,592	364,327	461,142	550,357	627,580	715,590	813,320	919,520	1,029,270	33%	13%
Workstation Installed Base	130,100	235,592	364,327	461,142	550,357	627,580	715,590	813,320	919,520	1,029,270	33%	13%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	19.5	16.6	22.8	16.1	14.1	13.2	12.8	12.6	12.5	12.5	-6%	-2%
Hardware-Only ASP	5.1	3.9	3.9	4.8	4.6	4.6	4.5	4.4	4.4	4.4	-2%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	460	452	568	611	667	731	770	802	827	818	8%	4%
CPU Revenue	446	436	565	594	649	708	738	762	779	778	8%	4%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	15	15	3	16	18	23	31	40	48	40	4%	18%
Software Revenue	170	227	260	304	362	404	443	485	527	584	16%	10%
Bundled	30	20	7	5	6	4	3	3	2	18	-26%	22%
Unbundled	140	207	253	299	356	400	440	482	524	566	20%	10%
Service Revenue	22	23	34	41	46	51	53	56	59	61	16%	6%
Total Revenue	652	702	862	956	1,075	1,185	1,266	1,343	1,413	1,464	11%	6%
Increase over Prior Year	NA	8%	23%	11%	12%	10%	7%	6%	5%	4%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 3  
 TITLE: Preliminary History and Forecast  
 APPLICATION: All Applications  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	36,039	58,525	65,466	85,971	110,563	132,350	156,180	175,650	188,130	191,420	25%	12%
Workstation Shipments	36,039	58,525	65,466	85,971	110,563	132,350	156,180	175,650	188,130	191,420	25%	12%
CPU Installed Base	50,633	108,063	169,157	243,102	329,269	421,580	537,750	673,570	821,940	973,800	45%	24%
Workstation Installed Base	50,633	108,063	169,157	243,102	329,269	421,580	537,750	673,570	821,940	973,800	45%	24%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	18.7	8.6	12.8	18.4	20.0	26.2	27.0	27.3	27.4	27.9	1%	7%
Hardware-Only ASP	5.5	4.5	5.3	5.0	4.8	4.8	4.7	4.6	4.6	4.6	-3%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	232	284	386	488	609	712	806	872	909	914	21%	8%
CPU Revenue	220	268	360	440	552	633	712	767	870	769	20%	7%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	12	17	26	48	57	79	94	105	39	145	37%	21%
Software Revenue	86	142	167	211	252	310	352	387	429	471	24%	13%
Bundled	28	25	28	28	27	41	36	30	28	29	-1%	2%
Unbundled	58	117	139	182	225	269	316	356	400	442	31%	14%
Service Revenue	11	24	31	40	48	54	61	67	71	74	34%	9%
Total Revenue	330	451	584	738	908	1,075	1,219	1,325	1,408	1,459	22%	10%
Increase over Prior Year	NA	37%	30%	26%	23%	18%	13%	9%	6%	4%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 4  
 TITLE: Preliminary History and Forecast  
 APPLICATION: All Applications  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	22,388	34,596	36,043	49,888	68,395	77,180	85,900	94,240	98,090	99,110	25%	8%
Workstation Shipments	22,388	34,596	36,043	49,888	68,395	77,180	85,900	94,240	98,090	99,110	25%	8%
CPU Installed Base	30,945	64,759	98,029	140,647	194,478	248,300	311,230	384,730	462,470	541,320	44%	23%
Workstation Installed Base	30,945	64,759	98,029	140,647	194,478	248,300	311,230	384,730	462,470	541,320	44%	23%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	31.0	24.3	28.7	17.3	18.3	18.4	18.5	18.7	18.7	18.6	-10%	0%
Hardware-Only ASP	3.6	5.5	6.9	4.6	4.2	4.2	4.1	4.1	4.0	4.0	3%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	206	266	344	370	451	466	493	510	505	496	17%	2%
CPU Revenue	159	224	237	327	403	341	363	377	376	369	20%	-2%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	47	42	106	42	48	125	131	132	129	127	0%	22%
Software Revenue	111	135	138	177	208	267	280	279	272	266	13%	5%
Bundled	87	86	76	102	112	159	165	163	156	149	5%	6%
Unbundled	24	49	62	75	97	107	115	116	115	118	32%	4%
Service Revenue	26	22	20	38	42	47	48	47	45	44	10%	1%
Total Revenue	343	423	502	585	701	779	822	836	822	806	15%	3%
Increase over Prior Year	NA	24%	19%	16%	20%	11%	5%	2%	-2%	-2%		

Forecasts

Source: Dataquest  
March 1991



TABLE NUMBER: 5  
 TITLE: Preliminary History and Forecast  
 APPLICATION: All Applications  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1,822	4,692	3,946	5,206	7,406	10,370	14,220	18,230	22,860	28,120	32%	31%
Workstation Shipments	1,822	4,692	3,946	5,206	7,406	10,370	14,220	18,230	22,860	28,120	32%	31%
CPU Installed Base	3,085	7,653	11,256	15,631	21,393	29,110	40,690	56,270	76,490	102,030	47%	37%
Workstation Installed Base	3,085	7,653	11,256	15,631	21,393	29,110	40,690	56,270	76,490	102,030	47%	37%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	20.3	8.4	11.6	16.2	9.4	9.5	10.0	10.2	10.8	8.5	-14%	-2%
Hardware-Only ASP	5.3	4.4	5.5	5.1	4.7	4.6	4.6	4.6	4.5	4.6	-2%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	10	21	22	27	35	48	66	83	104	128	27%	29%
CPU Revenue	10	20	22	26	35	46	63	79	97	117	27%	28%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	1	0	1	1	2	3	4	7	11	26%	79%
Software Revenue	5	6	6	13	20	27	35	44	50	60	30%	24%
Bundled	1	2	1	1	0	1	0	0	0	1	-20%	30%
Unbundled	5	5	6	12	20	27	34	43	50	59	33%	24%
Service Revenue	0	1	1	2	2	3	4	5	6	7	38%	29%
Total Revenue	16	28	30	42	57	78	104	132	160	195	29%	28%
Increase over Prior Year	NA	72%	6%	43%	35%	36%	33%	27%	22%	22%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 6  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Mechanical  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	76,917	108,319	124,548	120,479	147,826	166,130	182,990	198,510	209,190	211,790	14%	7%
Workstation Shipments	76,917	108,319	124,548	120,479	147,826	166,130	182,990	198,510	209,190	211,790	14%	7%
CPU Installed Base	107,965	213,550	328,355	423,975	523,028	613,710	721,610	846,150	981,420	1,120,640	37%	16%
Workstation Installed Base	107,965	213,550	328,355	423,975	523,028	613,710	721,610	846,150	981,420	1,120,640	37%	16%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	23.6	17.0	23.1	20.0	21.3	22.3	21.9	21.6	21.3	21.4	-2%	0%
Hardware-Only ASP	3.6	4.2	4.3	4.8	4.6	4.6	4.5	4.5	4.4	4.4	5%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	406	558	665	683	824	910	968	1,014	1,035	1,034	15%	5%
CPU Revenue	354	504	569	617	748	776	823	859	875	865	16%	3%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	52	54	95	66	76	134	145	154	159	169	8%	17%
Software Revenue	165	220	244	309	344	407	426	435	435	431	16%	5%
Bundled	91	97	81	91	95	135	136	133	126	119	1%	5%
Unbundled	74	123	163	218	249	273	290	302	309	312	28%	5%
Service Revenue	34	38	34	55	66	73	78	81	82	82	14%	5%
Total Revenue	605	816	943	1,047	1,234	1,390	1,472	1,530	1,552	1,547	15%	5%
Increase over Prior Year	NA	35%	16%	11%	18%	13%	6%	4%	1%	-0%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 7  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Mechanical  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	43,469	59,257	70,311	55,597	62,190	67,170	70,450	73,680	76,540	77,370	7%	4%
Workstation Shipments	43,469	59,257	70,311	55,597	62,190	67,170	70,450	73,680	76,540	77,370	7%	4%
CPU Installed Base	61,167	118,723	183,349	224,939	259,811	285,570	314,610	346,880	382,010	419,310	34%	10%
Workstation Installed Base	61,167	118,723	183,349	224,939	259,811	285,570	314,610	346,880	382,010	419,310	34%	10%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	19.0	14.9	12.7	9.6	15.9	15.7	15.6	15.4	15.3	15.3	-3%	-1%
Hardware-Only ASP	3.4	3.8	3.7	4.7	4.6	4.6	4.5	4.5	4.4	4.4	6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	171	243	264	264	285	308	319	330	339	343	11%	4%
CPU Revenue	161	232	263	255	275	298	306	314	320	320	11%	3%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	10	11	1	9	10	10	13	16	20	23	-0%	19%
Software Revenue	59	72	79	103	114	123	129	133	131	126	14%	2%
Bundled	17	12	2	3	3	1	1	1	1	1	-28%	-21%
Unbundled	42	60	76	100	110	121	128	132	130	125	21%	2%
Service Revenue	10	11	8	15	18	19	20	21	22	22	12%	5%
Total Revenue	240	326	352	382	416	450	468	484	492	491	12%	3%
Increase over Prior Year	NA	36%	8%	9%	9%	8%	4%	3%	2%	-0%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 8  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Mechanical  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	18,877	27,216	32,361	39,084	49,339	56,940	65,620	73,390	78,270	79,710	21%	10%
Workstation Shipments	18,877	27,216	32,361	39,084	49,339	56,940	65,620	73,390	78,270	79,710	21%	10%
CPU Installed Base	26,743	53,418	83,499	116,406	153,573	190,930	236,960	290,760	349,450	409,580	42%	22%
Workstation Installed Base	26,743	53,418	83,499	116,406	153,573	190,930	236,960	290,760	349,450	409,580	42%	22%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	15.3	9.4	14.7	24.2	23.1	30.1	30.1	29.9	29.6	29.6	9%	5%
Hardware-Only ASP	3.8	4.4	4.6	4.9	4.8	4.7	4.7	4.6	4.6	4.6	5%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	94	133	180	240	291	327	357	383	397	403	25%	7%
CPU Revenue	89	124	159	207	253	286	311	332	341	335	23%	6%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	5	10	20	33	38	41	46	51	56	68	50%	12%
Software Revenue	31	56	75	102	111	136	146	152	158	162	29%	8%
Bundled	12	17	19	20	17	29	26	23	21	21	8%	3%
Unbundled	19	39	56	82	94	107	120	129	137	141	38%	8%
Service Revenue	5	11	14	21	25	28	30	33	34	35	37%	7%
Total Revenue	130	201	269	363	428	491	534	567	590	600	27%	7%
Increase over Prior Year	NA	54%	34%	35%	18%	15%	9%	6%	4%	2%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 9  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Mechanical  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	13,632	19,625	19,923	23,611	33,136	37,510	41,110	44,540	46,410	45,640	19%	7%
Workstation Shipments	13,632	19,625	19,923	23,611	33,136	37,510	41,110	44,540	46,410	45,640	19%	7%
CPU Installed Base	18,610	37,798	56,094	75,411	100,042	124,350	152,620	185,440	220,180	254,150	40%	20%
Workstation Installed Base	18,610	37,798	56,094	75,411	100,042	124,350	152,620	185,440	220,180	254,150	40%	20%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	30.3	25.6	33.2	19.3	21.1	20.4	20.2	20.0	19.8	19.8	-7%	-1%
Hardware-Only ASP	4.0	5.7	6.9	4.6	4.3	4.2	4.2	4.1	4.1	4.1	1%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	138	172	212	168	234	254	266	270	263	248	11%	1%
CPU Revenue	100	139	138	145	205	172	180	185	182	173	15%	-3%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	37	33	74	23	28	83	85	85	81	75	-5%	22%
Software Revenue	73	89	89	100	113	140	139	135	127	119	9%	1%
Bundled	62	66	59	68	74	104	109	109	103	97	3%	6%
Unbundled	11	22	30	32	40	36	30	26	24	23	29%	-11%
Service Revenue	19	16	12	18	22	26	26	26	24	22	3%	0%
Total Revenue	229	277	312	286	369	420	431	430	414	390	10%	1%
Increase over Prior Year	NA	21%	13%	-8%	29%	14%	3%	-0%	-4%	-6%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 10  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Mechanical  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	939	2,221	1,953	2,187	3,161	4,520	5,810	6,900	7,980	9,070	27%	23%
Workstation Shipments	939	2,221	1,953	2,187	3,161	4,520	5,810	6,900	7,980	9,070	27%	23%
CPU Installed Base	1,443	3,612	5,413	7,219	9,601	12,860	17,420	23,060	29,780	37,600	46%	31%
Workstation Installed Base	1,443	3,612	5,413	7,219	9,601	12,860	17,420	23,060	29,780	37,600	46%	31%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	18.9	13.3	10.2	9.9	6.2	6.1	6.1	6.0	6.0	6.0	-20%	-1%
Hardware-Only ASP	3.4	4.3	4.5	5.1	4.6	4.6	4.5	4.5	4.4	4.4	6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	4	10	9	11	15	20	26	31	35	40	31%	22%
CPU Revenue	4	10	9	11	14	20	25	29	33	37	31%	21%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	1	0	0	0	1	1	2	2	3	25%	47%
Software Revenue	2	2	2	5	6	9	12	16	19	24	26%	34%
Bundled	0	1	0	1	0	0	0	0	0	0	-28%	28%
Unbundled	1	1	1	4	6	8	12	15	19	23	31%	34%
Service Revenue	0	1	0	1	1	1	1	2	2	2	38%	28%
Total Revenue	6	13	11	17	21	30	39	48	56	66	30%	26%
Increase over Prior Year	NA	134%	-17%	54%	23%	44%	31%	22%	16%	18%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 11  
 TITLE: Preliminary History and Forecast  
 APPLICATION: AEC  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	36,384	51,929	61,431	75,760	94,849	111,830	129,710	149,130	164,830	178,840	21%	14%
Workstation Shipments	36,384	51,929	61,431	75,760	94,849	111,830	129,710	149,130	164,830	178,840	21%	14%
CPU Installed Base	57,366	107,243	162,655	224,993	295,105	369,050	460,910	573,090	701,010	842,980	39%	23%
Workstation Installed Base	57,366	107,243	162,655	224,993	295,105	369,050	460,910	573,090	701,010	842,980	39%	23%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	22.8	14.0	15.1	15.6	15.3	15.8	15.7	15.5	15.2	15.2	-8%	-0%
Hardware-Only ASP	6.5	4.1	4.8	4.7	4.4	4.4	4.4	4.3	4.3	4.3	-8%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	247	228	311	410	467	524	594	669	725	765	14%	10%
CPU Revenue	242	219	295	391	448	477	538	602	647	690	13%	9%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	4	9	16	19	19	46	56	67	78	75	34%	32%
Software Revenue	57	89	118	163	213	281	347	419	486	578	30%	22%
Bundled	10	13	12	21	21	35	36	35	35	53	14%	21%
Unbundled	47	76	106	142	192	245	312	384	450	526	33%	22%
Service Revenue	5	8	23	28	31	36	43	49	55	62	45%	15%
Total Revenue	309	325	451	601	710	841	984	1,137	1,267	1,405	18%	15%
Increase over Prior Year	NA	5%	39%	33%	18%	18%	17%	16%	11%	11%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 12  
 TITLE: Preliminary History and Forecast  
 APPLICATION: AEC  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	23,319	30,018	37,586	38,028	44,376	50,990	57,080	64,470	70,890	76,550	14%	12%
Workstation Shipments	23,319	30,018	37,586	38,028	44,376	50,990	57,080	64,470	70,890	76,550	14%	12%
CPU Installed Base	37,467	66,062	99,609	129,015	157,974	186,240	220,600	262,340	310,520	364,350	33%	18%
Workstation Installed Base	37,467	66,062	99,609	129,015	157,974	186,240	220,600	262,340	310,520	364,350	33%	18%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	21.6	16.3	8.8	14.1	14.4	14.3	14.1	14.0	13.8	13.8	-8%	-1%
Hardware-Only ASP	6.6	3.8	3.8	4.6	4.4	4.4	4.3	4.3	4.2	4.2	-8%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	157	116	142	176	197	223	246	276	300	308	5%	9%
CPU Revenue	156	114	142	173	194	216	237	262	283	302	4%	9%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	2	0	3	3	7	10	14	17	6	18%	17%
Software Revenue	35	46	66	77	102	127	156	187	215	262	24%	21%
Bundled	2	1	0	1	1	1	0	0	0	16	-10%	68%
Unbundled	32	46	66	76	101	126	155	186	214	246	25%	20%
Service Revenue	2	2	11	11	12	13	15	18	20	22	43%	14%
Total Revenue	193	165	219	263	310	363	418	480	534	592	10%	14%
Increase over Prior Year	NA	-15%	33%	20%	18%	17%	15%	15%	11%	11%		

**Forecasts**

Source: Dataquest  
March 1991



TABLE NUMBER: 13  
 TITLE: Preliminary History and Forecast  
 APPLICATION: AEC  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	8,716	13,729	15,068	21,905	29,091	36,920	45,750	54,490	61,270	67,180	27%	18%
Workstation Shipments	8,716	13,729	15,068	21,905	29,091	36,920	45,750	54,490	61,270	67,180	27%	18%
CPU Installed Base	12,975	26,340	40,175	59,004	82,108	109,430	145,600	190,660	242,480	300,230	45%	30%
Workstation Installed Base	12,975	26,340	40,175	59,004	82,108	109,430	145,600	190,660	242,480	300,230	45%	30%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	18.2	7.3	8.3	14.0	13.9	18.0	18.2	18.3	18.3	18.5	-5%	6%
Hardware-Only ASP	7.2	4.3	6.3	4.8	4.7	4.6	4.6	4.5	4.5	4.5	-8%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	65	62	96	111	142	178	216	251	277	300	17%	16%
CPU Revenue	64	60	94	106	136	163	195	225	244	260	16%	14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	2	2	6	6	16	21	27	32	39	65%	45%
Software Revenue	12	21	31	46	62	83	110	141	174	212	39%	28%
Bundled	1	2	2	3	4	7	6	5	5	6	21%	9%
Unbundled	10	19	28	42	58	76	103	136	169	206	41%	29%
Service Revenue	1	2	7	7	10	13	16	20	23	26	74%	21%
Total Revenue	77	85	133	164	214	274	341	413	473	538	23%	20%
Increase over Prior Year	NA	11%	56%	23%	30%	28%	25%	21%	15%	14%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 14  
 TITLE: Preliminary History and Forecast  
 APPLICATION: AEC  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	3,865	6,882	7,547	14,551	19,432	21,490	23,970	26,820	28,980	31,120	38%	10%
Workstation Shipments	3,865	6,882	7,547	14,551	19,432	21,490	23,970	26,820	28,980	31,120	38%	10%
CPU Installed Base	5,912	12,578	19,505	32,607	49,204	65,890	85,070	107,870	132,850	159,980	53%	27%
Workstation Installed Base	5,912	12,578	19,505	32,607	49,204	65,890	85,070	107,870	132,850	159,980	53%	27%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	25.6	28.8	21.7	15.9	15.6	15.3	15.2	15.0	14.9	14.9	-9%	-1%
Hardware-Only ASP	3.3	5.0	7.1	4.4	4.1	4.0	4.0	4.0	3.9	3.9	4%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	21	44	65	117	119	112	119	128	133	140	41%	3%
CPU Revenue	19	39	51	106	109	88	94	101	106	111	42%	0%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	3	5	14	11	10	24	25	26	27	29	30%	24%
Software Revenue	9	21	20	37	45	66	76	84	90	96	37%	17%
Bundled	7	10	10	17	16	28	29	30	30	31	18%	15%
Unbundled	2	11	10	21	29	38	47	54	59	65	65%	18%
Service Revenue	2	3	4	10	9	10	10	11	12	12	32%	7%
Total Revenue	33	69	89	164	173	187	205	222	235	248	39%	8%
Increase over Prior Year	NA	109%	30%	84%	5%	8%	10%	8%	5%	6%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 15  
 TITLE: Preliminary History and Forecast  
 APPLICATION: AEC  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	483	1,300	1,230	1,275	1,950	2,430	2,920	3,360	3,690	3,980	32%	15%
Workstation Shipments	483	1,300	1,230	1,275	1,950	2,430	2,920	3,360	3,690	3,980	32%	15%
CPU Installed Base	1,012	2,263	3,365	4,368	5,819	7,480	9,640	12,220	15,160	18,420	42%	26%
Workstation Installed Base	1,012	2,263	3,365	4,368	5,819	7,480	9,640	12,220	15,160	18,420	42%	26%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	21.6	2.4	12.0	19.7	9.3	9.2	9.1	9.0	8.9	8.9	-16%	-1%
Hardware-Only ASP	7.7	4.3	6.7	4.9	4.5	4.5	4.4	4.4	4.3	4.3	-10%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	4	5	8	6	9	11	13	15	16	17	18%	14%
CPU Revenue	4	5	8	6	9	11	12	14	15	16	18%	13%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	1	1	1	1	11%	89%
Software Revenue	2	1	1	3	4	5	6	7	8	8	17%	15%
Bundled	0	0	0	0	0	0	0	0	0	0	-38%	-100%
Unbundled	2	1	1	3	4	5	6	7	8	8	19%	15%
Service Revenue	0	0	1	0	0	0	1	1	1	1	44%	16%
Total Revenue	6	6	10	10	13	16	20	22	24	26	18%	15%
Increase over Prior Year	NA	12%	61%	-6%	38%	23%	19%	14%	9%	8%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 16  
 TITLE: Preliminary History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	2,484	9,531	14,403	26,585	35,841	45,410	56,140	67,370	77,220	82,320	71%	18%
Workstation Shipments	2,484	9,531	14,403	26,585	35,841	45,410	56,140	67,370	77,220	82,320	71%	18%
CPU Installed Base	2,586	12,112	26,375	52,085	85,130	124,030	173,650	234,510	305,210	381,040	101%	35%
Workstation Installed Base	2,586	12,112	26,375	52,085	85,130	124,030	173,650	234,510	305,210	381,040	101%	35%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	26.9	13.3	21.5	22.9	19.6	20.3	20.8	20.9	21.0	21.1	-6%	1%
Hardware-Only ASP	6.5	4.7	4.9	4.9	4.7	4.6	4.6	4.5	4.5	4.5	-6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	21	50	80	141	181	226	276	326	367	388	54%	17%
CPU Revenue	20	47	76	136	175	209	252	296	327	334	55%	14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	3	4	5	6	17	24	30	40	54	38%	55%
Software Revenue	17	34	52	70	96	125	160	199	246	291	41%	25%
Bundled	3	5	6	7	10	12	15	17	18	19	29%	14%
Unbundled	14	29	46	64	86	113	146	182	228	272	43%	26%
Service Revenue	1	2	5	9	11	14	18	22	26	29	55%	20%
Total Revenue	39	86	137	220	288	366	454	547	639	708	49%	20%
Increase over Prior Year	NA	118%	59%	61%	31%	27%	24%	20%	17%	11%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 17  
 TITLE: Preliminary History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1,612	4,018	8,122	13,325	16,299	19,100	22,040	25,020	27,930	29,830	59%	13%
Workstation Shipments	1,612	4,018	8,122	13,325	16,299	19,100	22,040	25,020	27,930	29,830	59%	13%
CPU Installed Base	1,663	5,679	13,713	26,583	41,457	57,260	75,990	97,710	122,340	148,870	90%	29%
Workstation Installed Base	1,663	5,679	13,713	26,583	41,457	57,260	75,990	97,710	122,340	148,870	90%	29%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	21.0	30.9	34.0	53.5	9.2	9.1	9.0	8.9	8.8	8.8	-15%	-1%
Hardware-Only ASP	6.6	4.5	4.6	4.9	4.7	4.7	4.6	4.6	4.5	4.5	-7%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	12	21	39	70	77	89	102	114	126	135	44%	12%
CPU Revenue	12	20	38	68	76	86	97	108	119	126	45%	11%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	1	1	2	1	3	5	6	7	9	9%	63%
Software Revenue	11	23	34	46	59	76	96	119	149	178	40%	25%
Bundled	1	2	2	1	1	2	1	1	1	1	-0%	-8%
Unbundled	10	21	33	45	58	75	95	118	148	178	43%	25%
Service Revenue	1	1	3	4	6	7	8	10	12	14	47%	20%
Total Revenue	24	45	76	120	142	172	206	244	287	327	42%	18%
Increase over Prior Year	NA	86%	68%	59%	18%	21%	20%	18%	18%	14%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 18  
 TITLE: Preliminary History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	625	3,618	4,272	8,811	12,313	16,560	21,430	26,680	31,930	34,110	82%	23%
Workstation Shipments	625	3,618	4,272	8,811	12,313	16,560	21,430	26,680	31,930	34,110	82%	23%
CPU Installed Base	630	4,247	8,488	17,023	28,423	42,840	62,120	86,660	116,450	148,410	114%	39%
Workstation Installed Base	630	4,247	8,488	17,023	28,423	42,840	62,120	86,660	116,450	148,410	114%	39%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	25.0	7.9	10.5	34.0	26.0	27.7	28.2	28.6	29.1	30.0	1%	3%
Hardware-Only ASP	7.1	5.0	5.3	5.1	4.9	4.8	4.8	4.7	4.7	4.7	-7%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	6	19	24	48	63	84	106	129	151	160	60%	20%
CPU Revenue	6	18	23	46	61	76	96	116	124	129	60%	16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	1	1	2	2	8	10	14	27	31	52%	77%
Software Revenue	4	8	11	15	21	27	36	44	56	67	36%	27%
Bundled	1	1	1	2	2	2	2	2	2	3	31%	5%
Unbundled	4	7	10	12	18	25	33	42	54	65	36%	29%
Service Revenue	0	1	2	3	3	3	4	5	6	7	47%	20%
Total Revenue	11	28	36	65	86	114	146	178	214	234	51%	22%
Increase over Prior Year	NA	155%	29%	82%	32%	32%	28%	22%	20%	9%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 19  
 TITLE: Preliminary History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	185	1,497	1,739	3,743	6,248	8,440	10,970	13,630	14,990	15,640	102%	20%
Workstation Shipments	185	1,497	1,739	3,743	6,248	8,440	10,970	13,630	14,990	15,640	102%	20%
CPU Installed Base	230	1,725	3,448	7,077	12,956	20,510	30,600	43,360	57,470	72,260	124%	41%
Workstation Installed Base	230	1,725	3,448	7,077	12,956	20,510	30,600	43,360	57,470	72,260	124%	41%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	61.2	20.5	27.9	13.4	22.8	22.2	22.0	21.7	21.5	21.5	-18%	-1%
Hardware-Only ASP	3.1	4.9	5.8	4.5	4.1	4.0	4.0	4.0	3.9	3.9	6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	2	8	16	20	36	47	60	73	79	82	78%	18%
CPU Revenue	1	8	13	18	32	41	52	63	68	69	85%	17%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	1	2	1	3	6	8	10	11	13	47%	29%
Software Revenue	1	2	6	7	12	16	21	26	30	31	59%	21%
Bundled	1	1	3	3	7	9	11	14	15	15	46%	18%
Unbundled	0	1	2	4	6	8	10	13	15	16	89%	24%
Service Revenue	0	0	1	1	2	3	4	5	6	6	199%	20%
Total Revenue	3	10	22	27	50	67	86	104	115	119	73%	19%
Increase over Prior Year	NA	228%	112%	24%	83%	33%	29%	22%	10%	4%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 20  
 TITLE: Preliminary History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	62	398	269	706	980	1,320	1,700	2,040	2,360	2,740	74%	23%
Workstation Shipments	62	398	269	706	980	1,320	1,700	2,040	2,360	2,740	74%	23%
CPU Installed Base	63	461	726	1,402	2,294	3,420	4,930	6,780	8,950	11,500	105%	38%
Workstation Installed Base	63	461	726	1,402	2,294	3,420	4,930	6,780	8,950	11,500	105%	38%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	33.6	6.0	35.4	64.9	24.9	24.7	24.4	24.2	23.9	23.9	-6%	-1%
Hardware-Only ASP	7.4	4.8	5.9	5.0	4.7	4.7	4.6	4.6	4.5	4.5	-9%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	1	2	2	4	5	6	8	9	11	12	52%	20%
CPU Revenue	1	2	2	4	5	6	8	9	10	10	53%	16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	1	1	2	15%	120%
Software Revenue	1	1	1	3	4	6	7	10	11	14	53%	27%
Bundled	0	0	0	0	0	0	0	0	0	1	0%	41%
Unbundled	0	1	1	3	4	6	7	9	11	14	58%	27%
Service Revenue	0	0	0	0	1	1	1	1	1	2	70%	25%
Total Revenue	1	3	3	8	10	13	16	20	24	28	53%	24%
Increase over Prior Year	NA	128%	19%	139%	29%	32%	28%	24%	17%	18%		

**Forecasts**

Source: Dataquest  
March 1991



TABLE NUMBER: 21  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	29,801	37,737	46,860	44,773	52,218	56,290	58,020	53,210	46,220	36,290	12%	-7%
Workstation Shipments	29,801	37,737	46,860	44,773	52,218	56,290	58,020	53,210	46,220	36,290	12%	-7%
CPU Installed Base	46,845	83,163	125,383	159,469	192,234	219,800	249,090	274,140	292,780	301,760	33%	9%
Workstation Installed Base	46,845	83,163	125,383	159,469	192,234	219,800	249,090	274,140	292,780	301,760	33%	9%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	28.4	11.2	15.1	13.6	14.2	15.0	15.8	15.8	18.1	17.0	-13%	4%
Hardware-Only ASP	6.6	4.7	5.3	5.2	5.0	4.9	4.9	4.8	4.8	4.7	-5%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	235	188	264	261	290	297	296	258	218	169	4%	-10%
CPU Revenue	219	178	244	244	269	266	262	229	192	144	4%	-12%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	16	10	21	17	22	31	34	29	26	26	6%	3%
Software Revenue	133	167	157	164	190	194	176	142	110	82	7%	-16%
Bundled	41	18	12	18	20	22	18	12	8	6	-13%	-23%
Unbundled	92	149	146	145	170	172	158	129	102	76	13%	-15%
Service Revenue	19	22	25	28	30	30	28	23	18	13	10%	-15%
Total Revenue	387	377	446	453	510	521	500	422	346	264	6%	-12%
Increase over Prior Year	NA	-3%	18%	1%	13%	2%	-4%	-16%	-18%	-24%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 22  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	16,936	16,411	25,767	19,582	21,505	22,500	20,990	16,940	13,010	6,830	5%	-20%
Workstation Shipments	16,936	16,411	25,767	19,582	21,505	22,500	20,990	16,940	13,010	6,830	5%	-20%
CPU Installed Base	29,803	45,128	67,655	80,606	91,114	98,510	104,390	106,370	104,650	96,750	25%	1%
Workstation Installed Base	29,803	45,128	67,655	80,606	91,114	98,510	104,390	106,370	104,650	96,750	25%	1%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	20.0	20.4	99.7	38.9	22.3	21.8	22.3	22.1	18.1	13.4	2%	-10%
Hardware-Only ASP	7.0	4.2	4.5	5.1	5.0	4.9	4.9	4.8	4.8	4.8	-7%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	120	72	123	101	109	111	102	82	62	33	-2%	-21%
CPU Revenue	117	71	122	98	104	108	98	78	58	30	-2%	-22%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	3	2	1	3	5	3	4	4	4	2	6%	-12%
Software Revenue	65	85	81	79	87	78	62	46	32	18	6%	-27%
Bundled	10	4	3	1	1	1	0	0	0	0	-40%	-52%
Unbundled	55	80	79	78	86	77	62	46	32	18	9%	-27%
Service Revenue	9	9	12	11	12	11	9	7	5	3	5%	-25%
Total Revenue	195	166	216	191	208	200	174	135	99	53	1%	-24%
Increase over Prior Year	NA	-15%	30%	-12%	9%	-3%	-13%	-23%	-26%	-47%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 23  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	7,821	13,963	13,764	16,170	19,820	21,940	23,380	21,090	16,680	10,420	20%	-12%
Workstation Shipments	7,821	13,963	13,764	16,170	19,820	21,940	23,380	21,090	16,680	10,420	20%	-12%
CPU Installed Base	10,284	24,058	36,994	50,669	65,165	78,390	93,060	105,490	113,560	115,580	45%	12%
Workstation Installed Base	10,284	24,058	36,994	50,669	65,165	78,390	93,060	105,490	113,560	115,580	45%	12%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	26.6	7.9	11.2	8.4	14.7	20.4	25.1	27.6	22.2	18.0	-11%	4%
Hardware-Only ASP	7.5	4.7	6.0	5.3	5.2	5.1	5.1	5.0	5.0	5.0	-7%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	67	70	87	89	112	123	127	108	84	52	11%	-14%
CPU Revenue	61	66	84	82	102	108	110	95	73	45	11%	-15%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	6	5	3	7	11	15	17	13	10	8	12%	-7%
Software Revenue	39	57	50	49	58	63	60	50	40	30	8%	-12%
Bundled	14	5	5	3	4	3	1	0	0	0	-24%	-100%
Unbundled	25	52	45	46	54	60	59	50	40	30	17%	-11%
Service Revenue	5	10	9	9	9	10	10	9	7	5	15%	-12%
Total Revenue	111	137	146	146	180	196	197	167	131	87	10%	-13%
Increase over Prior Year	NA	23%	7%	-0%	23%	9%	1%	-15%	-22%	-33%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 24  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	4,707	6,590	6,834	7,983	9,578	9,740	9,860	9,250	7,710	6,710	15%	-7%
Workstation Shipments	4,707	6,590	6,834	7,983	9,578	9,740	9,860	9,250	7,710	6,710	15%	-7%
CPU Installed Base	6,192	12,659	18,982	25,552	32,275	37,550	42,930	48,070	51,970	54,930	39%	11%
Workstation Installed Base	6,192	12,659	18,982	25,552	32,275	37,550	42,930	48,070	51,970	54,930	39%	11%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	35.4	15.1	14.8	15.7	13.6	13.4	13.7	14.3	16.9	17.2	-17%	5%
Hardware-Only ASP	2.9	5.8	7.0	4.8	4.5	4.4	4.4	4.3	4.3	4.3	9%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	46	41	51	65	62	53	48	39	30	26	7%	-16%
CPU Revenue	39	38	35	59	56	40	36	28	21	16	8%	-22%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	7	4	16	7	6	12	12	11	9	10	-2%	11%
Software Revenue	27	24	24	34	38	45	44	35	25	20	7%	-12%
Bundled	17	9	4	14	16	19	16	12	8	6	-1%	-19%
Unbundled	10	15	20	19	23	26	28	23	17	14	17%	-9%
Service Revenue	5	3	4	9	9	8	7	6	4	3	13%	-18%
Total Revenue	77	68	79	108	109	106	99	79	59	49	7%	-15%
Increase over Prior Year	NA	-12%	16%	37%	1%	-3%	-6%	-20%	-25%	-17%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 25  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	338	773	495	1,038	1,315	2,110	3,790	5,940	8,830	12,320	31%	56%
Workstation Shipments	338	773	495	1,038	1,315	2,110	3,790	5,940	8,830	12,320	31%	56%
CPU Installed Base	566	1,318	1,752	2,642	3,679	5,350	8,710	14,210	22,600	34,510	45%	56%
Workstation Installed Base	566	1,318	1,752	2,642	3,679	5,350	8,710	14,210	22,600	34,510	45%	56%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	14.9	9.3	24.6	26.4	31.5	37.0	46.8	68.9	98.4	22.5	16%	-7%
Hardware-Only ASP	6.6	4.8	6.2	5.3	5.0	4.9	4.9	4.8	4.7	4.7	-5%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	2	4	3	6	7	10	19	29	42	58	24%	54%
CPU Revenue	2	4	3	5	7	10	18	27	39	53	24%	52%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	1	1	3	5	50%	103%
Software Revenue	1	2	2	2	7	8	10	11	12	14	38%	17%
Bundled	0	0	0	0	0	0	0	0	0	0	-13%	-100%
Unbundled	1	2	2	2	7	8	9	11	12	14	39%	17%
Service Revenue	0	0	0	0	0	1	1	1	2	2	18%	46%
Total Revenue	4	6	5	8	14	19	29	41	56	75	29%	41%
Increase over Prior Year	NA	54%	-8%	57%	63%	39%	53%	42%	37%	33%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 26  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	21,026	19,084	23,534	32,993	39,331	42,540	44,470	42,390	37,560	29,570	13%	-6%
Workstation Shipments	21,026	19,084	23,534	32,993	39,331	42,540	44,470	42,390	37,560	29,570	13%	-6%
CPU Installed Base	35,510	53,385	73,187	98,391	125,030	150,180	177,260	202,810	223,990	237,270	29%	14%
Workstation Installed Base	35,510	53,385	73,187	98,391	125,030	150,180	177,260	202,810	223,990	237,270	29%	14%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	29.5	12.5	19.5	14.2	13.3	12.8	12.5	12.5	86.5	.0	-15%	-100%
Hardware-Only ASP	6.8	4.7	5.2	5.1	4.9	4.9	4.8	4.7	4.7	4.7	-6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	173	96	134	183	207	213	215	198	172	134	4%	-8%
CPU Revenue	161	90	124	171	194	194	194	177	152	116	4%	-10%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	12	5	10	12	13	19	21	21	19	17	1%	7%
Software Revenue	88	82	94	121	140	139	125	96	70	49	10%	-19%
Bundled	35	10	7	15	14	14	11	7	4	4	-17%	-23%
Unbundled	53	72	88	106	126	125	114	89	66	45	19%	-18%
Service Revenue	14	12	15	22	22	22	21	17	13	10	9%	-16%
Total Revenue	276	189	243	325	369	375	360	311	255	193	6%	-12%
Increase over Prior Year	NA	-31%	29%	34%	13%	2%	-4%	-14%	-18%	-25%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 27  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	12,224	8,373	13,314	14,354	15,837	16,210	14,970	12,200	9,630	4,720	5%	-22%
Workstation Shipments	12,224	8,373	13,314	14,354	15,837	16,210	14,970	12,200	9,630	4,720	5%	-22%
CPU Installed Base	23,582	31,007	41,608	50,824	59,019	65,650	71,050	73,830	74,250	69,770	20%	3%
Workstation Installed Base	23,582	31,007	41,608	50,824	59,019	65,650	71,050	73,830	74,250	69,770	20%	3%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	20.4	33.0	89.7	35.0	42.8	42.4	41.9	41.5	41.1	41.1	16%	-1%
Hardware-Only ASP	7.3	4.3	4.5	5.1	4.9	4.9	4.8	4.8	4.7	4.7	-8%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	91	38	65	74	79	79	72	58	45	22	-3%	-22%
CPU Revenue	88	37	64	71	76	77	69	55	43	21	-3%	-23%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	3	1	1	3	3	2	3	3	3	1	2%	-15%
Software Revenue	46	45	49	62	71	62	47	33	22	10	9%	-33%
Bundled	9	3	2	0	1	0	0	0	0	0	-41%	-100%
Unbundled	37	42	47	62	70	62	47	33	22	10	14%	-33%
Service Revenue	7	6	8	8	9	9	7	5	4	2	5%	-28%
Total Revenue	144	88	121	144	159	150	127	97	71	34	2%	-27%
Increase over Prior Year	NA	-38%	37%	19%	10%	-6%	-15%	-24%	-27%	-52%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 28  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	4,831	7,050	6,949	12,050	15,026	16,860	18,260	17,280	13,600	7,980	25%	-12%
Workstation Shipments	4,831	7,050	6,949	12,050	15,026	16,860	18,260	17,280	13,600	7,980	25%	-12%
CPU Installed Base	6,870	13,757	20,096	30,552	42,484	54,410	67,740	80,130	88,890	92,110	44%	17%
Workstation Installed Base	6,870	13,757	20,096	30,552	42,484	54,410	67,740	80,130	88,890	92,110	44%	17%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	29.5	9.8	14.9	9.0	15.1	16.3	16.7	.0	.0	.0	-13%	-100%
Hardware-Only ASP	7.6	4.8	6.1	5.2	5.1	5.1	5.0	4.9	4.9	4.9	-8%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	45	37	47	65	81	88	92	86	67	39	13%	-14%
CPU Revenue	39	34	45	59	75	80	83	76	59	34	14%	-15%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	6	3	2	5	6	8	9	9	8	5	0%	-2%
Software Revenue	22	25	28	29	35	38	38	30	24	18	10%	-13%
Bundled	13	3	3	2	2	1	0	0	0	0	-29%	-100%
Unbundled	9	21	25	27	33	36	37	30	24	18	30%	-12%
Service Revenue	4	5	5	6	7	8	8	7	6	4	15%	-12%
Total Revenue	70	66	80	100	123	133	138	123	96	60	12%	-13%
Increase over Prior Year	NA	-6%	20%	26%	23%	8%	4%	-11%	-22%	-37%		

**Forecasts**

Source: Dataquest  
March 1991



TABLE NUMBER: 29  
 TITLE: Preliminary History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	3,732	3,273	3,017	5,791	7,427	7,690	7,830	7,440	6,060	5,210	15%	-7%
Workstation Shipments	3,732	3,273	3,017	5,791	7,427	7,690	7,830	7,440	6,060	5,210	15%	-7%
CPU Installed Base	4,667	7,858	10,512	15,341	20,976	26,040	31,240	36,410	40,390	43,530	35%	16%
Workstation Installed Base	4,667	7,858	10,512	15,341	20,976	26,040	31,240	36,410	40,390	43,530	35%	16%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	35.7	11.4	16.4	15.8	12.3	12.0	11.9	11.8	.0	.0	-19%	-100%
Hardware-Only ASP	3.1	5.7	6.3	4.6	4.3	4.2	4.2	4.1	4.1	4.1	7%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	37	19	21	41	42	38	34	28	20	18	3%	-16%
CPU Revenue	33	17	14	36	39	29	26	20	14	12	3%	-21%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	4	1	7	4	4	9	9	8	6	6	0%	10%
Software Revenue	19	12	16	28	29	34	32	24	16	13	8%	-14%
Bundled	13	3	2	13	11	13	10	7	4	4	-4%	-18%
Unbundled	7	8	15	15	18	21	22	17	12	10	23%	-12%
Service Revenue	4	1	2	6	6	6	5	4	2	2	10%	-19%
Total Revenue	60	32	40	75	77	77	72	56	39	33	5%	-16%
Increase over Prior Year	NA	-47%	25%	88%	3%	1%	-7%	-22%	-30%	-16%		

**FORECASTS**

Source: Dataquest  
March 1991

**TABLE NUMBER:** 30  
**TITLE:** Preliminary History and Forecast  
**APPLICATION:** Electronic CAE  
**REGION:** Rest of World  
**PLATFORM:** Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	239	388	253	797	1,041	1,780	3,400	5,470	8,270	11,650	34%	62%
Workstation Shipments	239	388	253	797	1,041	1,780	3,400	5,470	8,270	11,650	34%	62%
CPU Installed Base	391	763	971	1,674	2,551	4,080	7,230	12,450	20,460	31,860	45%	66%
Workstation Installed Base	391	763	971	1,674	2,551	4,080	7,230	12,450	20,460	31,860	45%	66%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	10.9	36.8	30.5	33.9	179.5	177.7	175.9	174.2	172.4	172.4	75%	-1%
Hardware-Only ASP	6.5	4.8	6.1	5.2	4.9	4.9	4.8	4.8	4.7	4.7	-5%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	2	2	2	4	5	9	16	26	39	55	27%	60%
CPU Revenue	2	2	2	4	5	8	16	25	36	50	26%	58%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	1	1	3	5	55%	123%
Software Revenue	0	1	1	2	5	6	7	8	8	8	62%	11%
Bundled	0	0	0	0	0	0	0	0	0	0	0%	-100%
Unbundled	0	1	1	2	5	6	7	8	8	8	64%	11%
Service Revenue	0	0	0	0	0	0	1	1	2	2	37%	48%
Total Revenue	2	3	3	7	10	15	25	36	49	65	38%	44%
Increase over Prior Year	NA	42%	-8%	139%	60%	47%	61%	45%	38%	33%		

**Forecasts**

Source: Dataquest  
 March 1991

TABLE NUMBER: 31  
 TITLE: Preliminary History and Forecast  
 APPLICATION: IC Layout  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	====	====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	612	1,739	1,420	558	432	540	630	400	290	200	-7%	-14%
Workstation Shipments	612	1,739	1,420	558	432	540	630	400	290	200	-7%	-14%
CPU Installed Base	659	2,396	3,778	4,146	4,082	3,790	3,580	3,140	2,590	2,140	44%	-12%
Workstation Installed Base	659	2,396	3,778	4,146	4,082	3,790	3,580	3,140	2,590	2,140	44%	-12%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of dollars)</b>												
Turnkey ASP	25.7	6.0	15.6	17.3	19.4	33.5	33.7	31.5	28.1	26.2	-5%	6%
Hardware-Only ASP	2.9	5.0	5.0	3.7	3.1	3.1	3.0	3.0	3.0	3.0	1%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	2	8	9	4	3	8	10	4	2	1	12%	-18%
CPU Revenue	2	8	8	4	3	4	5	3	2	1	9%	-18%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	1	4	5	2	1	0	45%	-18%
Software Revenue	4	16	5	2	3	4	4	3	2	1	-6%	-18%
Bundled	0	1	1	0	1	1	1	1	1	0	85%	-12%
Unbundled	4	15	4	2	2	3	3	2	1	1	-11%	-21%
Service Revenue	0	1	0	0	0	1	1	1	0	0	-5%	-1%
Total Revenue	7	25	14	6	7	13	15	8	5	3	1%	-17%
Increase over Prior Year	NA	269%	-45%	-53%	10%	84%	13%	-48%	-41%	-40%		

**Forecasts**

TABLE NUMBER: 32  
 TITLE: Preliminary History and Forecast  
 APPLICATION: IC Layout  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	594	581	577	273	256	290	330	260	200	160	-16%	-9%
Workstation Shipments	594	581	577	273	256	290	330	260	200	160	-16%	-9%
CPU Installed Base	602	1,183	1,729	1,882	1,871	1,770	1,710	1,570	1,380	1,140	25%	-9%
Workstation Installed Base	602	1,183	1,729	1,882	1,871	1,770	1,710	1,570	1,380	1,140	25%	-9%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	25.8	32.7	25.8	49.0	35.6	35.2	34.9	34.5	34.2	34.2	7%	-1%
Hardware-Only ASP	2.9	5.0	5.3	3.5	3.1	3.1	3.0	3.0	3.0	3.0	1%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	2	3	3	1	1	1	1	1	1	0	-12%	-14%
CPU Revenue	2	3	3	1	1	1	1	1	1	0	-13%	-16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	8%	0%
Software Revenue	3	10	2	1	1	1	1	1	0	0	-20%	-27%
Bundled	0	0	0	0	0	0	0	0	0	0	-8%	0%
Unbundled	3	10	2	1	1	1	1	1	0	0	-21%	-28%
Service Revenue	0	1	0	0	0	0	0	0	0	0	-33%	0%
Total Revenue	5	14	5	2	2	2	2	2	1	1	-17%	-18%
Increase over Prior Year	NA	192%	-61%	-63%	-7%	15%	1%	-26%	-36%	-34%		

FORECASTS

Source: Dataquest  
March 1991

TABLE NUMBER: 33  
 TITLE: Preliminary History and Forecast  
 APPLICATION: IC Layout  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	15	792	480	146	110	140	160	50	10	0	50%	-100%
Workstation Shipments	15	792	480	146	110	140	160	50	10	0	50%	-100%
CPU Installed Base	49	839	1,313	1,408	1,363	1,210	1,080	840	560	390	94%	-22%
Workstation Installed Base	49	839	1,313	1,408	1,363	1,210	1,080	840	560	390	94%	-22%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	19.6	2.8	6.5	10.9	13.4	38.7	40.1	40.9	42.6	.0	-7%	-100%
Hardware-Only ASP	2.9	5.0	4.7	3.7	.0	.0	.0	.0	.0	.0	-100%	NA
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	3	2	1	1	5	6	2	0	0	88%	-100%
CPU Revenue	0	3	2	1	1	1	2	1	0	0	78%	-100%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	4	5	1	0	0	NA	-100%
Software Revenue	1	2	1	1	2	2	2	1	1	1	11%	-21%
Bundled	0	0	0	0	0	0	0	0	0	0	NA	-100%
Unbundled	1	2	1	1	2	2	2	1	1	1	7%	-18%
Service Revenue	0	0	0	0	0	0	0	0	0	0	0%	-3%
Total Revenue	1	5	3	2	3	7	8	3	1	1	20%	-27%
Increase over Prior Year	NA	296%	-37%	-32%	47%	133%	13%	-59%	-59%	-53%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 34  
 TITLE: Preliminary History and Forecast  
 APPLICATION: IC Layout  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	3	311	339	135	66	110	140	90	70	50	85%	-5%
Workstation Shipments	3	311	339	135	66	110	140	90	70	50	85%	-5%
CPU Installed Base	7	318	656	774	775	750	760	710	650	600	154%	-5%
Workstation Installed Base	7	318	656	774	775	750	760	710	650	600	154%	-5%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	26.3	15.1	18.3	20.1	27.7	27.0	26.7	26.4	26.2	26.1	1%	-1%
Hardware-Only ASP	.0	5.0	5.0	4.2	.0	.0	.0	.0	.0	.0	NA	NA
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	2	3	2	1	2	3	2	1	1	79%	-10%
CPU Revenue	0	2	3	2	1	2	2	1	1	1	94%	-10%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	48%	-11%
Software Revenue	1	4	2	0	1	1	1	1	1	0	-4%	-4%
Bundled	0	1	1	0	1	1	1	1	1	0	122%	-4%
Unbundled	1	3	1	0	0	0	0	0	0	0	-100%	NA
Service Revenue	0	0	0	0	0	0	0	0	0	0	37%	-2%
Total Revenue	1	6	5	2	2	3	4	3	2	1	22%	-7%
Increase over Prior Year	NA	662%	-13%	-57%	-7%	69%	22%	-37%	-20%	-35%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 35  
 TITLE: Preliminary History and Forecast  
 APPLICATION: IC Layout  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	55	25	4	0	0	0	0	0	0	NA	NA
Workstation Shipments	0	55	25	4	0	0	0	0	0	0	NA	NA
CPU Installed Base	0	55	80	82	72	50	40	20	0	0	NA	-100%
Workstation Installed Base	0	55	80	82	72	50	40	20	0	0	NA	-100%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	.0	25.1	.0	.0	.0	.0	.0	.0	NA	NA
Hardware-Only ASP	.0	4.9	6.0	5.5	.0	.0	.0	.0	.0	.0	NA	NA
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
CPU Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Software Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Bundled	0	0	0	0	0	0	0	0	0	0	NA	NA
Unbundled	0	0	0	0	0	0	0	0	0	0	NA	NA
Service Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Total Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Increase over Prior Year	NA	NA	-47%	-47%	-100%	NA	0%	0%	0%	0%		

Forecasts

Source: Dataquest  
March 1991

TABLE NUMBER: 36  
 TITLE: Preliminary History and Forecast  
 APPLICATION: PCB/Hybrid/MCM  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	8,163	16,914	21,906	11,222	12,455	13,200	12,920	10,420	8,380	6,520	9%	-12%
Workstation Shipments	8,163	16,914	21,906	11,222	12,455	13,200	12,920	10,420	8,380	6,520	9%	-12%
CPU Installed Base	10,676	27,382	48,418	56,931	63,122	65,830	68,250	68,190	66,200	62,360	43%	-0%
Workstation Installed Base	10,676	27,382	48,418	56,931	63,122	65,830	68,250	68,190	66,200	62,360	43%	-0%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	24.0	11.1	10.9	12.3	15.2	15.8	15.7	15.2	15.0	14.9	-9%	-0%
Hardware-Only ASP	6.5	4.6	5.4	5.4	5.4	5.3	5.2	5.2	5.2	5.2	-4%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	60	84	122	73	80	76	71	56	44	34	6%	-15%
CPU Revenue	56	80	111	69	71	68	64	49	38	27	5%	-18%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	4	4	11	4	8	8	8	6	6	8	15%	-1%
Software Revenue	40	69	58	41	47	51	47	43	37	31	3%	-8%
Bundled	5	8	4	3	5	7	6	4	3	1	0%	-25%
Unbundled	35	62	54	38	42	44	42	39	34	30	4%	-6%
Service Revenue	4	9	9	7	7	7	6	5	4	3	14%	-15%
Total Revenue	104	163	189	121	134	133	125	104	86	69	5%	-12%
Increase over Prior Year	NA	57%	16%	-36%	11%	-0%	-6%	-17%	-18%	-19%		

**Forecasts**

Source: Dataquest  
March 1991



TABLE NUMBER: 37  
 TITLE: Preliminary History and Forecast  
 APPLICATION: PCB/Hybrid/MCM  
 REGION: North America  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	4,118	7,456	11,875	4,954	5,413	6,000	5,680	4,480	3,180	1,960	6%	-18%
Workstation Shipments	4,118	7,456	11,875	4,954	5,413	6,000	5,680	4,480	3,180	1,960	6%	-18%
CPU Installed Base	5,618	12,938	24,318	27,899	30,224	31,090	31,630	30,980	29,020	25,840	40%	-3%
Workstation Installed Base	5,618	12,938	24,318	27,899	30,224	31,090	31,630	30,980	29,020	25,840	40%	-3%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	17.3	11.9	288.5	55.3	13.1	13.0	12.8	12.7	12.6	12.6	-5%	-1%
Hardware-Only ASP	6.5	4.1	4.5	5.3	5.2	5.1	5.1	5.0	5.0	5.0	-4%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	28	31	55	26	29	31	29	23	16	10	1%	-19%
CPU Revenue	27	31	55	26	28	30	28	22	15	9	0%	-20%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	1	1	1	1	1	1	28%	-7%
Software Revenue	17	30	30	16	16	15	14	12	10	8	-1%	-13%
Bundled	1	1	1	0	0	0	0	0	0	0	-33%	-100%
Unbundled	16	29	29	16	16	15	14	12	10	8	-0%	-13%
Service Revenue	2	3	4	2	2	2	2	2	1	1	7%	-15%
Total Revenue	46	64	89	44	47	49	45	37	27	19	0%	-17%
Increase over Prior Year	NA	39%	40%	-50%	6%	3%	-7%	-19%	-25%	-32%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 38  
 TITLE: Preliminary History and Forecast  
 APPLICATION: PCB/Hybrid/NCM  
 REGION: Europe  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	2,975	6,121	6,336	3,973	4,684	4,940	4,960	3,760	3,070	2,440	10%	-12%
Workstation Shipments	2,975	6,121	6,336	3,973	4,684	4,940	4,960	3,760	3,070	2,440	10%	-12%
CPU Installed Base	3,365	9,462	15,585	18,708	21,318	22,770	24,240	24,520	24,110	23,080	45%	2%
Workstation Installed Base	3,365	9,462	15,585	18,708	21,318	22,770	24,240	24,520	24,110	23,080	45%	2%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	13.5	7.3	8.2	7.5	14.6	17.3	17.6	17.8	17.6	18.0	2%	4%
Hardware-Only ASP	7.4	4.7	5.9	5.6	5.5	5.5	5.4	5.4	5.3	5.3	-6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	23	30	38	23	30	30	29	21	17	13	6%	-15%
CPU Revenue	22	29	37	21	25	26	25	18	14	11	3%	-16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	2	1	1	5	3	3	2	2	2	58%	-13%
Software Revenue	16	31	21	19	21	23	21	18	15	12	6%	-11%
Bundled	1	2	2	1	1	2	1	0	0	0	8%	-100%
Unbundled	15	29	19	18	20	22	20	18	15	12	6%	-10%
Service Revenue	1	5	4	2	2	2	2	2	1	1	15%	-14%
Total Revenue	39	66	63	44	53	56	52	41	33	26	6%	-13%
Increase over Prior Year	NA	67%	-4%	-31%	22%	4%	-8%	-21%	-18%	-22%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 39  
 TITLE: Preliminary History and Forecast  
 APPLICATION: PCB/Hybrid/MCM  
 REGION: Asia  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	971	3,006	3,478	2,057	2,085	1,940	1,880	1,720	1,570	1,450	17%	-7%
Workstation Shipments	971	3,006	3,478	2,057	2,085	1,940	1,880	1,720	1,570	1,450	17%	-7%
CPU Installed Base	1,518	4,482	7,814	9,437	10,524	10,750	10,930	10,950	10,930	10,800	47%	1%
Workstation Installed Base	1,518	4,482	7,814	9,437	10,524	10,750	10,930	10,950	10,930	10,800	47%	1%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	34.4	18.6	12.0	15.3	15.7	15.2	15.1	14.9	14.8	14.7	-15%	-1%
Hardware-Only ASP	2.3	6.1	7.8	5.5	5.4	5.3	5.3	5.2	5.2	5.2	19%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	9	21	27	23	19	13	11	10	8	8	17%	-16%
CPU Revenue	6	19	18	20	17	9	8	7	6	3	25%	-27%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	3	2	9	2	2	3	3	3	3	4	-7%	14%
Software Revenue	7	8	6	6	9	11	10	10	8	6	5%	-7%
Bundled	4	5	1	2	4	5	5	4	3	1	3%	-22%
Unbundled	3	3	4	4	5	5	6	6	6	5	7%	1%
Service Revenue	1	1	1	2	3	2	2	2	1	1	23%	-17%
Total Revenue	17	30	34	31	30	25	24	21	18	15	13%	-13%
Increase over Prior Year	NA	83%	13%	-9%	-3%	-16%	-7%	-10%	-15%	-17%		

**Forecasts**

Source: Dataquest  
March 1991

TABLE NUMBER: 40  
 TITLE: Preliminary History and Forecast  
 APPLICATION: PCB/Hybrid/MCM  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	CAGR 86-90	CAGR 90-95
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	99	330	217	237	274	330	390	470	560	670	23%	20%
Workstation Shipments	99	330	217	237	274	330	390	470	560	670	23%	20%
CPU Installed Base	175	500	700	886	1,056	1,220	1,440	1,740	2,140	2,640	43%	20%
Workstation Installed Base	175	500	700	886	1,056	1,220	1,440	1,740	2,140	2,640	43%	20%
<b>CALCULATED AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	25.2	3.3	19.8	19.8	20.0	19.8	19.6	19.4	19.2	19.2	-5%	-1%
Hardware-Only ASP	6.8	4.7	6.3	5.4	5.4	5.3	5.3	5.2	5.2	5.2	-5%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	1	1	1	1	2	2	2	2	3	3	18%	18%
CPU Revenue	1	1	1	1	1	2	2	2	3	3	17%	17%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	43%	26%
Software Revenue	1	1	1	0	2	2	2	3	4	6	13%	29%
Bundled	0	0	0	0	0	0	0	0	0	0	-24%	-100%
Unbundled	1	1	1	0	2	2	2	3	4	6	14%	29%
Service Revenue	0	0	0	0	0	0	0	0	0	0	-11%	26%
Total Revenue	2	2	2	2	3	4	4	5	7	9	14%	24%
Increase over Prior Year	NA	47%	-1%	-29%	86%	13%	19%	24%	29%	37%		

Source: Dataquest  
March 1991

**Forecasts**

TABLE NUMBER: 1  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	44,849	145,586	194,217	244,493	277,447	321,340	360,330	390,510	411,600	423,470	58%	9%
Workstation Shipments	44,849	145,586	194,217	244,493	277,447	321,340	360,330	390,510	411,600	423,470	58%	9%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	28.0	24.7	16.0	19.3	16.8	17.0	16.7	16.4	16.0	15.9	-12%	-1%
Hardware-Only ASP	6.2	5.0	4.2	4.7	4.7	4.7	4.7	4.6	4.5	4.5	-7%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	366	909	944	1300	1478	1677	1827	1927	1984	2021	32%	6%
CPU Revenue	339	835	869	1167	1375	1538	1671	1756	1800	1834	32%	6%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	27	74	75	133	103	139	156	171	184	187	30%	13%
Software Revenue	164	374	508	561	676	789	866	945	1033	1113	33%	10%
Bundled	84	145	133	105	131	163	161	153	144	139	9%	1%
Unbundled	79	229	376	456	545	626	706	791	889	973	47%	12%
Service Revenue	8	59	77	86	115	129	138	144	148	152	72%	6%
Total Revenue	538	1342	1530	1947	2270	2596	2832	3015	3165	3286	33%	8%
Increase over Prior Year	NA	150%	14%	27%	17%	14%	9%	6%	5%	4%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 2  
 TITLE: History and forecast  
 APPLICATION: All Applications  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	27,010	85,336	110,592	141,690	148,117	168,490	184,870	197,400	207,180	212,990	53%	8%
Workstation Shipments	27,010	85,336	110,592	141,690	148,117	168,490	184,870	197,400	207,180	212,990	53%	8%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	23.6	19.6	17.2	23.9	14.2	16.1	16.2	14.6	13.1	12.0	-12%	-3%
Hardware-Only ASP	6.4	5.1	3.9	3.9	4.6	4.6	4.5	4.5	4.4	4.4	-8%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	190	460	457	568	690	778	842	888	921	945	29%	6%
CPU Revenue	185	446	442	564	674	761	816	852	875	890	30%	6%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	5	15	15	3	16	17	26	36	46	55	27%	28%
Software Revenue	80	171	230	264	299	336	376	430	495	554	30%	13%
Bundled	23	30	20	7	3	4	3	3	2	2	-33%	-9%
Unbundled	57	141	210	257	296	332	373	427	493	552	39%	13%
Service Revenue	4	22	23	34	41	45	49	52	55	58	62%	7%
Total Revenue	274	654	710	865	1030	1159	1268	1370	1471	1556	30%	9%
Increase over Prior Year	NA	139%	9%	22%	19%	13%	9%	8%	7%	6%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 3  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	====	====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	11,673	36,039	45,374	62,693	84,664	98,930	113,450	124,340	130,220	131,450	64%	9%
Workstation Shipments	11,673	36,039	45,374	62,693	84,664	98,930	113,450	124,340	130,220	131,450	64%	9%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	32.2	18.7	8.2	10.2	14.9	16.4	16.7	17.2	17.3	17.8	-18%	4%
Hardware-Only ASP	5.6	5.5	4.3	5.6	4.9	4.9	4.9	4.8	4.8	4.7	-3%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	86	232	209	366	461	527	584	622	639	641	40%	7%
CPU Revenue	76	220	195	343	417	502	556	590	602	608	41%	8%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	10	12	14	23	43	25	28	32	37	33	33%	-5%
Software Revenue	28	87	136	152	194	230	253	273	297	311	47%	10%
Bundled	12	28	24	21	27	30	24	19	16	14	18%	-12%
Unbundled	16	59	113	131	167	200	229	255	281	297	59%	12%
Service Revenue	3	11	22	30	39	44	48	51	53	54	70%	7%
Total Revenue	117	330	368	549	694	801	884	946	989	1007	43%	8%
Increase over Prior Year	NA	182%	12%	49%	27%	15%	10%	7%	5%	2%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 4  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	5,461	22,388	34,560	36,063	37,355	43,870	48,920	52,910	55,390	57,030	62%	9%
Workstation Shipments	5,461	22,388	34,560	36,063	37,355	43,870	48,920	52,910	55,390	57,030	62%	9%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	29.2	31.0	25.0	28.8	17.8	17.3	16.8	16.3	15.9	15.7	-12%	-2%
Hardware-Only ASP	8.9	3.6	5.2	6.9	4.5	4.5	4.5	4.4	4.4	4.4	-16%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	87	206	262	343	292	324	339	341	336	333	27%	3%
CPU Revenue	75	159	217	237	249	229	239	242	240	240	27%	-1%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	12	47	45	106	43	96	99	99	96	93	29%	17%
Software Revenue	53	111	136	138	172	209	219	219	215	217	26%	5%
Bundled	49	87	88	76	100	128	133	131	126	122	15%	4%
Unbundled	4	24	49	62	71	80	86	88	89	94	77%	6%
Service Revenue	1	26	31	20	34	38	39	38	36	35	95%	1%
Total Revenue	142	343	429	502	497	571	596	598	587	585	29%	3%
Increase over Prior Year	NA	142%	25%	17%	-1%	15%	4%	0%	-2%	-0%		

Source: Dataquest  
 July 1990



TABLE NUMBER: 5  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	705	1,822	3,692	4,048	7,310	10,060	13,080	15,870	18,810	22,010	79%	25%
Workstation Shipments	705	1,822	3,692	4,048	7,310	10,060	13,080	15,870	18,810	22,010	79%	25%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	36.6	20.3	8.5	9.0	13.1	14.4	15.4	16.7	18.6	14.9	-23%	3%
Hardware-Only ASP	5.3	5.3	4.2	5.5	4.7	4.7	4.7	4.7	4.6	4.6	-3%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	4	10	16	23	35	48	62	75	88	102	56%	24%
CPU Revenue	4	10	15	22	34	47	60	71	83	96	55%	23%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	1	1	1	1	2	3	5	6	70%	54%
Software Revenue	2	5	6	7	11	14	18	23	26	31	45%	23%
Bundled	0	1	2	1	1	1	1	1	1	1	24%	-7%
Unbundled	1	5	5	6	10	14	18	22	25	30	48%	24%
Service Revenue	0	0	1	1	2	2	3	4	4	5	145%	22%
Total Revenue	6	16	23	31	48	65	83	101	118	138	54%	23%
Increase over Prior Year	NA	189%	42%	33%	57%	36%	28%	21%	17%	17%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 6  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	21,140	76,917	107,349	143,035	144,020	160,970	173,910	184,880	191,190	191,480	62%	6%
Workstation Shipments	21,140	76,917	107,349	143,035	144,020	160,970	173,910	184,880	191,190	191,480	62%	6%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	26.6	23.6	17.7	21.5	18.6	18.8	18.6	18.3	18.1	18.0	-9%	-1%
Hardware-Only ASP	4.7	3.6	4.2	4.5	4.7	4.7	4.7	4.6	4.6	4.6	0%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	169	406	548	757	786	873	918	948	955	945	36%	4%
CPU Revenue	155	354	495	662	719	783	821	847	851	840	36%	3%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	14	52	53	94	67	90	97	102	104	105	37%	10%
Software Revenue	67	165	218	237	290	322	330	329	320	308	34%	1%
Bundled	44	91	97	77	92	107	107	102	95	89	16%	-1%
Unbundled	23	74	121	160	198	215	224	227	225	219	54%	2%
Service Revenue	3	34	41	34	57	64	66	67	66	64	79%	2%
Total Revenue	239	605	808	1028	1132	1259	1314	1345	1341	1317	36%	3%
Increase over Prior Year	NA	153%	33%	27%	10%	11%	4%	2%	-0%	-2%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 7  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	10,592	43,469	61,465	81,554	75,756	81,770	85,750	89,670	93,140	94,150	64%	4%
Workstation Shipments	10,592	43,469	61,465	81,554	75,756	81,770	85,750	89,670	93,140	94,150	64%	4%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	19.5	19.0	15.6	14.4	7.5	7.5	7.4	7.4	7.3	7.3	-21%	-1%
Hardware-Only ASP	4.6	3.4	3.8	3.9	4.6	4.6	4.6	4.5	4.5	4.5	0%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	64	171	254	323	352	376	391	404	416	420	41%	4%
CPU Revenue	61	161	244	322	344	369	379	388	395	396	41%	3%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	2	10	10	1	8	8	12	16	21	24	27%	26%
Software Revenue	20	59	73	80	97	106	112	115	113	109	37%	2%
Bundled	5	17	12	2	1	1	1	1	1	1	-24%	-11%
Unbundled	15	42	61	78	96	105	111	114	113	108	45%	2%
Service Revenue	1	10	11	9	16	17	17	18	19	19	71%	4%
Total Revenue	85	240	338	412	464	499	520	538	548	548	40%	3%
Increase over Prior Year	NA	183%	41%	22%	13%	8%	4%	3%	2%	0%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 8  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	6,906	18,877	23,500	37,257	44,482	50,360	55,810	60,110	61,200	59,910	59%	6%
Workstation Shipments	6,906	18,877	23,500	37,257	44,482	50,360	55,810	60,110	61,200	59,910	59%	6%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	23.1	15.3	9.2	11.2	19.1	21.2	21.0	20.8	20.5	20.5	-5%	1%
Hardware-Only ASP	4.6	3.8	4.2	4.8	4.9	4.9	4.9	4.8	4.8	4.8	2%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	44	94	111	199	256	282	299	311	310	302	42%	3%
CPU Revenue	41	89	102	181	225	267	283	293	291	281	40%	5%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	3	5	8	19	31	16	17	18	20	21	61%	-7%
Software Revenue	9	31	54	66	90	101	102	99	97	93	58%	1%
Bundled	4	12	17	14	20	21	17	14	12	11	39%	-11%
Unbundled	5	19	37	52	70	80	85	85	85	82	68%	3%
Service Revenue	2	5	10	13	22	24	25	25	25	24	70%	3%
Total Revenue	55	130	174	279	368	407	426	436	432	420	46%	3%
Increase over Prior Year	NA	138%	34%	60%	32%	11%	5%	2%	-1%	-3%		

**Forecasts**

Source: Dataquest  
 July 1990

TABLE NUMBER: 9  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	3,394	13,632	20,469	21,967	19,571	22,770	24,500	25,770	26,030	25,110	55%	5%
Workstation Shipments	3,394	13,632	20,469	21,967	19,571	22,770	24,500	25,770	26,030	25,110	55%	5%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	30.8	30.3	26.2	33.4	19.2	18.6	18.4	18.2	18.0	18.0	-11%	-1%
Hardware-Only ASP	9.0	4.0	5.4	6.7	4.6	4.6	4.5	4.5	4.5	4.5	-15%	-0%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	60	138	175	223	158	186	191	189	179	166	22%	1%
CPU Revenue	51	100	140	149	130	120	124	124	118	110	21%	-3%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	9	37	34	74	28	66	67	66	61	56	26%	15%
Software Revenue	37	73	89	88	99	111	111	107	100	93	22%	-1%
Bundled	35	62	67	59	70	85	88	88	82	77	15%	2%
Unbundled	2	11	22	29	29	26	22	19	17	17	74%	-11%
Service Revenue	1	19	20	12	19	22	23	22	21	19	104%	-0%
Total Revenue	97	229	284	323	276	319	324	318	300	278	23%	0%
Increase over Prior Year	NA	136%	24%	14%	-14%	15%	2%	-2%	-6%	-7%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 10  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	248	939	1,915	2,258	4,211	6,070	7,850	9,330	10,810	12,310	103%	24%
Workstation Shipments	248	939	1,915	2,258	4,211	6,070	7,850	9,330	10,810	12,310	103%	24%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	32.2	18.9	13.6	10.8	14.5	14.5	14.4	14.2	14.1	14.1	-18%	-1%
Hardware-Only ASP	4.8	3.4	4.1	4.7	4.7	4.7	4.7	4.6	4.6	4.6	-1%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	1	4	9	11	20	29	37	43	50	56	75%	23%
CPU Revenue	1	4	8	11	20	28	36	41	47	53	74%	22%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	1	0	0	1	1	2	3	3	106%	54%
Software Revenue	1	2	2	2	3	5	6	8	10	12	40%	30%
Bundled	0	0	1	1	0	0	0	0	0	0	64%	-7%
Unbundled	1	1	1	1	3	4	6	8	10	12	38%	34%
Service Revenue	0	0	1	0	1	1	1	1	2	2	130%	25%
Total Revenue	2	6	12	13	24	34	44	53	61	71	67%	24%
Increase over Prior Year	NA	206%	108%	14%	78%	44%	29%	20%	15%	16%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 11  
 TITLE: History and Forecast  
 APPLICATION: AEC  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	11,816	36,384	52,404	63,820	84,455	104,830	126,520	146,800	164,190	180,560	64%	16%
Workstation Shipments	11,816	36,384	52,404	63,820	84,455	104,830	126,520	146,800	164,190	180,560	64%	16%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	21.1	22.8	14.8	14.9	13.8	13.5	13.5	13.4	13.3	13.4	-10%	-1%
Hardware-Only ASP	5.9	6.5	4.1	4.9	4.6	4.6	4.6	4.5	4.5	4.5	-6%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	78	247	226	325	420	508	601	685	754	825	40%	14%
CPU Revenue	75	242	217	309	404	478	563	638	698	758	40%	13%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	2	4	9	15	16	30	38	47	56	67	47%	32%
Software Revenue	29	57	89	116	159	215	269	332	402	466	41%	24%
Bundled	8	10	13	12	18	30	32	32	32	33	17%	13%
Unbundled	21	47	76	105	141	185	237	300	370	433	47%	25%
Service Revenue	1	5	10	23	27	34	41	48	54	60	89%	17%
Total Revenue	107	309	325	464	606	757	911	1066	1210	1350	41%	17%
Increase over Prior Year	NA	187%	5%	43%	31%	25%	20%	17%	14%	12%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 12  
 TITLE: History and Forecast  
 APPLICATION: AEC  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	7,593	23,319	31,658	39,576	47,305	58,130	69,710	80,140	88,930	97,810	58%	16%
Workstation Shipments	7,593	23,319	31,658	39,576	47,305	58,130	69,710	80,140	88,930	97,810	58%	16%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	20.5	21.6	17.0	7.6	9.1	9.1	9.0	8.9	8.8	8.8	-18%	-1%
Hardware-Only ASP	5.7	6.6	3.9	3.8	4.5	4.5	4.5	4.4	4.4	4.4	-6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	46	157	124	152	214	262	311	354	388	427	36%	15%
CPU Revenue	45	156	122	152	211	256	301	340	369	402	36%	14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	1	2	0	3	5	9	14	19	25	32%	56%
Software Revenue	18	35	47	67	79	99	124	155	194	231	35%	24%
Bundled	3	2	1	0	0	0	0	0	0	0	-37%	-7%
Unbundled	15	32	46	66	79	99	124	155	194	231	40%	24%
Service Revenue	0	2	3	11	12	15	18	21	23	26	89%	17%
Total Revenue	64	193	174	230	304	375	452	529	606	684	37%	18%
Increase over Prior Year	NA	203%	-10%	33%	32%	23%	21%	17%	14%	13%		

Source: Dataquest  
 July 1990



TABLE NUMBER: 13  
 TITLE: History and Forecast  
 APPLICATION: AEC  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	2,904	8,716	12,060	14,902	23,723	30,150	37,240	44,220	50,480	55,280	69%	18%
Workstation Shipments	2,904	8,716	12,060	14,902	23,723	30,150	37,240	44,220	50,480	55,280	69%	18%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	29.2	18.2	6.7	6.4	13.1	12.1	12.0	11.9	11.8	11.9	-18%	-2%
Hardware-Only ASP	5.8	7.2	4.2	6.6	4.8	4.8	4.8	4.7	4.7	4.7	-5%	-0%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	19	65	52	96	120	150	181	212	238	260	45%	17%
CPU Revenue	18	64	50	95	113	145	174	202	226	244	44%	17%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	1	1	1	7	5	7	10	13	16	59%	19%
Software Revenue	5	12	20	29	43	61	80	103	126	144	54%	27%
Bundled	1	1	2	2	3	5	5	4	3	3	36%	-4%
Unbundled	4	10	18	27	40	55	75	99	123	142	57%	29%
Service Revenue	0	1	2	7	8	11	13	16	19	21	98%	20%
Total Revenue	24	77	74	131	171	221	274	330	383	425	48%	20%
Increase over Prior Year	NA	218%	-4%	78%	30%	29%	24%	20%	16%	11%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 14  
 TITLE: History and Forecast  
 APPLICATION: AEC  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1,001	3,865	7,542	7,977	11,416	14,070	16,610	19,050	21,050	23,370	84%	15%
Workstation Shipments	1,001	3,865	7,542	7,977	11,416	14,070	16,610	19,050	21,050	23,370	84%	15%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	19.7	25.6	28.8	21.7	14.3	14.0	13.9	13.7	13.6	13.6	-8%	-1%
Hardware-Only ASP	9.0	3.3	4.7	7.0	4.5	4.5	4.4	4.4	4.3	4.3	-16%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	11	21	45	68	77	85	95	104	111	119	48%	9%
CPU Revenue	10	19	40	54	70	66	74	82	87	94	48%	6%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	3	5	14	7	19	21	23	24	25	47%	29%
Software Revenue	5	9	21	20	34	52	61	70	77	85	45%	20%
Bundled	4	7	10	10	14	24	26	28	29	30	27%	17%
Unbundled	1	2	11	10	21	28	35	42	48	55	74%	22%
Service Revenue	0	2	6	4	7	8	9	10	11	12	79%	12%
Total Revenue	17	33	72	92	118	145	166	185	198	216	48%	13%
Increase over Prior Year	NA	98%	119%	27%	29%	23%	14%	11%	7%	9%		

Forecasts

Source: Dataquest  
 July 1990

TABLE NUMBER: 15  
 TITLE: History and Forecast  
 APPLICATION: AEC  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	318	483	1,144	1,365	2,010	2,480	2,960	3,400	3,730	4,100	59%	15%
Workstation Shipments	318	483	1,144	1,365	2,010	2,480	2,960	3,400	3,730	4,100	59%	15%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	24.6	21.6	2.4	2.3	6.4	6.4	6.3	6.3	6.2	6.2	-29%	-1%
Hardware-Only ASP	5.9	7.7	4.2	6.6	4.7	4.7	4.7	4.6	4.6	4.6	-6%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	2	4	4	9	9	12	14	16	17	19	38%	15%
CPU Revenue	2	4	4	9	9	11	13	15	16	18	38%	14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	1	1	1	25%	79%
Software Revenue	1	2	1	1	3	3	4	5	5	6	27%	15%
Bundled	0	0	0	0	0	0	0	0	0	0	-1%	-100%
Unbundled	1	2	1	1	3	3	4	5	5	6	30%	16%
Service Revenue	0	0	0	1	0	1	1	1	1	1	114%	15%
Total Revenue	3	6	6	11	13	16	19	21	23	25	35%	15%
Increase over Prior Year	NA	103%	-2%	95%	17%	23%	18%	14%	9%	10%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 16  
 TITLE: History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	102	2,484	3,872	5,289	12,206	16,440	21,240	25,990	29,150	31,470	231%	21%
Workstation Shipments	102	2,484	3,872	5,289	12,206	16,440	21,240	25,990	29,150	31,470	231%	21%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	33.7	26.9	13.6	20.7	16.5	15.1	14.3	13.7	13.2	13.1	-16%	-5%
Hardware-Only ASP	5.0	6.5	4.1	4.9	4.7	4.8	4.7	4.7	4.6	4.6	-2%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	1	21	21	34	66	86	109	131	146	158	140%	19%
CPU Revenue	1	20	18	30	62	80	101	121	133	151	140%	19%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	1	2	4	4	6	8	11	13	7	143%	9%
Software Revenue	2	17	34	52	67	92	125	172	227	279	99%	33%
Bundled	0	3	5	6	5	8	9	11	13	15	78%	25%
Unbundled	2	14	29	46	62	84	116	161	215	264	101%	34%
Service Revenue	0	1	2	4	6	8	10	13	17	20	80%	27%
Total Revenue	3	39	57	90	139	185	244	316	390	456	111%	27%
Increase over Prior Year	NA	1093%	44%	58%	55%	33%	32%	30%	23%	17%		

Forecasts

Source: Dataquest  
 July 1990

TABLE NUMBER: 17  
 TITLE: History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	51	1,612	1,903	2,671	6,101	8,190	10,200	12,210	13,650	14,590	231%	19%
Workstation Shipments	51	1,612	1,903	2,671	6,101	8,190	10,200	12,210	13,650	14,590	231%	19%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	16.5	21.0	30.9	34.0	50.6	50.6	50.1	49.6	49.1	49.1	32%	-1%
Hardware-Only ASP	4.9	6.6	3.9	3.8	4.7	4.7	4.7	4.6	4.6	4.6	-1%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	0	12	10	12	33	41	49	58	63	67	161%	16%
CPU Revenue	0	12	9	11	31	39	47	55	60	63	158%	15%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	1	1	2	2	2	3	4	4	NA	20%
Software Revenue	2	11	23	34	45	62	85	118	159	198	90%	34%
Bundled	0	1	2	2	1	2	2	1	1	1	97%	2%
Unbundled	2	10	21	33	44	60	83	117	158	197	90%	35%
Service Revenue	0	1	1	2	3	4	5	7	9	10	137%	28%
Total Revenue	2	24	34	48	81	106	140	183	231	276	107%	28%
Increase over Prior Year	NA	1043%	42%	39%	68%	32%	31%	31%	26%	19%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 18  
 TITLE: History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	5	625	1,252	1,631	4,036	5,370	7,120	8,780	9,570	10,180	431%	20%
Workstation Shipments	5	625	1,252	1,631	4,036	5,370	7,120	8,780	9,570	10,180	431%	20%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	29.6	25.0	7.8	8.7	11.2	10.9	10.7	10.7	10.6	10.7	-22%	-1%
Hardware-Only ASP	.0	7.1	4.5	6.5	4.9	4.9	4.8	4.8	4.7	4.7	NA	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	6	7	11	21	27	35	43	46	49	172%	19%
CPU Revenue	0	6	6	10	20	26	34	41	43	55	173%	23%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	1	1	1	1	2	2	3	-6	154%	ERR
Software Revenue	0	4	8	10	13	17	22	31	41	49	316%	31%
Bundled	0	1	1	1	1	1	1	1	1	1	139%	-7%
Unbundled	0	4	7	10	12	16	21	30	40	48	NA	33%
Service Revenue	0	0	1	2	2	2	3	4	5	6	53%	25%
Total Revenue	0	11	15	22	35	47	61	78	92	103	146%	24%
Increase over Prior Year	NA	2700%	41%	46%	57%	32%	31%	28%	19%	12%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 19  
 TITLE: History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	45	185	563	831	1,695	2,390	3,280	4,240	5,050	5,670	148%	27%
Workstation Shipments	45	185	563	831	1,695	2,390	3,280	4,240	5,050	5,670	148%	27%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	42.3	61.2	20.5	27.9	13.4	13.1	13.0	12.8	12.7	12.7	-25%	-1%
Hardware-Only ASP	5.1	3.1	4.2	6.6	4.5	4.6	4.5	4.5	4.4	4.4	-3%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	2	3	11	11	15	21	27	32	37	92%	28%
CPU Revenue	0	1	3	9	9	12	17	21	25	29	91%	25%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	1	1	2	1	3	4	5	7	8	101%	44%
Software Revenue	0	1	2	6	7	10	13	17	21	24	90%	29%
Bundled	0	1	1	3	3	4	6	8	11	13	66%	35%
Unbundled	0	0	1	2	4	6	7	9	10	11	148%	24%
Service Revenue	0	0	1	1	1	1	1	2	2	2	77%	28%
Total Revenue	1	3	6	17	18	26	35	45	55	63	91%	28%
Increase over Prior Year	NA	342%	81%	198%	6%	44%	34%	29%	21%	15%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 20  
 TITLE: History and Forecast  
 APPLICATION: GIS/Mapping  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1	62	154	156	374	490	650	770	880	1,020	333%	22%
Workstation Shipments	1	62	154	156	374	490	650	770	880	1,020	333%	22%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	33.6	6.0	8.6	18.5	18.5	18.3	18.1	18.0	18.0	NA	-1%
Hardware-Only ASP	10.3	7.4	4.2	6.6	4.8	4.8	4.8	4.7	4.7	4.7	-17%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	1	1	1	2	3	3	4	4	5	192%	18%
CPU Revenue	0	1	1	1	2	2	3	4	4	4	186%	18%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	NA	15%
Software Revenue	0	1	1	1	3	4	4	6	7	8	105%	26%
Bundled	0	0	0	0	0	0	0	0	0	0	NA	10%
Unbundled	0	0	1	1	2	3	4	5	7	8	103%	27%
Service Revenue	0	0	0	0	0	0	1	1	1	1	NA	22%
Total Revenue	0	1	1	2	5	7	8	10	12	14	129%	23%
Increase over Prior Year	NA	1350%	22%	71%	107%	29%	27%	23%	16%	17%		

Source: Dataquest  
 July 1990



TABLE NUMBER: 21  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	11,791	29,801	30,592	32,349	36,765	39,100	38,650	32,840	27,070	19,970	33%	-11%
Workstation Shipments	11,791	29,801	30,592	32,349	36,765	39,100	38,650	32,840	27,070	19,970	33%	-11%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	36.8	28.5	11.4	14.4	14.6	15.8	15.5	14.5	11.1	10.1	-21%	-7%
Hardware-Only ASP	8.9	6.6	4.5	5.3	4.8	4.9	4.8	4.8	4.7	4.8	-14%	0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	119	235	149	185	206	210	199	162	129	94	12%	-14%
CPU Revenue	108	219	139	165	190	197	186	151	119	85	12%	-15%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	11	16	11	20	16	13	13	11	10	9	8%	-11%
Software Revenue	66	134	167	156	161	160	142	111	84	60	20%	-18%
Bundled	32	41	18	11	17	18	13	8	5	3	-12%	-28%
Unbundled	34	94	149	145	144	142	129	104	80	57	34%	-17%
Service Revenue	3	19	23	24	25	24	21	16	12	8	53%	-20%
Total Revenue	188	389	340	365	392	394	362	289	224	162	16%	-16%
Increase over Prior Year	NA	107%	-13%	7%	7%	0%	-8%	-20%	-22%	-28%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 22  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	8,774	16,936	15,566	17,889	18,954	20,400	19,220	15,380	11,460	6,440	21%	-19%
Workstation Shipments	8,774	16,936	15,566	17,889	18,954	20,400	19,220	15,380	11,460	6,440	21%	-19%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	33.7	20.1	20.4	94.5	39.1	82.2	81.1	78.0	68.9	46.5	4%	4%
Hardware-Only ASP	9.0	7.0	4.2	4.2	4.8	4.8	4.7	4.7	4.6	4.6	-15%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	80	120	68	81	91	99	92	73	53	30	3%	-20%
CPU Revenue	78	117	67	80	87	97	89	70	51	28	2%	-20%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	2	3	2	1	4	2	3	3	3	2	17%	-16%
Software Revenue	41	67	87	83	79	69	56	41	29	16	14%	-27%
Bundled	15	10	4	3	1	0	0	0	0	0	-47%	-46%
Unbundled	26	57	82	80	78	69	55	41	29	16	25%	-27%
Service Revenue	2	9	9	12	10	10	8	6	5	3	37%	-25%
Total Revenue	123	196	164	175	180	178	156	120	87	48	8%	-23%
Increase over Prior Year	NA	60%	-16%	7%	3%	-1%	-12%	-23%	-28%	-44%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 23  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	1,858	7,821	8,562	8,903	12,423	13,040	13,290	11,230	8,970	6,070	61%	-13%
Workstation Shipments	1,858	7,821	8,562	8,903	12,423	13,040	13,290	11,230	8,970	6,070	61%	-13%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	75.4	26.7	7.0	9.9	7.7	8.3	8.5	8.3	7.4	6.3	-43%	-4%
Hardware-Only ASP	9.0	7.5	4.4	6.7	5.0	5.1	5.1	5.0	4.9	5.0	-14%	0%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	23	68	40	61	64	68	68	56	44	30	23%	-14%
CPU Revenue	16	61	36	58	59	65	65	54	42	28	30%	-14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	7	6	4	3	5	3	3	2	2	2	-5%	-18%
Software Revenue	14	39	54	47	49	51	49	41	33	25	28%	-12%
Bundled	7	14	4	4	3	2	1	0	0	0	-16%	-60%
Unbundled	7	25	51	43	46	49	48	41	33	25	46%	-11%
Service Revenue	1	5	10	8	7	7	6	5	4	3	61%	-16%
Total Revenue	37	111	104	116	120	126	123	102	82	58	26%	-14%
Increase over Prior Year	NA	199%	-6%	12%	4%	5%	-2%	-17%	-20%	-29%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 24  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1,022	4,707	5,986	5,288	4,673	4,640	4,530	3,850	3,260	2,880	46%	-9%
Workstation Shipments	1,022	4,707	5,986	5,288	4,673	4,640	4,530	3,850	3,260	2,880	46%	-9%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	29.7	35.4	16.9	14.5	19.0	18.9	16.9	14.5	10.4	10.2	-11%	-12%
Hardware-Only ASP	9.0	2.9	5.6	7.5	4.5	4.5	4.5	4.4	4.4	4.4	-16%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	16	46	39	42	46	38	31	21	14	12	23%	-24%
CPU Revenue	14	39	34	25	40	31	24	16	10	8	23%	-28%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	2	7	5	16	6	8	7	5	4	4	24%	-11%
Software Revenue	11	27	24	24	32	36	34	25	18	14	25%	-15%
Bundled	9	17	9	4	13	15	12	7	4	3	7%	-25%
Unbundled	1	11	15	20	18	21	22	18	14	11	77%	-9%
Service Revenue	0	5	5	4	7	6	5	4	2	2	94%	-24%
Total Revenue	27	77	67	70	85	81	71	50	34	28	26%	-20%
Increase over Prior Year	NA	186%	-13%	3%	22%	-5%	-13%	-30%	-32%	-18%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 25  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	138	338	479	269	715	1,020	1,620	2,370	3,380	4,580	51%	45%
Workstation Shipments	138	338	479	269	715	1,020	1,620	2,370	3,380	4,580	51%	45%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	14.9	9.3	7.1	13.3	18.0	22.4	29.0	35.8	15.8	NA	4%
Hardware-Only ASP	5.0	6.6	4.6	6.5	5.1	5.0	5.0	4.9	4.9	4.9	0%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	1	2	2	2	4	5	8	12	17	22	39%	43%
CPU Revenue	1	2	2	2	4	5	8	11	16	21	39%	42%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	1	1	1	35%	75%
Software Revenue	0	1	2	2	2	3	3	4	4	5	68%	14%
Bundled	0	0	0	0	0	0	0	0	0	0	-4%	-100%
Unbundled	0	1	2	2	2	3	3	4	4	5	102%	15%
Service Revenue	0	0	0	0	0	0	1	1	1	1	NA	21%
Total Revenue	1	4	4	4	6	9	12	17	22	28	49%	34%
Increase over Prior Year	NA	320%	15%	-8%	64%	33%	43%	36%	32%	26%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 26  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	9,990	21,026	17,899	15,963	16,851	17,640	17,630	16,070	13,840	10,030	14%	-10%
Workstation Shipments	9,990	21,026	17,899	15,963	16,851	17,640	17,630	16,070	13,840	10,030	14%	-10%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	32.6	29.5	11.6	19.1	21.2	24.4	28.0	31.4	51.7	.0	-10%	-100%
Hardware-Only ASP	9.0	6.8	4.6	5.2	4.7	4.8	4.8	4.7	4.7	4.7	-15%	0%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	97	174	86	92	98	100	94	79	65	47	0%	-14%
CPU Revenue	93	161	81	83	91	94	88	74	60	43	-0%	-14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	4	12	5	9	7	6	6	5	4	4	8%	-12%
Software Revenue	42	90	82	93	119	112	98	72	51	34	23%	-22%
Bundled	19	35	9	6	14	10	7	3	1	1	-7%	-45%
Unbundled	22	55	73	87	105	102	91	69	50	33	36%	-21%
Service Revenue	3	15	13	15	16	14	11	8	6	4	44%	-25%
Total Revenue	141	278	180	199	232	226	203	160	122	84	10%	-18%
Increase over Prior Year	NA	97%	-35%	11%	16%	-2%	-10%	-21%	-24%	-31%		

Forecasts

Source: Dataquest  
 July 1990

TABLE NUMBER: 27  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	7,834	12,224	9,143	9,257	8,532	8,720	8,050	6,560	5,180	2,540	2%	-22%
Workstation Shipments	7,834	12,224	9,143	9,257	8,532	8,720	8,050	6,560	5,180	2,540	2%	-22%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	26.6	20.6	33.0	87.7	35.3	105.7	104.6	103.6	102.6	102.6	7%	24%
Hardware-Only ASP	9.0	7.3	4.3	4.2	4.7	4.7	4.7	4.6	4.6	4.6	-15%	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	70	91	42	43	41	42	38	31	24	12	-10%	-22%
CPU Revenue	69	88	41	42	40	41	37	29	23	11	-10%	-23%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	3	1	1	1	1	1	1	1	1	-6%	-6%
Software Revenue	27	47	47	50	63	55	42	29	19	9	19%	-33%
Bundled	11	9	3	2	0	0	0	0	0	0	-51%	-100%
Unbundled	16	38	44	48	63	54	42	29	19	9	31%	-33%
Service Revenue	2	7	6	7	7	6	5	3	2	1	30%	-31%
Total Revenue	99	145	94	101	111	102	85	63	45	21	2%	-28%
Increase over Prior Year	NA	47%	-35%	7%	10%	-7%	-17%	-25%	-28%	-53%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 28  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1,479	4,831	4,846	4,331	6,146	6,540	6,850	6,420	5,050	2,960	43%	-14%
Workstation Shipments	1,479	4,831	4,846	4,331	6,146	6,540	6,850	6,420	5,050	2,960	43%	-14%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	27.0	29.6	7.9	12.9	8.4	9.1	9.1	.0	.0	.0	-25%	-100%
Hardware-Only ASP	9.0	7.6	4.5	6.9	4.9	5.0	4.9	4.9	4.8	4.8	-14%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	14	45	23	31	31	33	34	31	24	14	17%	-14%
CPU Revenue	12	39	21	30	29	32	33	30	23	14	18%	-14%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	2	6	2	1	2	1	1	1	1	1	3%	-17%
Software Revenue	8	23	22	25	27	29	29	23	18	14	28%	-13%
Bundled	2	13	2	2	2	1	0	0	0	0	-2%	-100%
Unbundled	6	9	20	23	25	28	29	23	18	14	33%	-12%
Service Revenue	1	4	4	5	3	3	2	2	2	1	46%	-20%
Total Revenue	23	71	50	61	62	65	65	57	44	29	22%	-14%
Increase over Prior Year	NA	212%	-29%	22%	0%	5%	1%	-13%	-22%	-35%		

Source: Dataquest  
 July 1990



TABLE NUMBER: 29  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	====	====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	608	3,732	3,604	2,248	1,842	1,810	1,650	1,360	1,000	860	32%	-14%
Workstation Shipments	608	3,732	3,604	2,248	1,842	1,810	1,650	1,360	1,000	860	32%	-14%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	44.1	35.7	11.4	16.0	30.5	30.1	29.8	29.5	.0	.0	-9%	-100%
Hardware-Only ASP	9.0	3.1	5.2	6.4	4.5	4.5	4.5	4.4	4.4	4.4	-16%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	12	37	19	16	24	22	16	9	4	3	14%	-34%
CPU Revenue	11	33	18	9	20	18	13	7	2	2	13%	-37%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	4	1	7	4	4	3	2	1	1	21%	-23%
Software Revenue	7	20	12	16	26	26	24	17	10	8	31%	-21%
Bundled	7	13	3	2	12	9	7	3	1	1	11%	-43%
Unbundled	0	7	8	15	15	17	18	14	10	8	142%	-12%
Service Revenue	0	4	3	2	5	5	4	2	1	1	85%	-30%
Total Revenue	19	60	33	35	56	53	44	27	15	12	23%	-26%
Increase over Prior Year	NA	209%	-44%	5%	59%	-4%	-17%	-38%	-45%	-18%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 30  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	69	239	307	127	331	560	1,080	1,730	2,610	3,670	48%	62%
Workstation Shipments	69	239	307	127	331	560	1,080	1,730	2,610	3,670	48%	62%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	10.9	36.8	29.8	33.9	48.0	47.5	47.0	46.6	46.6	NA	7%
Hardware-Only ASP	4.9	6.5	4.8	6.5	5.0	5.0	5.0	4.9	4.9	4.9	1%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	2	2	1	2	3	6	9	13	18	38%	59%
CPU Revenue	0	2	2	1	2	3	5	8	12	17	38%	58%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	1	1	NA	125%
Software Revenue	0	0	1	1	2	2	3	3	3	3	NA	10%
Bundled	0	0	0	0	0	0	0	0	0	0	NA	-100%
Unbundled	0	0	1	1	2	2	3	3	3	3	NA	11%
Service Revenue	0	0	0	0	0	0	0	1	1	1	NA	22%
Total Revenue	0	2	3	2	4	6	9	13	17	22	63%	41%
Increase over Prior Year	NA	512%	23%	-22%	96%	44%	56%	43%	36%	26%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 31  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	====	====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	47	612	1,255	342	846	1,070	1,220	900	740	570	106%	-8%
Workstation Shipments	47	612	1,255	342	846	1,070	1,220	900	740	570	106%	-8%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	30.7	25.7	5.8	18.6	10.4	9.1	8.7	8.2	7.7	7.6	-24%	-6%
Hardware-Only ASP	.0	2.9	5.0	3.1	4.0	3.8	3.8	3.7	3.7	3.7	NA	-2%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	1	2	6	3	5	5	6	4	3	2	43%	-13%
CPU Revenue	0	2	5	2	4	5	5	4	3	2	74%	-12%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	0	0	0	1	1	1	1	0	0	5%	-15%
Software Revenue	2	4	16	5	2	3	3	2	2	1	2%	-12%
Bundled	1	0	1	1	0	1	1	1	1	0	-9%	1%
Unbundled	1	4	15	4	2	2	2	2	1	1	6%	-16%
Service Revenue	0	0	1	0	0	0	0	0	0	0	10%	-10%
Total Revenue	3	7	23	8	7	9	10	7	5	4	19%	-12%
Increase over Prior Year	NA	121%	232%	-65%	-8%	23%	11%	-31%	-24%	-27%		

Source: Dataquest  
 July 1990

**Forecasts**

TABLE NUMBER: 32  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	8	594	539	99	332	380	430	340	270	200	153%	-10%
Workstation Shipments	8	594	539	99	332	380	430	340	270	200	153%	-10%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	25.9	25.8	32.7	25.8	49.0	49.0	48.5	48.0	47.5	47.5	17%	-1%
Hardware-Only ASP	.0	2.9	5.0	3.9	3.8	3.8	3.8	3.7	3.7	3.7	NA	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	2	3	1	1	2	2	1	1	1	63%	-12%
CPU Revenue	0	2	3	0	1	2	2	1	1	1	72%	-10%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	38%	-21%
Software Revenue	1	3	10	2	1	1	1	1	0	0	-2%	-30%
Bundled	0	0	0	0	0	0	0	0	0	0	17%	-37%
Unbundled	1	3	10	2	1	1	1	1	0	0	-5%	-28%
Service Revenue	0	0	1	0	0	0	0	0	0	0	2%	-15%
Total Revenue	1	5	14	3	2	3	3	2	1	1	15%	-17%
Increase over Prior Year	NA	298%	188%	-79%	-16%	8%	5%	-26%	-31%	-30%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 33  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	35	15	594	58	120	120	110	80	60	50	36%	-16%
Workstation Shipments	35	15	594	58	120	120	110	80	60	50	36%	-16%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	29.2	19.6	2.0	23.3	33.7	31.7	32.8	30.0	26.5	.0	4%	-100%
Hardware-Only ASP	.0	2.9	5.0	3.3	4.4	4.3	4.3	4.1	4.0	4.3	NA	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	1	0	2	0	1	1	1	0	0	0	10%	-25%
CPU Revenue	0	0	2	0	1	1	1	0	0	0	58%	-26%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	-17%	-23%
Software Revenue	1	1	2	1	1	1	1	1	1	0	4%	-19%
Bundled	0	0	0	0	0	0	0	0	0	0	-30%	-100%
Unbundled	0	1	2	1	1	1	1	1	1	0	18%	-18%
Service Revenue	0	0	0	0	0	0	0	0	0	0	0%	-10%
Total Revenue	2	1	4	1	2	2	2	1	1	1	6%	-21%
Increase over Prior Year	NA	-18%	209%	-74%	101%	12%	2%	-39%	-36%	-30%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 34  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	4	3	91	185	389	560	670	480	410	320	209%	-4%
Workstation Shipments	4	3	91	185	389	560	670	480	410	320	209%	-4%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	51.5	26.3	15.1	18.0	7.7	7.5	7.4	7.3	7.3	7.3	-38%	-1%
Hardware-Only ASP	.0	.0	5.2	1.1	4.0	3.7	3.6	3.6	3.5	3.5	NA	-3%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	0	1	2	2	3	3	2	2	1	79%	-11%
CPU Revenue	0	0	0	2	2	2	3	2	2	1	84%	-10%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	57%	-15%
Software Revenue	0	1	4	2	0	1	1	1	1	1	9%	18%
Bundled	0	0	1	1	0	1	1	1	1	0	2%	32%
Unbundled	0	1	3	1	0	0	0	0	0	0	15%	5%
Service Revenue	0	0	0	0	0	0	0	0	0	0	67%	-7%
Total Revenue	0	1	5	4	3	4	5	3	3	2	54%	-6%
Increase over Prior Year	NA	138%	518%	-13%	-32%	46%	19%	-31%	-16%	-26%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 35  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	====	====
UNIT SHIPMENT DATA (Workstation Shipments)												
CPU Shipments	0	0	31	0	5	0	0	0	0	0	NA	-100%
Workstation Shipments	0	0	31	0	5	0	0	0	0	0	NA	-100%
AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)												
Turnkey ASP	.0	.0	.0	.0	25.1	25.1	24.8	24.6	24.4	24.4	NA	-1%
Hardware-Only ASP	.0	.0	4.8	.0	3.9	3.9	3.9	3.8	3.8	3.8	NA	-1%
REVENUE DATA (Millions of Dollars)												
Hardware Revenue	0	0	0	0	0	0	0	0	0	0	NA	7%
CPU Revenue	0	0	0	0	0	0	0	0	0	0	NA	-100%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	NA	48%
Software Revenue	0	0	0	0	0	0	0	0	0	0	NA	-10%
Bundled	0	0	0	0	0	0	0	0	0	0	NA	-100%
Unbundled	0	0	0	0	0	0	0	0	0	0	NA	0%
Service Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Total Revenue	0	0	0	0	0	0	0	0	0	0	NA	0%
Increase over Prior Year	NA	NA	NA	-83%	150%	0%	0%	0%	0%	0%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 36  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	1,755	8,163	11,438	16,043	19,069	20,400	19,810	15,870	12,480	9,370	82%	-13%
Workstation Shipments	1,755	8,163	11,438	16,043	19,069	20,400	19,810	15,870	12,480	9,370	82%	-13%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	47.6	24.2	12.2	10.5	10.0	10.6	10.8	11.8	11.8	11.9	-32%	4%
Hardware-Only ASP	8.8	6.5	4.3	5.4	5.0	5.0	5.0	4.9	4.8	4.9	-13%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	22	60	58	91	104	105	100	79	61	45	37%	-15%
CPU Revenue	16	56	52	80	95	99	93	73	55	40	44%	-16%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	6	4	5	11	9	6	6	6	5	5	8%	-11%
Software Revenue	22	40	70	58	40	44	41	37	31	25	13%	-9%
Bundled	12	5	8	4	3	6	5	4	3	2	-23%	-7%
Unbundled	10	35	61	54	37	38	36	33	28	23	30%	-9%
Service Revenue	0	4	10	9	9	10	9	7	6	4	100%	-14%
Total Revenue	44	104	137	158	153	158	149	122	98	74	29%	-13%
Increase over Prior Year	NA	138%	32%	15%	-3%	3%	-6%	-18%	-20%	-24%		

Source: Dataquest  
 July 1990



TABLE NUMBER: 37  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: North America  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	932	4,118	5,884	8,533	10,090	11,300	10,730	8,480	6,010	3,700	81%	-18%
Workstation Shipments	932	4,118	5,884	8,533	10,090	11,300	10,730	8,480	6,010	3,700	81%	-18%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	126.2	17.3	11.9	203.4	55.3	55.3	54.7	54.2	53.7	53.7	-19%	-1%
Hardware-Only ASP	9.0	6.5	3.8	4.2	4.9	4.9	4.9	4.8	4.8	4.8	-14%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	9	28	23	37	49	55	52	41	29	18	39%	-19%
CPU Revenue	9	27	23	37	46	54	51	39	27	17	39%	-19%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	0	0	0	3	1	2	2	1	1	39%	-19%
Software Revenue	13	17	30	30	15	14	13	11	9	7	2%	-13%
Bundled	4	1	1	1	0	0	0	0	0	0	-51%	-39%
Unbundled	9	16	29	29	15	14	13	11	9	7	11%	-13%
Service Revenue	0	2	3	4	4	4	4	3	2	1	76%	-17%
Total Revenue	23	46	56	71	67	73	69	55	40	26	24%	-17%
Increase over Prior Year	NA	102%	22%	27%	-6%	9%	-6%	-20%	-27%	-35%		

Source: Dataquest  
 July 1990

TABLE NUMBER: 38  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Europe  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	345	2,975	3,123	4,513	6,158	6,380	6,330	4,740	3,860	3,060	106%	-13%
Workstation Shipments	345	2,975	3,123	4,513	6,158	6,380	6,330	4,740	3,860	3,060	106%	-13%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	988.7	14.2	7.3	8.0	6.8	7.2	7.2	7.1	7.1	6.3	-71%	-2%
Hardware-Only ASP	9.0	7.4	4.0	6.5	5.2	5.3	5.2	5.2	5.1	5.1	-13%	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	8	23	15	29	33	34	33	24	20	16	33%	-14%
CPU Revenue	3	22	13	28	30	32	32	23	19	15	56%	-13%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	5	1	2	1	3	1	1	1	1	1	-8%	-19%
Software Revenue	5	15	30	21	20	21	19	17	14	11	32%	-11%
Bundled	5	1	2	2	1	1	1	0	0	0	-25%	-52%
Unbundled	0	15	29	19	19	20	18	17	14	11	131%	-10%
Service Revenue	0	1	5	4	4	4	4	3	3	2	123%	-13%
Total Revenue	13	39	50	54	57	59	56	44	36	29	34%	-13%
Increase over Prior Year	NA	203%	27%	8%	6%	4%	-6%	-21%	-18%	-21%		

Source: Dataquest  
 July 1990

Forecasts

TABLE NUMBER: 39  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Asia  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	409	971	2,291	2,854	2,442	2,270	2,210	2,020	1,850	1,700	56%	-7%
Workstation Shipments	409	971	2,291	2,854	2,442	2,270	2,210	2,020	1,850	1,700	56%	-7%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	16.0	34.4	22.3	11.7	12.2	12.9	12.8	12.7	12.6	12.6	-7%	1%
Hardware-Only ASP	.0	2.3	6.4	8.3	4.6	4.6	4.6	4.6	4.5	4.5	NA	-0%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	4	9	19	24	20	13	12	10	9	7	39%	-18%
CPU Revenue	3	6	16	14	17	10	9	7	6	5	40%	-23%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	1	3	3	9	2	3	3	3	2	3	30%	1%
Software Revenue	3	7	9	6	5	9	8	8	7	5	8%	2%
Bundled	3	4	5	1	2	5	4	4	3	2	-7%	2%
Unbundled	1	3	3	4	3	4	4	4	4	3	32%	1%
Service Revenue	0	1	2	1	2	2	1	1	1	1	184%	-13%
Total Revenue	7	17	29	31	27	23	22	19	16	14	29%	-13%
Increase over Prior Year	NA	127%	77%	4%	-13%	-12%	-8%	-11%	-15%	-16%		

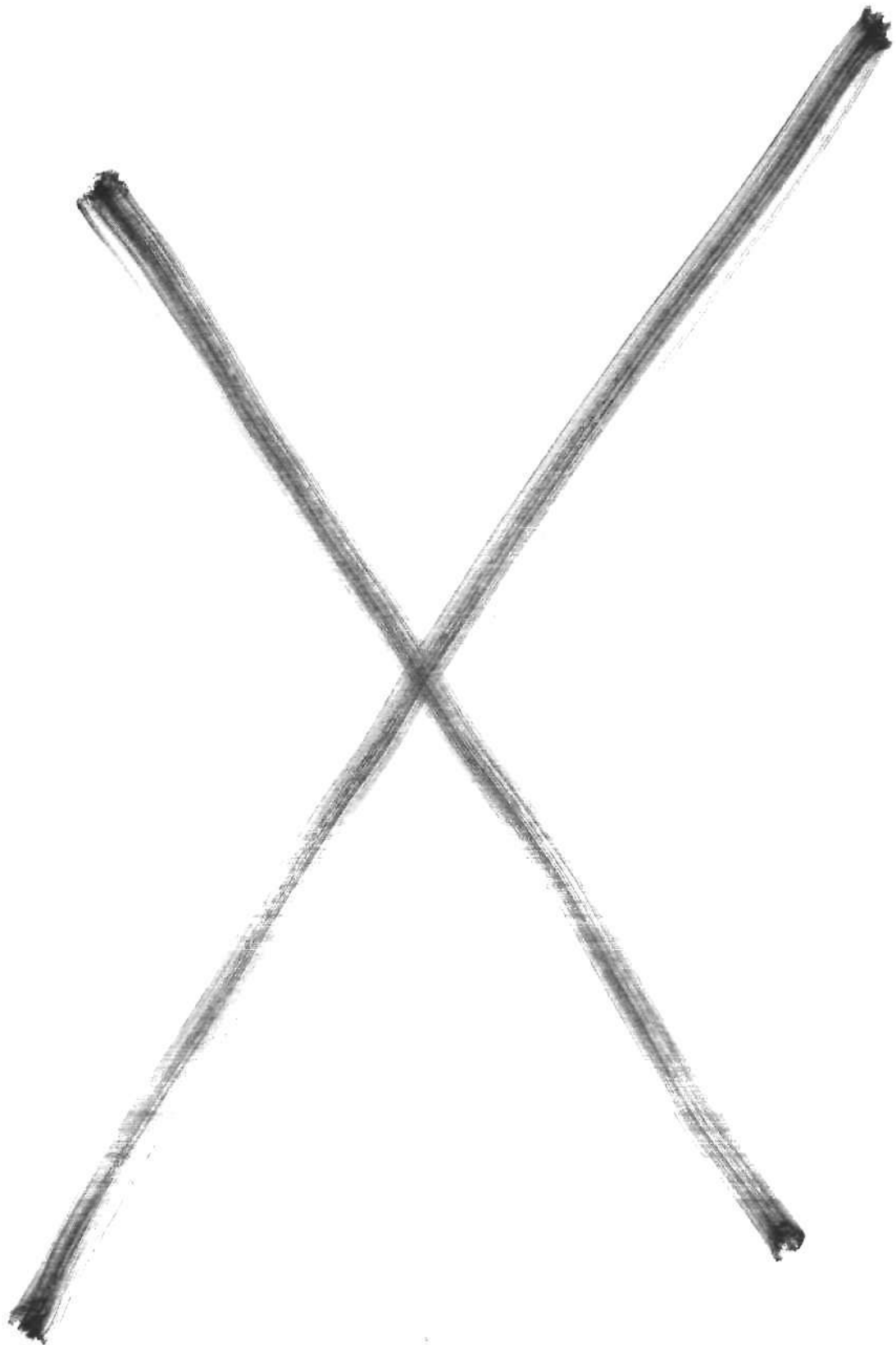
Source: Dataquest  
 July 1990

TABLE NUMBER: 40  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	CAGR 85-89	CAGR 89-94
	====	====	====	====	====	====	====	====	====	====	=====	=====
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	69	99	140	143	379	450	530	640	760	910	53%	19%
Workstation Shipments	69	99	140	143	379	450	530	640	760	910	53%	19%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	25.2	3.3	4.6	6.6	6.6	6.5	6.5	6.4	6.4	NA	-1%
Hardware-Only ASP	5.1	6.8	4.1	6.5	5.1	5.1	5.0	5.0	4.9	4.9	0%	-1%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	0	1	1	1	2	2	3	3	4	5	39%	19%
CPU Revenue	0	1	0	1	2	2	3	3	4	4	40%	18%
Workstation Revenue	0	0	0	0	0	0	0	0	0	0	NA	NA
Peripheral Revenue	0	0	0	0	0	0	0	0	0	0	25%	32%
Software Revenue	0	1	1	1	0	0	1	1	1	1	20%	27%
Bundled	0	0	0	0	0	0	0	0	0	0	-18%	-100%
Unbundled	0	1	1	1	0	0	1	1	1	1	42%	29%
Service Revenue	0	0	0	0	0	0	0	0	0	0	NA	20%
Total Revenue	1	2	1	2	2	3	3	4	5	6	35%	20%
Increase over Prior Year	NA	202%	-10%	28%	28%	16%	18%	20%	22%	26%		

Source: Dataquest  
 July 1990

Forecasts



# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	420.5	420.5	.0	70,078	15.5%	24.3%	.0%	21.1%
Autodesk	221.2	.0	221.2	0	8.1%	.0%	25.8%	.0%
Apple Computer	218.4	192.2	.0	42,000	8.0%	11.1%	.0%	12.7%
IBM	208.7	198.3	.0	46,651	7.7%	11.5%	.0%	14.1%
Hewlett-Packard	119.2	95.3	.0	18,505	4.4%	5.5%	.0%	5.6%
NEC	115.2	97.5	8.5	9,086	4.2%	5.6%	1.0%	2.7%
Hitachi	70.8	34.0	29.7	1,470	2.6%	2.0%	3.5%	.4%
Fujitsu	61.8	30.1	28.3	2,864	2.3%	1.7%	3.3%	.9%
CADAM	45.5	11.3	31.4	5,000	1.7%	.7%	3.7%	1.5%
Hakuto	40.9	19.6	19.2	1,184	1.5%	1.1%	2.2%	.4%
Mutoh Industries--NO OEM	36.4	20.6	14.0	1,320	1.3%	1.2%	1.6%	.4%
Investronica SA	27.0	21.6	2.7	1,080	1.0%	1.2%	.3%	.3%
Wacom	27.0	7.8	16.6	1,684	1.0%	.4%	1.9%	.5%
Intergraph	26.9	.0	25.3	0	1.0%	.0%	2.9%	.0%
Toshiba--NO OEM	20.4	10.2	8.1	1,453	.7%	.6%	.9%	.4%
Dell Computer	18.6	18.6	.0	4,650	.7%	1.1%	.0%	1.4%
Ziegler	18.2	.0	18.2	0	.7%	.0%	2.1%	.0%
Everex Systems	17.4	17.4	.0	5,540	.6%	1.0%	.0%	1.7%
Viewlogic Systems	16.3	.0	13.7	0	.6%	.0%	1.6%	.0%
CADKEY	15.6	.9	14.7	145	.6%	.1%	1.7%	.0%
Vero International Software	15.2	.0	15.2	0	.6%	.0%	1.8%	.0%
Xilinx	15.2	.0	13.7	0	.6%	.0%	1.6%	.0%
Racal-Redac	14.8	.0	14.1	0	.5%	.0%	1.6%	.0%
Wiechers Datentechnik	14.6	11.7	2.9	414	.5%	.7%	.3%	.1%
Research Machines	14.0	14.0	.0	2,200	.5%	.8%	.0%	.7%
EEsof	13.0	.1	11.6	9	.5%	.0%	1.3%	.0%
Computervision	12.8	2.2	9.1	126	.5%	.1%	1.1%	.0%
Caditron	12.8	6.4	5.1	200	.5%	.4%	.6%	.1%
LPKF	12.2	7.9	3.1	500	.4%	.5%	.4%	.2%
ISICAD	11.6	.0	11.6	0	.4%	.0%	1.3%	.0%
Andor	11.1	2.8	7.9	100	.4%	.2%	.9%	.0%
Design Automation	10.2	.0	8.8	0	.4%	.0%	1.0%	.0%
Altera	10.0	.0	8.5	0	.4%	.0%	1.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Datagraph	10.0	8.0	2.0	50	.4%	.5%	.2%	.0%
Mitsubishi Electric	9.4	6.3	3.3	829	.3%	.4%	.4%	.2%
Orcad	9.2	.0	9.2	0	.3%	.0%	1.1%	.0%
Data I/O	8.7	.0	8.7	0	.3%	.0%	1.0%	.0%
CPU	7.6	.0	7.3	364	.3%	.0%	.8%	.1%
DAT Standard Information syste	7.6	.0	7.2	0	.3%	.0%	.8%	.0%
ETAK	7.6	.4	7.2	19	.3%	.0%	.8%	.0%
Infinite Graphics	7.5	.0	7.5	0	.3%	.0%	.9%	.0%
Micrograph	7.3	2.7	3.7	135	.3%	.2%	.4%	.0%
Aucotec	7.3	2.9	3.6	224	.3%	.2%	.4%	.1%
BATISOFT	7.1	1.1	3.5	230	.3%	.1%	.4%	.1%
Geobased Systems	6.9	1.4	5.1	149	.3%	.1%	.6%	.0%
Kloekner-Moeller	6.7	4.0	2.3	72	.2%	.2%	.3%	.0%
Ground Modelling Systems	6.6	4.4	3.3	40	.2%	.3%	.4%	.0%
D.C.A. Software, Inc.	6.1	.0	6.1	0	.2%	.0%	.7%	.0%
CNC Software	6.0	.0	6.0	0	.2%	.0%	.7%	.0%
Moda CAD	6.0	1.5	4.2	50	.2%	.1%	.5%	.0%
CAP Electronic Sweet's	5.9	.0	4.8	0	.2%	.0%	.6%	.0%
Mapinfo	5.6	.0	4.5	0	.2%	.0%	.5%	.0%
Robocom	5.5	.0	5.5	0	.2%	.0%	.6%	.0%
CAD Software	5.4	.0	4.6	0	.2%	.0%	.5%	.0%
Serbi	4.9	.0	4.9	0	.2%	.0%	.6%	.0%
Cimatron	4.8	2.2	2.1	141	.2%	.1%	.2%	.0%
ESRI	4.8	.0	4.8	0	.2%	.0%	.6%	.0%
Olivetti	4.7	4.0	.0	793	.2%	.2%	.0%	.2%
Westward	4.7	4.7	.0	279	.2%	.3%	.0%	.1%
Claris	4.7	.0	4.7	0	.2%	.0%	.5%	.0%
Technovision	4.7	.0	4.7	0	.2%	.0%	.5%	.0%
Engineering Computer Services	4.7	1.5	1.7	112	.2%	.1%	.2%	.0%
Microsim	4.7	.0	4.4	0	.2%	.0%	.5%	.0%
Strategic Mapping, Inc.	4.3	.0	4.3	0	.2%	.0%	.5%	.0%
Algor Interactive Systems	4.2	.0	3.7	0	.2%	.0%	.4%	.0%
ADRA Systems	4.1	.0	3.7	0	.2%	.0%	.4%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
MCS	4.1	.0	3.7	0	.2%	.0%	.4%	.0%
Pathtrace	4.1	1.1	2.7	58	.2%	.1%	.3%	.0%
BETRONEX	4.1	.0	4.1	0	.1%	.0%	.5%	.0%
ERDAS	3.9	.5	3.3	26	.1%	.0%	.4%	.0%
InterCAD	3.9	2.0	1.1	189	.1%	.1%	.1%	.1%
Foresight Resources	3.8	.0	3.4	0	.1%	.0%	.4%	.0%
International Software Systems	3.8	.0	3.8	0	.1%	.0%	.4%	.0%
Teradyne	3.8	.0	3.0	0	.1%	.0%	.4%	.0%
LandCadd	3.5	.0	3.3	0	.1%	.0%	.4%	.0%
American Small Business Comp.	3.5	.0	3.5	0	.1%	.0%	.4%	.0%
Datagraphic	3.4	1.7	1.3	55	.1%	.1%	.2%	.0%
Micrografx	3.3	.0	3.3	0	.1%	.0%	.4%	.0%
rotring euroCAD	3.1	1.7	1.4	74	.1%	.1%	.2%	.0%
Innovative Data Design	3.0	.0	3.0	0	.1%	.0%	.4%	.0%
Mitsui Engineering	3.0	2.8	.0	26	.1%	.2%	.0%	.0%
Swanson Analysis	3.0	.0	3.0	0	.1%	.0%	.3%	.0%
ACTEL	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
Sigma Design	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
Cadtronic	2.8	1.5	1.3	84	.1%	.1%	.1%	.0%
Whessee Computing Systems	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
Bentley	2.8	.0	2.8	0	.1%	.0%	.3%	.0%
Engineering Mechanics	2.6	.9	1.5	223	.1%	.1%	.2%	.1%
Superdraft	2.6	1.2	1.3	147	.1%	.1%	.2%	.0%
ALS Design	2.5	.0	2.5	0	.1%	.0%	.3%	.0%
Visionics	2.4	.0	1.8	45	.1%	.0%	.2%	.0%
PacSoft	2.4	.0	2.4	0	.1%	.0%	.3%	.0%
PAFEC	2.4	.0	2.4	0	.1%	.0%	.3%	.0%
Aries Technology	2.4	.0	2.2	0	.1%	.0%	.3%	.0%
Accel Technologies	2.3	.0	2.1	0	.1%	.0%	.2%	.0%
Kewill Systems	2.3	.7	1.2	23	.1%	.0%	.1%	.0%
Sophia Systems	2.2	.6	1.5	40	.1%	.0%	.2%	.0%
Sharp System Products--NO OEM	2.2	1.2	1.1	28	.1%	.1%	.1%	.0%
Facility Mapping Systems	2.1	.0	1.9	2	.1%	.0%	.2%	.0%

(Continued)



# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Evolution Computing	2.1	.0	2.1	0	.1%	.0%	.2%	.0%
CADworks	2.0	.0	1.7	0	.1%	.0%	.2%	.0%
Accugraph	1.9	.1	1.7	7	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	1.9	.0	1.9	0	.1%	.0%	.2%	.0%
Sycotronic AG	1.8	.0	1.5	4	.1%	.0%	.2%	.0%
CAD-UL	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Elstree Computing	1.6	.7	.9	50	.1%	.0%	.1%	.0%
CIVILSOFT	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Micro Engineering Solutions	1.6	.4	1.0	120	.1%	.0%	.1%	.0%
Academi Systems	1.6	.2	1.3	6	.1%	.0%	.1%	.0%
Hahn & Kolb	1.5	.9	.5	30	.1%	.1%	.1%	.0%
A.I. Systems	1.5	.0	1.5	0	.1%	.0%	.2%	.0%
Schlumberger	1.4	.4	.5	10	.1%	.0%	.1%	.0%
Terr-Mar	1.4	.4	1.0	32	.1%	.0%	.1%	.0%
Land Innovation	1.4	.0	1.4	0	.1%	.0%	.2%	.0%
Comshoppe	1.4	.0	1.4	0	.1%	.0%	.2%	.0%
Aptos	1.4	.0	1.4	0	.1%	.0%	.2%	.0%
Automated Images	1.4	.0	1.2	0	.1%	.0%	.1%	.0%
Geographix	1.4	.0	1.4	0	.0%	.0%	.2%	.0%
Terra Sciences	1.3	.0	1.3	0	.0%	.0%	.2%	.0%
European Silicon Structures	1.3	.1	1.2	4	.0%	.0%	.1%	.0%
Omaton	1.3	.0	1.3	0	.0%	.0%	.1%	.0%
FEA Limited	1.2	.3	.3	25	.0%	.0%	.0%	.0%
Engineering Software	1.2	.1	1.0	34	.0%	.0%	.1%	.0%
Tydac Technologies	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
GRAPHSOFT	1.2	.0	1.2	0	.0%	.0%	.1%	.0%
Zycor	1.2	.0	.8	0	.0%	.0%	.1%	.0%
Genasys II	1.2	.4	.7	6	.0%	.0%	.1%	.0%
Spectrum Software	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
DATAID Technologies	1.1	.0	.2	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	1.1	.4	.7	11	.0%	.0%	.1%	.0%
Microcomputer Graphics	1.1	.0	1.1	0	.0%	.0%	.1%	.0%
The Great Softwestern Co.	1.1	.0	1.1	0	.0%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Mega CADD	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Marcus Computer Systeme	1.0	.5	.3	31	.0%	.0%	.0%	.0%
Aucos elektronische Gerate	1.0	.3	.7	100	.0%	.0%	.1%	.0%
Ikos Systems	1.0	.7	.3	6	.0%	.0%	.0%	.0%
Intrinsic	1.0	.7	.3	10	.0%	.0%	.0%	.0%
Point Control	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
ARKTEC	1.0	.2	.8	22	.0%	.0%	.1%	.0%
Cascade Graphics	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Cadisys	1.0	.0	1.0	0	.0%	.0%	.1%	.0%
Massteck	.9	.0	.9	0	.0%	.0%	.1%	.0%
Phase Three Logic	.9	.0	.9	8	.0%	.0%	.1%	.0%
Vision 3D	.9	.5	.2	6	.0%	.0%	.0%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.8	.0	.8	0	.0%	.0%	.1%	.0%
Number One Systems	.8	.1	.7	20	.0%	.0%	.1%	.0%
Engineering Systems Corp.	.7	.0	.5	0	.0%	.0%	.1%	.0%
Maptek	.7	.0	.7	0	.0%	.0%	.1%	.0%
INS Engineering	.6	.4	.2	51	.0%	.0%	.0%	.0%
Caddlink	.6	.0	.6	0	.0%	.0%	.1%	.0%
Dynaware	.6	.0	.6	0	.0%	.0%	.1%	.0%
Douglas Electronics	.6	.0	.6	0	.0%	.0%	.1%	.0%
IGC Technology	.6	.0	.6	0	.0%	.0%	.1%	.0%
Uniras	.6	.0	.6	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.6	.0	.6	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.6	.0	.6	0	.0%	.0%	.1%	.0%
Pelton Engineering	.6	.0	.6	0	.0%	.0%	.1%	.0%
Vamp	.6	.0	.6	0	.0%	.0%	.1%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.1%	.0%
ACERI SA	.5	.1	.3	3	.0%	.0%	.0%	.0%
Premise	.5	.0	.5	0	.0%	.0%	.1%	.0%
Tanner Research	.5	.0	.5	0	.0%	.0%	.1%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.1%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Imagine That	.5	.0	.5	0	.0%	.0%	.1%	.0%
CAD-Capture	.5	.0	.1	0	.0%	.0%	.0%	.0%
ECOM Associates	.5	.0	.5	45	.0%	.0%	.1%	.0%
Inca	.5	.0	.5	0	.0%	.0%	.1%	.0%
ALDEC	.4	.0	.4	0	.0%	.0%	.1%	.0%
CAD Lab	.4	.0	.4	0	.0%	.0%	.0%	.0%
PLUS Logic	.4	.0	.4	0	.0%	.0%	.1%	.0%
A/E Microsystems	.4	.2	.2	56	.0%	.0%	.0%	.0%
Radian Corporation	.4	.0	.3	0	.0%	.0%	.0%	.0%
Digital	.4	.0	.3	0	.0%	.0%	.0%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.0%	.0%
Norsk Data	.4	.2	.1	7	.0%	.0%	.0%	.0%
Carrier Corporation	.4	.0	.4	0	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.0%	.0%
Ithaca Software	.4	.0	.4	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.3	.0	.3	0	.0%	.0%	.0%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.0%	.0%
Genrad	.3	.1	.2	0	.0%	.0%	.0%	.0%
Bechtel Software	.3	.0	.3	0	.0%	.0%	.0%	.0%
Synthesis	.3	.0	.3	0	.0%	.0%	.0%	.0%
Geomath	.3	.0	.3	0	.0%	.0%	.0%	.0%
Geosoft	.3	.0	.3	0	.0%	.0%	.0%	.0%
Pasco	.3	.1	.1	6	.0%	.0%	.0%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.0%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.0%	.0%
Microtel Pacific Research	.2	.0	.2	0	.0%	.0%	.0%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.0%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	3	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	2	.0%	.0%	.0%	.0%
Instrumatic Espanola	.1	.0	.1	0	.0%	.0%	.0%	.0%
Pacific Numeric	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	420.0	419.5	.0	110,196	15.4%	24.3%	.1%	33.2%
All Companies	2,719.1	1,729.8	858.6	331,679	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	2,029.7	1,383.2	562.2	303,665	74.6%	80.0%	65.5%	91.6%
All Asian-Based Companies	423.7	233.8	159.1	20,504	15.6%	13.5%	18.5%	6.2%
All European-Based Companies	265.7	112.8	137.4	7,510	9.8%	6.5%	16.0%	2.3%
All Hardware Companies	1,420.8	1,360.3	.0	297,524	52.3%	78.6%	.0%	89.7%
All Turnkey & SW Companies	1,298.4	369.5	858.6	34,156	47.7%	21.4%	100.0%	10.3%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 2  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	150.6	150.6	.0	25,088	12.4%	18.7%	.0%	17.0%
Apple Computer	89.5	78.8	.0	17,220	7.4%	9.8%	.0%	11.6%
Autodesk	83.1	.0	83.1	0	6.9%	.0%	24.3%	.0%
IBM	81.4	77.3	.0	18,194	6.7%	9.6%	.0%	12.3%
Hewlett-Packard	73.9	59.1	.0	11,473	6.1%	7.3%	.0%	7.8%
Hitachi	53.1	25.5	22.3	1,103	4.4%	3.2%	6.5%	.7%
NEC	46.5	39.4	3.4	3,670	3.8%	4.9%	1.0%	2.5%
Hakuto	40.9	19.6	19.2	1,184	3.4%	2.4%	5.6%	.8%
CADAM	31.6	7.9	21.9	3,472	2.6%	1.0%	6.4%	2.3%
Mutoh Industries--NO OEM	27.3	15.5	10.5	990	2.3%	1.9%	3.1%	.7%
Investronica SA	27.0	21.6	2.7	1,080	2.2%	2.7%	.8%	.7%
Fujitsu	24.3	14.0	8.9	1,269	2.0%	1.7%	2.6%	.9%
Toshiba--NO OEM	18.0	9.0	7.2	1,282	1.5%	1.1%	2.1%	.9%
Vero International Software	15.2	.0	15.2	0	1.3%	.0%	4.4%	.0%
CADKEY	15.1	.9	14.2	145	1.2%	.1%	4.1%	.1%
Wiechers Datentechnik	14.6	11.7	2.9	414	1.2%	1.5%	.9%	.3%
Design Automation	10.2	.0	8.8	0	.8%	.0%	2.6%	.0%
Datagraph	10.0	8.0	2.0	50	.8%	1.0%	.6%	.0%
Computervision	9.0	2.0	5.8	111	.7%	.2%	1.7%	.1%
Caditron	7.7	3.8	3.1	120	.6%	.5%	.9%	.1%
Andor	7.7	2.2	5.2	74	.6%	.3%	1.5%	.0%
Dell Computer	7.6	7.6	.0	1,907	.6%	.9%	.0%	1.3%
Intergraph	7.4	.0	7.0	0	.6%	.0%	2.0%	.0%
Ziegler	7.3	.0	7.3	0	.6%	.0%	2.1%	.0%
Research Machines	6.7	6.7	.0	1,056	.6%	.8%	.0%	.7%
Kloekner-Moeller	6.7	4.0	2.3	72	.6%	.5%	.7%	.0%
DAT Standard Information syste	6.4	.0	6.1	0	.5%	.0%	1.8%	.0%
CNC Software	6.0	.0	6.0	0	.5%	.0%	1.8%	.0%
Cimatron	4.8	2.2	2.1	141	.4%	.3%	.6%	.1%
Engineering Computer Services	4.7	1.5	1.7	112	.4%	.2%	.5%	.1%
Everex Systems	4.3	4.3	.0	1,385	.4%	.5%	.0%	.9%
Mitsubishi Electric	4.2	2.8	1.5	372	.3%	.3%	.4%	.3%
Moda CAD	4.2	1.0	2.9	35	.3%	.1%	.9%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Algor Interactive Systems	4.2	.0	3.7	0	.3%	.0%	1.1%	.0%
ADRA Systems	4.1	.0	3.7	0	.3%	.0%	1.1%	.0%
MCS	4.1	.0	3.7	0	.3%	.0%	1.1%	.0%
Pathtrace	4.1	1.1	2.7	58	.3%	.1%	.8%	.0%
Wacom	4.1	1.2	2.5	253	.3%	.1%	.7%	.2%
Westward	3.7	3.7	.0	217	.3%	.5%	.0%	.1%
Micrograph	3.3	1.1	1.8	59	.3%	.1%	.5%	.0%
Intercad	3.1	1.6	.9	151	.3%	.2%	.3%	.1%
Mitsui Engineering	3.0	2.8	.0	26	.2%	.4%	.0%	.0%
Swenson Analysis	3.0	.0	3.0	0	.2%	.0%	.9%	.0%
Whesoe Computing Systems	2.8	.0	2.8	0	.2%	.0%	.8%	.0%
Claris	2.8	.0	2.8	0	.2%	.0%	.8%	.0%
Engineering Mechanics	2.6	.9	1.5	223	.2%	.1%	.4%	.2%
Superdraft	2.6	1.2	1.3	147	.2%	.2%	.4%	.1%
Infinite Graphics	2.6	.0	2.6	0	.2%	.0%	.8%	.0%
Robocom	2.5	.0	2.5	0	.2%	.0%	.7%	.0%
Olivetti	2.5	2.2	.0	429	.2%	.3%	.0%	.3%
Serbi	2.5	.0	2.5	0	.2%	.0%	.7%	.0%
PAFEC	2.4	.0	2.4	0	.2%	.0%	.7%	.0%
Aries Technology	2.4	.0	2.2	0	.2%	.0%	.6%	.0%
Sharp System Products--NO OEM	2.2	1.2	1.1	28	.2%	.1%	.3%	.0%
rotring euroCAD	2.1	1.2	.9	51	.2%	.1%	.3%	.0%
American Small Business Comp.	2.1	.0	2.1	0	.2%	.0%	.6%	.0%
Micro Engineering Solutions	1.6	.4	1.0	120	.1%	.1%	.3%	.1%
Hahn & Kolb	1.5	.9	.5	30	.1%	.1%	.1%	.0%
Micrografx	1.4	.0	1.4	0	.1%	.0%	.4%	.0%
Foresight Resources	1.4	.0	1.3	0	.1%	.0%	.4%	.0%
Schlumberger	1.4	.4	.5	10	.1%	.0%	.1%	.0%
Aura CAD/CAM Systems	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
ISICAD	1.2	.0	1.2	0	.1%	.0%	.4%	.0%
Evolution Computing	1.2	.0	1.2	0	.1%	.0%	.4%	.0%
FEA Limited	1.2	.3	.3	25	.1%	.0%	.1%	.0%
A.I. Systems	1.2	.0	1.2	0	.1%	.0%	.3%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Kewill Systems	1.2	.4	.6	11	.1%	.0%	.2%	.0%
Marcus Computer Systeme	1.0	.5	.3	31	.1%	.1%	.1%	.0%
Point Control	1.0	.0	1.0	0	.1%	.0%	.3%	.0%
DATAID Technologies	.9	.0	.2	0	.1%	.0%	.1%	.0%
Vision 3D	.9	.5	.2	6	.1%	.1%	.1%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.1%	.0%	.2%	.0%
MacNeal-Schwendler	.8	.0	.8	0	.1%	.0%	.2%	.0%
Microcomputer Graphics	.7	.0	.7	0	.1%	.0%	.2%	.0%
Innovative Data Design	.6	.0	.6	0	.1%	.0%	.2%	.0%
Machinery Sales	.6	.0	.6	0	.0%	.0%	.2%	.0%
GRAPHSOFT	.5	.0	.5	0	.0%	.0%	.1%	.0%
Premise	.5	.0	.5	0	.0%	.0%	.1%	.0%
Engineering Software	.5	.0	.4	12	.0%	.0%	.1%	.0%
CAD Lab	.4	.0	.4	0	.0%	.0%	.1%	.0%
Cadtronic	.4	.2	.2	13	.0%	.0%	.1%	.0%
Cascade Graphics	.4	.0	.4	0	.0%	.0%	.1%	.0%
Norsk Data	.4	.2	.1	7	.0%	.0%	.0%	.0%
Ithaca Software	.4	.0	.4	0	.0%	.0%	.1%	.0%
Ashlar	.3	.0	.3	0	.0%	.0%	.1%	.0%
Bentley	.3	.0	.3	0	.0%	.0%	.1%	.0%
Pelton Engineering	.3	.0	.3	0	.0%	.0%	.1%	.0%
Uniras	.3	.0	.3	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Synthesis	.3	.0	.3	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	.3	.0	.2	0	.0%	.0%	.1%	.0%
Mega CADD	.2	.0	.2	0	.0%	.0%	.1%	.0%
Caddlink	.2	.0	.2	0	.0%	.0%	.1%	.0%
Carrier Corporation	.2	.0	.2	0	.0%	.0%	.0%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.0%	.0%
CAD-Capture	.2	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.1	.0	.1	0	.0%	.0%	.0%	.0%
A/E Microsystems	.1	.1	.0	12	.0%	.0%	.0%	.0%
Comshoppe	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IGC Technology	.1	.0	.1	0	.0%	.0%	.0%	.0%
Imagine That	.1	.0	.1	0	.0%	.0%	.0%	.0%
Number One Systems	.0	.0	.0	1	.0%	.0%	.0%	.0%
Other Companies	205.9	205.9	.0	54,007	16.9%	25.6%	.3%	36.5%
All Companies	1,209.4	804.8	342.3	147,944	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	816.1	596.1	183.8	133,356	67.5%	74.1%	53.7%	90.1%
All Asian-Based Companies	241.4	133.0	90.5	10,249	20.0%	16.5%	26.4%	6.9%
All European-Based Companies	151.9	75.7	68.1	4,339	12.6%	9.4%	19.9%	2.9%
All Hardware Companies	612.2	582.6	.0	129,215	50.6%	72.4%	.0%	87.3%
All Turnkey & SW Companies	597.2	222.2	342.3	18,729	49.4%	27.6%	100.0%	12.7%

Source: Dataquest  
January 1991



# Market Share

TABLE NUMBER: 3  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
Autodesk	98.3	.0	98.3	0	13.8%	.0%	44.3%	.0%
Compaq	93.0	93.0	.0	15,487	13.1%	20.3%	.0%	16.2%
Apple Computer	87.4	76.9	.0	16,800	12.3%	16.8%	.0%	17.6%
IBM	45.9	43.6	.0	10,263	6.5%	9.5%	.0%	10.8%
NEC	43.8	37.0	3.2	3,452	6.2%	8.1%	1.5%	3.6%
Fujitsu	20.4	7.5	11.9	817	2.9%	1.6%	5.3%	.9%
Hewlett-Packard	17.9	14.3	.0	2,776	2.5%	3.1%	.0%	2.9%
ISICAD	10.4	.0	10.4	0	1.5%	.0%	4.7%	.0%
CPU	7.6	.0	7.3	364	1.1%	.0%	3.3%	.4%
Intergraph	7.5	.0	7.0	0	1.1%	.0%	3.2%	.0%
Dell Computer	7.4	7.4	.0	1,860	1.0%	1.6%	.0%	2.0%
Hitachi	7.1	3.4	3.0	147	1.0%	.7%	1.3%	.2%
BATISOFT	7.1	1.1	3.5	230	1.0%	.2%	1.6%	.2%
Mutoh Industries--NO OEM	6.7	3.8	2.6	243	.9%	.8%	1.2%	.3%
Everex Systems	6.4	6.4	.0	2,050	.9%	1.4%	.0%	2.1%
CADAM	6.3	1.6	4.4	694	.9%	.3%	2.0%	.7%
CAP Electronic Sweet's	5.9	.0	4.8	0	.8%	.0%	2.1%	.0%
Technovision	4.7	.0	4.7	0	.7%	.0%	2.1%	.0%
D.C.A. Software, Inc.	4.4	.0	4.4	0	.6%	.0%	2.0%	.0%
Research Machines	3.8	3.8	.0	594	.5%	.8%	.0%	.6%
International Software Systems	3.8	.0	3.8	0	.5%	.0%	1.7%	.0%
Caditron	3.6	1.8	1.4	56	.5%	.4%	.6%	.1%
Datagraphic	3.4	1.7	1.3	55	.5%	.4%	.6%	.1%
Infinite Graphics	2.9	.0	2.9	0	.4%	.0%	1.3%	.0%
Sigma Design	2.8	.0	2.8	0	.4%	.0%	1.2%	.0%
Andor	2.6	.5	2.0	19	.4%	.1%	.9%	.0%
Robocom	2.5	.0	2.5	0	.3%	.0%	1.1%	.0%
Toshiba--NO OEM	2.4	1.2	1.0	172	.3%	.3%	.4%	.2%
Ziegler	2.4	.0	2.4	0	.3%	.0%	1.1%	.0%
Innovative Data Design	2.2	.0	2.2	0	.3%	.0%	1.0%	.0%
CADWorks	2.0	.0	1.7	0	.3%	.0%	.8%	.0%
Claris	1.9	.0	1.9	0	.3%	.0%	.9%	.0%
Micrografx	1.9	.0	1.9	0	.3%	.0%	.9%	.0%

(Continued)

# Market Share

TABLE NUMBER: 3  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Computervision	1.9	.1	1.7	5	.3%	.0%	.8%	.0%
Moda CAD	1.8	.5	1.3	15	.3%	.1%	.6%	.0%
Bentley	1.8	.0	1.8	0	.2%	.0%	.8%	.0%
Accugraph	1.7	.1	1.5	6	.2%	.0%	.7%	.0%
Elstree Computing	1.6	.7	.9	50	.2%	.2%	.4%	.1%
CIVILSOFT	1.6	.0	1.6	0	.2%	.0%	.7%	.0%
Foresight Resources	1.5	.0	1.4	0	.2%	.0%	.6%	.0%
Olivetti	1.5	1.3	.0	254	.2%	.3%	.0%	.3%
Serbi	1.4	.0	1.4	0	.2%	.0%	.6%	.0%
Land Innovation	1.4	.0	1.4	0	.2%	.0%	.6%	.0%
Mitsubishi Electric	1.4	.9	.5	119	.2%	.2%	.2%	.1%
Ground Modelling Systems	1.3	.9	.6	8	.2%	.2%	.3%	.0%
Comshoppe	1.3	.0	1.3	0	.2%	.0%	.6%	.0%
Micrograph	1.2	.4	.7	18	.2%	.1%	.3%	.0%
Kewill Systems	1.2	.4	.6	11	.2%	.1%	.3%	.0%
ARKTEC	1.0	.2	.8	22	.1%	.0%	.4%	.0%
Cadtronic	1.0	.5	.4	29	.1%	.1%	.2%	.0%
American Small Business Comp.	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
Mega CADD	.8	.0	.8	0	.1%	.0%	.4%	.0%
Evolution Computing	.8	.0	.8	0	.1%	.0%	.4%	.0%
Engineering Software	.8	.0	.7	22	.1%	.0%	.3%	.0%
GRAPHSOFT	.7	.0	.7	0	.1%	.0%	.3%	.0%
INS Engineering	.6	.4	.2	51	.1%	.1%	.1%	.1%
Dynaware	.6	.0	.6	0	.1%	.0%	.3%	.0%
Sycotronic AG	.6	.0	.5	1	.1%	.0%	.2%	.0%
Aura CAD/CAM Systems	.6	.0	.6	0	.1%	.0%	.3%	.0%
Westward	.6	.6	.0	37	.1%	.1%	.0%	.0%
CADKEY	.6	.0	.6	0	.1%	.0%	.3%	.0%
ACERI SA	.5	.1	.3	3	.1%	.0%	.1%	.0%
IGC Technology	.5	.0	.5	0	.1%	.0%	.2%	.0%
ECOM Associates	.5	.0	.5	45	.1%	.0%	.2%	.0%
Cascade Graphics	.4	.0	.4	0	.1%	.0%	.2%	.0%
DAT Standard Information syste	.4	.0	.4	0	.1%	.0%	.2%	.0%

(Continued)

## Market Share

TABLE NUMBER: 3  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.1%	.0%
Bechtel Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Microcomputer Graphics	.3	.0	.3	0	.0%	.0%	.1%	.0%
Pelton Engineering	.3	.0	.3	0	.0%	.0%	.1%	.0%
Caddlink	.2	.0	.2	0	.0%	.0%	.1%	.0%
A.I. Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
A/E Microsystems	.2	.1	.1	27	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.2	.0	.2	0	.0%	.0%	.1%	.0%
Carrier Corporation	.2	.0	.2	0	.0%	.0%	.1%	.0%
Ashlar	.2	.0	.2	0	.0%	.0%	.1%	.0%
CAD-Capture	.2	.0	.0	0	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	2	.0%	.0%	.0%	.0%
Uniras	.1	.0	.1	0	.0%	.0%	.1%	.0%
Imagine That	.0	.0	.0	0	.0%	.0%	.0%	.0%
Schlumberger	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	146.3	146.3	.1	38,535	20.6%	31.9%	.0%	40.4%
All Companies	710.0	458.3	222.0	95,340	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	577.4	390.2	167.7	88,586	81.3%	85.1%	75.6%	92.9%
All Asian-Based Companies	97.2	54.7	36.2	5,383	13.7%	11.9%	16.3%	5.6%
All European-Based Companies	35.4	13.4	18.1	1,371	5.0%	2.9%	8.1%	1.4%
All Hardware Companies	404.3	387.9	.0	87,771	56.9%	84.6%	.0%	92.1%
All Turnkey & SW Companies	305.7	70.5	222.0	7,569	43.1%	15.4%	100.0%	7.9%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 4  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: GIS/Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	60.8	60.8	.0	10,126	21.2%	33.8%	.0%	28.4%
IBM	34.9	33.1	.0	7,795	12.2%	18.4%	.0%	21.8%
Apple Computer	24.0	21.1	.0	4,620	8.4%	11.8%	.0%	12.9%
Autodesk	22.3	.0	22.3	0	7.8%	.0%	22.8%	.0%
Intergraph	12.1	.0	11.3	0	4.2%	.0%	11.6%	.0%
ETAK	7.6	.4	7.2	19	2.6%	.2%	7.4%	.1%
Hitachi	7.1	3.4	3.0	147	2.5%	1.9%	3.0%	.4%
Geobased Systems	6.9	1.4	5.1	149	2.4%	.8%	5.2%	.4%
Fujitsu	6.7	3.6	2.7	340	2.3%	2.0%	2.7%	1.0%
Mapinfo	5.6	.0	4.5	0	2.0%	.0%	4.6%	.0%
Ground Modelling Systems	5.2	3.5	2.6	32	1.8%	2.0%	2.7%	.1%
ESRI	4.8	.0	4.8	0	1.7%	.0%	4.9%	.0%
Strategic Mapping, Inc.	4.3	.0	4.3	0	1.5%	.0%	4.4%	.0%
ERDAS	3.9	.5	3.3	26	1.4%	.3%	3.3%	.1%
Mitsubishi Electric	3.8	2.6	1.4	338	1.3%	1.4%	1.4%	.9%
LandCadd	3.5	.0	3.3	0	1.2%	.0%	3.4%	.0%
PacSoft	2.4	.0	2.4	0	.8%	.0%	2.5%	.0%
Mutoh Industries--NO OEM	2.4	1.4	.9	87	.8%	.8%	.9%	.2%
Facility Mapping Systems	2.1	.0	1.9	2	.7%	.0%	1.9%	.0%
Ziegler	2.0	.0	2.0	0	.7%	.0%	2.0%	.0%
D.C.A. Software, Inc.	1.7	.0	1.7	0	.6%	.0%	1.7%	.0%
Cadtronic	1.4	.8	.6	42	.5%	.4%	.6%	.1%
Terr-Mar	1.4	.4	1.0	32	.5%	.2%	1.1%	.1%
Geographix	1.4	.0	1.4	0	.5%	.0%	1.4%	.0%
Terra Sciences	1.3	.0	1.3	0	.5%	.0%	1.4%	.0%
Dell Computer	1.3	1.3	.0	326	.5%	.7%	.0%	.9%
Tydac Technologies	1.2	.0	1.2	0	.4%	.0%	1.2%	.0%
Zycor	1.2	.0	.8	0	.4%	.0%	.8%	.0%
Genasys II	1.2	.4	.7	6	.4%	.2%	.7%	.0%
Research Machines	1.0	1.0	.0	154	.3%	.5%	.0%	.4%
Everex Systems	.9	.9	.0	277	.3%	.5%	.0%	.8%
Bentley	.7	.0	.7	0	.2%	.0%	.7%	.0%
Maptek	.7	.0	.7	0	.2%	.0%	.7%	.0%

(Continued)

# Market Share

TABLE NUMBER: 4  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: GIS/Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company =====	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
NEC	.6	.5	.1	51	.2%	.3%	.1%	.1%
GEOVISION Inc.	.6	.0	.6	0	.2%	.0%	.6%	.0%
Olivetti	.6	.5	.0	93	.2%	.3%	.0%	.3%
Micrograph	.6	.1	.4	6	.2%	.1%	.4%	.0%
Foresight Resources	.5	.0	.5	0	.2%	.0%	.5%	.0%
Andor	.5	.1	.4	6	.2%	.1%	.4%	.0%
Robocom	.4	.0	.4	0	.2%	.0%	.4%	.0%
Radian Corporation	.4	.0	.3	0	.1%	.0%	.3%	.0%
Daniel Geophysical	.3	.0	.3	0	.1%	.0%	.3%	.0%
Geomath	.3	.0	.3	0	.1%	.0%	.3%	.0%
Geosoft	.3	.0	.3	0	.1%	.0%	.3%	.0%
Pasco	.3	.1	.1	6	.1%	.1%	.1%	.0%
Caditron	.3	.1	.1	4	.1%	.1%	.1%	.0%
Caddlink	.2	.0	.2	0	.1%	.0%	.2%	.0%
DATAID Technologies	.2	.0	.0	0	.1%	.0%	.0%	.0%
Engineering Systems Corp.	.2	.0	.2	0	.1%	.0%	.2%	.0%
CAD-Capture	.2	.0	.0	0	.1%	.0%	.0%	.0%
Computervision	.2	.0	.1	1	.1%	.0%	.1%	.0%
Kork Systems	.1	.0	.1	3	.0%	.0%	.1%	.0%
Uniras	.1	.0	.1	0	.0%	.0%	.1%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.1%	.0%
A/E Microsystems	.1	.0	.1	13	.0%	.0%	.1%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.1%	.0%
Accugraph	.1	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	41.8	41.8	.0	11,010	14.6%	23.3%	.0%	30.8%
All Companies	286.8	179.7	98.1	35,711	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	253.6	162.0	83.4	34,406	88.4%	90.2%	85.1%	96.3%
All Asian-Based Companies	21.4	11.7	8.4	975	7.5%	6.5%	8.6%	2.7%
All European-Based Companies	11.8	5.9	6.2	331	4.1%	3.3%	6.4%	.9%
All Hardware Companies	163.6	159.0	.0	34,155	57.0%	88.5%	.0%	95.6%
All Turnkey & SW Companies	123.2	20.7	98.1	1,556	43.0%	11.5%	100.0%	4.4%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 5

TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total Hardware		Software		Wkstns Shipped	Total Hardware		Software		Wkstns Shipped
	Revenue	Revenue	Revenue	Revenue		Revenue	Revenue	Revenue	Revenue	
Compaq	116.3	116.3	.0	.0	19,377	22.7%	40.5%	.0%	.0%	36.8%
IBM	46.5	44.2	.0	.0	10,399	9.1%	15.4%	.0%	.0%	19.7%
Hewlett-Packard	27.4	21.9	.0	.0	4,256	5.3%	7.6%	.0%	.0%	8.1%
NEC	24.3	20.5	1.8	1.8	1,913	4.7%	7.2%	.9%	.9%	3.6%
Wacom	23.0	6.6	14.1	14.1	1,431	4.5%	2.3%	7.2%	7.2%	2.7%
Autodesk	17.5	.0	17.5	.0	0	3.4%	.0%	8.9%	8.9%	.0%
Apple Computer	17.5	15.4	.0	.0	3,360	3.4%	5.4%	.0%	.0%	6.4%
Viewlogic Systems	16.3	.0	13.7	.0	0	3.2%	.0%	7.0%	7.0%	.0%
Xilinx	15.2	.0	13.7	.0	0	3.0%	.0%	7.0%	7.0%	.0%
Racal-Redac	14.8	.0	14.1	.0	0	2.9%	.0%	7.2%	7.2%	.0%
EEsof	13.0	.1	11.6	.0	9	2.5%	.0%	5.9%	5.9%	.0%
LPKF	12.2	7.9	3.1	3.1	500	2.4%	2.8%	1.6%	1.6%	.9%
Fujitsu	10.4	5.0	4.9	4.9	438	2.0%	1.7%	2.5%	2.5%	.8%
Altera	10.0	.0	8.5	.0	0	1.9%	.0%	4.3%	4.3%	.0%
Orcad	9.2	.0	9.2	.0	0	1.8%	.0%	4.7%	4.7%	.0%
Data I/O	8.7	.0	8.7	.0	0	1.7%	.0%	4.4%	4.4%	.0%
CADAM	7.6	1.9	5.2	5.2	833	1.5%	.7%	2.7%	2.7%	1.6%
Aucotec	7.3	2.9	3.6	3.6	224	1.4%	1.0%	1.8%	1.8%	.4%
Ziegler	6.5	.0	6.5	.0	0	1.3%	.0%	3.3%	3.3%	.0%
Everex Systems	5.7	5.7	.0	.0	1,828	1.1%	2.0%	.0%	.0%	3.5%
CAD Software	5.4	.0	4.6	.0	0	1.1%	.0%	2.4%	2.4%	.0%
Microsim	4.7	.0	4.4	.0	0	.9%	.0%	2.2%	2.2%	.0%
BETRONEX	4.1	.0	4.1	.0	0	.8%	.0%	2.1%	2.1%	.0%
Teradyne	3.8	.0	3.0	.0	0	.7%	.0%	1.5%	1.5%	.0%
Hitachi	3.5	1.7	1.5	1.5	74	.7%	.6%	.8%	.8%	.1%
ACTEL	2.8	.0	2.8	.0	0	.5%	.0%	1.4%	1.4%	.0%
ALS Design	2.5	.0	2.5	.0	0	.5%	.0%	1.3%	1.3%	.0%
Research Machines	2.5	2.5	.0	.0	396	.5%	.9%	.0%	.0%	.8%
Visionics	2.4	.0	1.8	.0	45	.5%	.0%	.9%	.9%	.1%
Accel Technologies	2.3	.0	2.1	.0	0	.4%	.0%	1.1%	1.1%	.0%
Micrograph	2.3	1.2	.9	.9	51	.4%	.4%	.4%	.4%	.1%
Dell Computer	2.2	2.2	.0	.0	558	.4%	.8%	.0%	.0%	1.1%
Sophia Systems	2.2	.6	1.5	1.5	40	.4%	.2%	.7%	.7%	.1%

(Continued)

# Market Share

TABLE NUMBER: 5  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
Infinite Graphics	2.0	.0	2.0	0	.4%	.0%	1.0%	.0%
Computervision	1.8	.1	1.5	9	.3%	.0%	.8%	.0%
CAD-UL	1.7	.0	1.7	0	.3%	.0%	.9%	.0%
Academi Systems	1.6	.2	1.3	6	.3%	.1%	.6%	.0%
Aptos	1.4	.0	1.4	0	.3%	.0%	.7%	.0%
Automated Images	1.4	.0	1.2	0	.3%	.0%	.6%	.0%
Caditron	1.3	.6	.5	20	.2%	.2%	.3%	.0%
European Silicon Structures	1.3	.1	1.2	4	.2%	.0%	.6%	.0%
Omatron	1.3	.0	1.3	0	.2%	.0%	.6%	.0%
Sycotronic AG	1.2	.0	1.0	3	.2%	.0%	.5%	.0%
Spectrum Software	1.1	.0	1.1	0	.2%	.0%	.6%	.0%
Integrated Silicon Systems	1.1	.4	.7	11	.2%	.1%	.4%	.0%
The Great Softwestern Co.	1.1	.0	1.1	0	.2%	.0%	.5%	.0%
Aucos elektronische Gerate	1.0	.3	.7	100	.2%	.1%	.4%	.2%
Ikos Systems	1.0	.7	.3	6	.2%	.2%	.1%	.0%
Intrinsic	1.0	.7	.3	10	.2%	.2%	.2%	.0%
Serbi	1.0	.0	1.0	0	.2%	.0%	.5%	.0%
rottring euroCAD	1.0	.5	.4	23	.2%	.2%	.2%	.0%
Cadisys	1.0	.0	1.0	0	.2%	.0%	.5%	.0%
Massteck	.9	.0	.9	0	.2%	.0%	.5%	.0%
Phase Three Logic	.9	.0	.9	8	.2%	.0%	.4%	.0%
InterCAD	.8	.4	.2	38	.2%	.1%	.1%	.1%
DAT Standard Information syste	.8	.0	.7	0	.1%	.0%	.4%	.0%
Number One Systems	.8	.1	.7	19	.1%	.0%	.4%	.0%
Douglas Electronics	.6	.0	.6	0	.1%	.0%	.3%	.0%
Vamp	.6	.0	.6	0	.1%	.0%	.3%	.0%
Tanner Research	.5	.0	.5	0	.1%	.0%	.2%	.0%
Capilano Computing	.5	.0	.5	0	.1%	.0%	.3%	.0%
Inca	.5	.0	.5	0	.1%	.0%	.2%	.0%
ALDEC	.4	.0	.4	0	.1%	.0%	.2%	.0%
PLUS Logic	.4	.0	.4	0	.1%	.0%	.2%	.0%
Westward	.4	.4	.0	26	.1%	.1%	.0%	.0%
Digital	.4	.0	.3	0	.1%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 5  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
The CAD Group	.4	.0	.4	0	.1%	.0%	.2%	.0%
Imagine That	.4	.0	.4	0	.1%	.0%	.2%	.0%
American Small Business Comp.	.4	.0	.4	0	.1%	.0%	.2%	.0%
Andor	.4	.0	.3	2	.1%	.0%	.2%	.0%
BV Engineering	.4	.0	.4	0	.1%	.0%	.2%	.0%
Foresight Resources	.3	.0	.3	0	.1%	.0%	.1%	.0%
Genrad	.3	.1	.2	0	.1%	.0%	.1%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.1%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Microtel Pacific Research	.2	.0	.2	0	.0%	.0%	.1%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.1%	.0%
Cascade Graphics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Microcomputer Graphics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.1%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.1%	.0%
Instrumatic Espanola	.1	.0	.1	0	.0%	.0%	.1%	.0%
Olivetti	.1	.1	.0	17	.0%	.0%	.0%	.0%
Pacific Numeric	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Robocom	.0	.0	.0	0	.0%	.0%	.0%	.0%
Schlumberger	.0	.0	.0	0	.0%	.0%	.0%	.0%
A/E Microsystems	.0	.0	.0	4	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	25.9	25.5	.2	6,644	5.0%	8.9%	.1%	12.6%
All Companies	513.0	287.0	196.3	52,684	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	382.6	234.8	127.2	47,318	74.6%	81.8%	64.8%	89.8%
All Asian-Based Companies	63.8	34.4	24.0	3,898	12.4%	12.0%	12.2%	7.4%
All European-Based Companies	66.6	17.7	45.0	1,469	13.0%	6.2%	22.9%	2.8%
All Hardware Companies	240.7	230.8	.0	46,383	46.9%	80.4%	.0%	88.0%
All Turnkey & SW Companies	272.3	56.1	196.3	6,301	53.1%	19.6%	100.0%	12.0%

Source: Dataquest  
January 1991



# Market Share

TABLE NUMBER: 6  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	82.0	82.0	.0	13,665	22.3%	39.8%	.0%	34.7%
IBM	39.7	37.7	.0	8,864	10.8%	18.3%	.0%	22.5%
Hewlett-Packard	25.0	20.0	.0	3,886	6.8%	9.7%	.0%	9.9%
Wacom	20.8	6.0	12.7	1,297	5.6%	2.9%	9.1%	3.3%
Viewlogic Systems	16.3	.0	13.7	0	4.4%	.0%	9.8%	.0%
Autodesk	15.3	.0	15.3	0	4.2%	.0%	10.9%	.0%
Xilinx	15.2	.0	13.7	0	4.1%	.0%	9.7%	.0%
NEC	14.2	12.1	1.1	1,124	3.9%	5.8%	.7%	2.9%
EEsof	13.0	.1	11.6	9	3.5%	.1%	8.3%	.0%
Altera	10.0	.0	8.5	0	2.7%	.0%	6.1%	.0%
Apple Computer	8.7	7.7	.0	1,680	2.4%	3.7%	.0%	4.3%
Data I/O	8.7	.0	8.7	0	2.4%	.0%	6.2%	.0%
Racal-Redac	7.7	.0	7.3	0	2.1%	.0%	5.2%	.0%
Aucotec	7.3	2.9	3.6	224	2.0%	1.4%	2.6%	.6%
Orcad	6.5	.0	6.5	0	1.8%	.0%	4.7%	.0%
Microsim	4.7	.0	4.4	0	1.3%	.0%	3.1%	.0%
Teradyne	3.8	.0	3.0	0	1.0%	.0%	2.2%	.0%
Ziegler	3.6	.0	3.6	0	1.0%	.0%	2.6%	.0%
Everex Systems	3.3	3.3	.0	1,053	.9%	1.6%	.0%	2.7%
Fujitsu	3.3	1.8	1.2	161	.9%	.9%	.9%	.4%
ACTEL	2.8	.0	2.8	0	.8%	.0%	2.0%	.0%
Sophia Systems	2.1	.5	1.4	38	.6%	.3%	1.0%	.1%
Infinite Graphics	2.0	.0	2.0	0	.5%	.0%	1.4%	.0%
ALS Design	1.9	.0	1.9	0	.5%	.0%	1.4%	.0%
Micrograph	1.4	.6	.7	26	.4%	.3%	.5%	.1%
Automated Images	1.4	.0	1.2	0	.4%	.0%	.8%	.0%
CAD Software	1.4	.0	1.2	0	.4%	.0%	.8%	.0%
Caditron	1.3	.6	.5	20	.3%	.3%	.4%	.1%
Dell Computer	1.1	1.1	.0	279	.3%	.5%	.0%	.7%
Spectrum Software	1.1	.0	1.1	0	.3%	.0%	.8%	.0%
Aucos elektronische Gerate	1.0	.3	.7	100	.3%	.1%	.5%	.3%
Ikos Systems	1.0	.7	.3	6	.3%	.3%	.2%	.0%
Intrinsix	1.0	.7	.3	10	.3%	.3%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 6  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total Revenue			Units Shipped	Market Share		
	Revenue	Hardware Revenue	Software Revenue		Revenue	Hardware Revenue	Software Revenue
Research Machines	1.0	1.0	.0	154	.3%	.5%	.0%
Serbi	1.0	.0	1.0	0	.3%	.0%	.7%
rotting euroCAD	1.0	.5	.4	23	.3%	.3%	.3%
Omaton	.9	.0	.9	0	.2%	.0%	.6%
Phase Three Logic	.9	.0	.9	8	.2%	.0%	.6%
Intercad	.8	.4	.2	38	.2%	.2%	.2%
DAI Standard Information syste	.8	.0	.7	0	.2%	.0%	.5%
Computervision	.8	.0	.7	3	.2%	.0%	.5%
Visionics	.7	.0	.5	12	.2%	.0%	.3%
Douglas Electronics	.6	.0	.6	0	.2%	.0%	.4%
Caplano Computing	.5	.0	.5	0	.1%	.0%	.4%
ALDEC	.4	.0	.4	0	.1%	.0%	.3%
PLUS Logic	.4	.0	.4	0	.1%	.0%	.3%
Accel Technologies	.4	.0	.4	0	.1%	.0%	.3%
Westward	.4	.4	.0	26	.1%	.2%	.0%
The CAD Group	.4	.0	.4	0	.1%	.0%	.3%
Imagine That	.4	.0	.4	0	.1%	.0%	.3%
BV Engineering	.4	.0	.4	0	.1%	.0%	.2%
Genrad	.3	.1	.2	0	.1%	.0%	.1%
Bobcat Systems	.2	.0	.2	0	.1%	.0%	.2%
Forestight Resources	.2	.0	.2	0	.1%	.0%	.1%
Digital	.2	.0	.2	0	.1%	.0%	.1%
Simutest	.2	.0	.2	0	.1%	.0%	.1%
Cascade Graphics	.2	.0	.2	0	.1%	.0%	.1%
American Small Business Comp.	.2	.0	.2	0	.0%	.0%	.1%
Microcomputer Graphics	.2	.0	.2	0	.0%	.0%	.1%
Vamp	.1	.0	.1	0	.0%	.0%	.1%
Tanner Research	.1	.0	.1	0	.0%	.0%	.1%
Number One Systems	.1	.0	.1	3	.0%	.0%	.1%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 6  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
A/E Microsystems	.0	.0	.0	4	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Sycotronic AG	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	25.9	25.5	.2	6,644	7.0%	12.4%	.2%	16.9%
All Companies	368.4	206.0	140.2	39,354	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	298.0	178.5	102.7	36,083	80.9%	86.7%	73.3%	91.7%
All Asian-Based Companies	40.4	20.4	16.4	2,619	11.0%	9.9%	11.7%	6.7%
All European-Based Companies	30.0	7.1	21.1	651	8.1%	3.5%	15.0%	1.7%
All Hardware Companies	184.9	176.9	.0	36,032	50.2%	85.9%	.0%	91.6%
All Turnkey & SW Companies	183.5	29.1	140.2	3,322	49.8%	14.1%	100.0%	8.4%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 7  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: IC Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Fujitsu	2.4	2.2	.0	155	33.5%	54.4%	.0%	28.9%
European Silicon Structures	1.3	.1	1.2	4	17.7%	1.7%	41.3%	.8%
Integrated Silicon Systems	1.1	.4	.7	11	15.0%	8.6%	25.5%	2.0%
Everex Systems	.9	.9	.0	277	12.1%	21.3%	.0%	51.8%
Research Machines	.6	.6	.0	88	7.9%	14.0%	.0%	16.5%
Inca	.5	.0	.5	0	6.5%	.0%	16.4%	.0%
Tanner Research	.4	.0	.4	0	5.4%	.0%	12.2%	.0%
National Semiconductor	.1	.0	.1	0	1.0%	.0%	2.4%	.0%
American Small Business Comp.	.1	.0	.1	0	.8%	.0%	2.1%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Companies	7.2	4.1	2.9	534	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	2.5	1.2	1.2	288	34.4%	29.9%	42.3%	53.8%
All Asian-Based Companies	2.4	2.2	.0	155	33.5%	54.4%	.0%	28.9%
All European-Based Companies	2.3	.6	1.7	92	32.1%	15.7%	57.7%	17.2%
All Hardware Companies	.9	.9	.0	277	12.1%	21.3%	.0%	51.8%
All Turnkey & SW Companies	6.3	3.2	2.9	257	87.9%	78.7%	100.0%	48.2%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 8  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	34.3	34.3	.0	5,711	24.9%	44.6%	.0%	44.6%
LPKF	12.2	7.9	3.1	500	8.9%	10.3%	5.7%	3.9%
NEC	10.0	8.5	.7	790	7.3%	11.0%	1.4%	6.2%
Apple Computer	8.7	7.7	.0	1,680	6.4%	10.0%	.0%	13.1%
CADAM	7.6	1.9	5.2	833	5.5%	2.5%	9.8%	6.5%
Racal-Redac	7.1	.0	6.7	0	5.2%	.0%	12.6%	.0%
IBM	6.9	6.5	.0	1,535	5.0%	8.5%	.0%	12.0%
Fujitsu	4.8	1.0	3.7	122	3.5%	1.3%	6.9%	1.0%
CAD Software	4.1	.0	3.5	0	3.0%	.0%	6.5%	.0%
BETRONEX	4.1	.0	4.1	0	2.9%	.0%	7.6%	.0%
Hitachi	3.5	1.7	1.5	74	2.6%	2.2%	2.8%	.6%
Ziegler	2.9	.0	2.9	0	2.1%	.0%	5.5%	.0%
Orcad	2.7	.0	2.7	0	1.9%	.0%	5.0%	.0%
Hewlett-Packard	2.4	1.9	.0	370	1.7%	2.5%	.0%	2.9%
Autodesk	2.2	.0	2.2	0	1.6%	.0%	4.2%	.0%
Wacom	2.2	.6	1.3	135	1.6%	.8%	2.5%	1.1%
Accel Technologies	1.9	.0	1.7	0	1.4%	.0%	3.2%	.0%
Visionics	1.8	.0	1.3	33	1.3%	.0%	2.5%	.3%
CAD-UL	1.7	.0	1.7	0	1.3%	.0%	3.2%	.0%
Academi Systems	1.6	.2	1.3	6	1.1%	.2%	2.3%	.1%
Everex Systems	1.6	1.6	.0	499	1.1%	2.0%	.0%	3.9%
Aptos	1.4	.0	1.4	0	1.0%	.0%	2.6%	.0%
Sycotronic AG	1.2	.0	1.0	3	.9%	.0%	1.8%	.0%
Dell Computer	1.1	1.1	.0	279	.8%	1.5%	.0%	2.2%
The Great Softwestern Co.	1.1	.0	1.1	0	.8%	.0%	2.0%	.0%
Computervision	1.0	.1	.8	6	.7%	.1%	1.5%	.0%
Research Machines	1.0	1.0	.0	154	.7%	1.3%	.0%	1.2%
Cadisys	1.0	.0	1.0	0	.7%	.0%	1.8%	.0%
Massteck	.9	.0	.9	0	.7%	.0%	1.8%	.0%
Micrograph	.9	.6	.2	25	.6%	.8%	.4%	.2%
Number One Systems	.6	.0	.6	16	.5%	.1%	1.1%	.1%
ALS Design	.6	.0	.6	0	.5%	.0%	1.2%	.0%
Vamp	.4	.0	.4	0	.3%	.0%	.8%	.0%

(Continued)

# Market Share

TABLE NUMBER: 8  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Omaton	.4	.0	.4	0	.3%	.0%	.7%	.0%
Andor	.4	.0	.3	2	.3%	.0%	.6%	.0%
Kontron Instruments	.2	.1	.1	4	.2%	.2%	.2%	.0%
Digital	.2	.0	.2	0	.1%	.0%	.3%	.0%
Microtel Pacific Research	.2	.0	.2	0	.1%	.0%	.4%	.0%
American Small Business Comp.	.1	.0	.1	0	.1%	.0%	.3%	.0%
Sophia Systems	.1	.0	.1	3	.1%	.1%	.2%	.0%
Foresight Resources	.1	.0	.1	0	.1%	.0%	.2%	.0%
Instrumatic Espanola	.1	.0	.1	0	.1%	.0%	.2%	.0%
Olivetti	.1	.1	.0	17	.1%	.1%	.0%	.1%
Pacific Numeric	.1	.0	.1	0	.1%	.0%	.2%	.0%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.1%	.0%
Robocom	.0	.0	.0	0	.0%	.0%	.1%	.0%
Schlumberger	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
<b>All Companies</b>	<b>137.4</b>	<b>76.9</b>	<b>53.2</b>	<b>12,796</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>All U.S.-Based Companies</b>	<b>82.1</b>	<b>55.1</b>	<b>23.3</b>	<b>10,947</b>	<b>59.8%</b>	<b>71.7%</b>	<b>43.7%</b>	<b>85.5%</b>
<b>All Asian-Based Companies</b>	<b>21.0</b>	<b>11.8</b>	<b>7.6</b>	<b>1,124</b>	<b>15.3%</b>	<b>15.4%</b>	<b>14.3%</b>	<b>8.8%</b>
<b>All European-Based Companies</b>	<b>34.3</b>	<b>9.9</b>	<b>22.3</b>	<b>725</b>	<b>25.0%</b>	<b>12.9%</b>	<b>41.9%</b>	<b>5.7%</b>
<b>All Hardware Companies</b>	<b>54.9</b>	<b>53.1</b>	<b>.0</b>	<b>10,074</b>	<b>40.0%</b>	<b>69.1%</b>	<b>.0%</b>	<b>78.7%</b>
<b>All Turnkey &amp; SW Companies</b>	<b>82.5</b>	<b>23.8</b>	<b>53.2</b>	<b>2,722</b>	<b>60.0%</b>	<b>30.9%</b>	<b>100.0%</b>	<b>21.3%</b>

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 9  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	197.6	197.6	.0	32,937	18.4%	30.0%	.0%	22.9%
Apple Computer	155.1	136.5	.0	29,820	14.5%	20.7%	.0%	20.7%
Autodesk	121.7	.0	121.7	0	11.3%	.0%	33.1%	.0%
IBM	62.6	59.5	.0	13,995	5.8%	9.0%	.0%	9.7%
Hewlett-Packard	41.7	33.4	.0	6,477	3.9%	5.1%	.0%	4.5%
Dell Computer	15.8	15.8	.0	3,952	1.5%	2.4%	.0%	2.7%
Everex Systems	15.6	15.6	.0	4,986	1.5%	2.4%	.0%	3.5%
Intergraph	14.3	.0	13.5	0	1.3%	.0%	3.7%	.0%
CADAM	13.6	3.4	9.4	1,500	1.3%	.5%	2.6%	1.0%
CADKEY	13.5	.0	13.5	0	1.3%	.0%	3.7%	.0%
Viewlogic Systems	11.6	.0	9.7	0	1.1%	.0%	2.6%	.0%
Xilinx	9.9	.0	8.9	0	.9%	.0%	2.4%	.0%
Computervision	7.7	.0	7.7	0	.7%	.0%	2.1%	.0%
EEsof	7.5	.1	6.7	5	.7%	.0%	1.8%	.0%
Infinite Graphics	7.5	.0	7.5	0	.7%	.0%	2.0%	.0%
Geobased Systems	6.2	1.2	4.6	134	.6%	.2%	1.3%	.1%
Altera	5.8	.0	4.9	0	.5%	.0%	1.3%	.0%
ETAK	5.7	.3	5.4	14	.5%	.0%	1.5%	.0%
D.C.A. Software, Inc.	5.2	.0	5.2	0	.5%	.0%	1.4%	.0%
CAP Electronic Sweet's	5.1	.0	4.0	0	.5%	.0%	1.1%	.0%
Racal-Redac	4.8	.0	4.6	0	.4%	.0%	1.2%	.0%
Mapinfo	4.7	.0	3.7	0	.4%	.0%	1.0%	.0%
Microsim	4.7	.0	4.4	0	.4%	.0%	1.2%	.0%
Orcad	4.6	.0	4.6	0	.4%	.0%	1.3%	.0%
CNC Software	4.2	.0	4.2	0	.4%	.0%	1.1%	.0%
ISICAD	4.2	.0	4.2	0	.4%	.0%	1.1%	.0%
Mode CAD	3.8	1.0	2.7	32	.4%	.1%	.7%	.0%
Strategic Mapping, Inc.	3.7	.0	3.7	0	.3%	.0%	1.0%	.0%
LandCadd	3.5	.0	3.3	0	.3%	.0%	.9%	.0%
Data I/O	3.5	.0	3.5	0	.3%	.0%	.9%	.0%
Algor Interactive Systems	3.4	.0	3.0	0	.3%	.0%	.8%	.0%
ESRI	3.3	.0	3.3	0	.3%	.0%	.9%	.0%
Foresight Resources	3.2	.0	2.9	0	.3%	.0%	.8%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
MCS	3.2	.0	2.8	0	.3%	.0%	.8%	.0%
American Small Business Comp.	3.2	.0	3.2	0	.3%	.0%	.9%	.0%
Claris	3.0	.0	3.0	0	.3%	.0%	.8%	.0%
ERDAS	3.0	.4	2.5	20	.3%	.1%	.7%	.0%
Innovative Data Design	2.9	.0	2.9	0	.3%	.0%	.8%	.0%
International Software Systems	2.8	.0	2.8	0	.3%	.0%	.8%	.0%
Bentley	2.8	.0	2.8	0	.3%	.0%	.8%	.0%
ACTEL	2.8	.0	2.8	0	.3%	.0%	.8%	.0%
CAD Software	2.7	.0	2.3	0	.3%	.0%	.6%	.0%
ADRA Systems	2.7	.0	2.4	0	.3%	.0%	.7%	.0%
Visionics	2.4	.0	1.8	45	.2%	.0%	.5%	.0%
PacSoft	2.4	.0	2.4	0	.2%	.0%	.7%	.0%
Micrografx	2.2	.0	2.2	0	.2%	.0%	.6%	.0%
Sigma Design	2.1	.0	2.1	0	.2%	.0%	.6%	.0%
Teradyne	2.1	.0	1.7	0	.2%	.0%	.5%	.0%
Swanson Analysis	2.0	.0	2.0	0	.2%	.0%	.5%	.0%
Aries Technology	1.9	.0	1.7	0	.2%	.0%	.5%	.0%
Accel Technologies	1.8	.0	1.7	0	.2%	.0%	.4%	.0%
LPKF	1.8	1.2	.5	75	.2%	.2%	.1%	.1%
Facility Mapping Systems	1.8	.0	1.6	2	.2%	.0%	.4%	.0%
Evolution Computing	1.8	.0	1.8	0	.2%	.0%	.5%	.0%
Accugraph	1.7	.1	1.5	6	.2%	.0%	.4%	.0%
CIVILSOFT	1.6	.0	1.6	0	.2%	.0%	.4%	.0%
Micro Engineering Solutions	1.6	.4	1.0	120	.1%	.1%	.3%	.1%
Aura CAD/CAM Systems	1.6	.0	1.6	0	.1%	.0%	.4%	.0%
A.I. Systems	1.5	.0	1.5	0	.1%	.0%	.4%	.0%
Terr-Mar	1.4	.4	1.0	32	.1%	.1%	.3%	.0%
Land Innovation	1.4	.0	1.4	0	.1%	.0%	.4%	.0%
Comshoppe	1.4	.0	1.4	0	.1%	.0%	.4%	.0%
Aptos	1.4	.0	1.4	0	.1%	.0%	.4%	.0%
Automated Images	1.4	.0	1.2	0	.1%	.0%	.3%	.0%
Geographix	1.4	.0	1.4	0	.1%	.0%	.4%	.0%
Terra Sciences	1.3	.0	1.3	0	.1%	.0%	.4%	.0%

(Continued)



# Market Share

TABLE NUMBER: 9  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
Engineering Mechanics	1.3	.5	.8	111	.1%	.1%	.2%	.1%
Engineering Software	1.2	.1	1.0	34	.1%	.0%	.3%	.0%
Tydac Technologies	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
GRAPHISOFT	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
BETRONEX	1.1	.0	1.1	0	.1%	.0%	.3%	.0%
Investronica SA	1.1	.9	.1	43	.1%	.1%	.0%	.0%
Microcomputer Graphics	1.1	.0	1.1	0	.1%	.0%	.3%	.0%
The Great Softwestern Co.	1.1	.0	1.1	0	.1%	.0%	.3%	.0%
Mega CADD	1.0	.0	1.0	0	.1%	.0%	.3%	.0%
Intrinsic	1.0	.7	.3	10	.1%	.1%	.1%	.0%
Spectrum Software	1.0	.0	1.0	0	.1%	.0%	.3%	.0%
Cadisys	1.0	.0	1.0	0	.1%	.0%	.3%	.0%
Massteck	.9	.0	.9	0	.1%	.0%	.2%	.0%
Phase Three Logic	.9	.0	.9	8	.1%	.0%	.2%	.0%
Zycor	.8	.0	.6	0	.1%	.0%	.2%	.0%
CADWorks	.8	.0	.7	0	.1%	.0%	.2%	.0%
Omaton	.8	.0	.8	0	.1%	.0%	.2%	.0%
Cascade Graphics	.8	.0	.8	0	.1%	.0%	.2%	.0%
Pathtrace	.8	.2	.5	10	.1%	.0%	.1%	.0%
Cimatron	.7	.3	.3	21	.1%	.0%	.1%	.0%
Maptek	.7	.0	.7	0	.1%	.0%	.2%	.0%
Ground Modelling Systems	.7	.4	.3	4	.1%	.1%	.1%	.0%
Caddlink	.6	.0	.6	0	.1%	.0%	.2%	.0%
Dynaware	.6	.0	.6	0	.1%	.0%	.2%	.0%
Integrated Silicon Systems	.6	.2	.4	6	.1%	.0%	.1%	.0%
Douglas Electronics	.6	.0	.6	0	.1%	.0%	.2%	.0%
IGC Technology	.6	.0	.6	0	.1%	.0%	.2%	.0%
Point Control	.6	.0	.6	0	.1%	.0%	.2%	.0%
Uniras	.6	.0	.6	0	.1%	.0%	.2%	.0%
GEOVISION Inc.	.6	.0	.6	0	.1%	.0%	.1%	.0%
MacNeal-Schwendler	.6	.0	.6	0	.1%	.0%	.2%	.0%
Pelton Engineering	.6	.0	.6	0	.1%	.0%	.2%	.0%
Engineering Systems Corp.	.6	.0	.4	0	.1%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Ikos Systems	.6	.4	.2	3	.1%	.1%	.0%	.0%
Schlumberger	.6	.2	.2	4	.1%	.0%	.1%	.0%
Vamp	.6	.0	.6	0	.1%	.0%	.2%	.0%
Machinery Sales	.6	.0	.6	0	.1%	.0%	.1%	.0%
Tanner Research	.5	.0	.5	0	.0%	.0%	.1%	.0%
Ashlar	.5	.0	.5	0	.0%	.0%	.1%	.0%
ECOM Associates	.5	.0	.5	45	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Capilano Computing	.5	.0	.5	0	.0%	.0%	.1%	.0%
ALDEC	.4	.0	.4	0	.0%	.0%	.1%	.0%
PLUS Logic	.4	.0	.4	0	.0%	.0%	.1%	.0%
A/E Microsystems	.4	.2	.2	56	.0%	.0%	.1%	.0%
Digital	.4	.0	.3	0	.0%	.0%	.1%	.0%
Imagine That	.4	.0	.4	0	.0%	.0%	.1%	.0%
Premise	.4	.0	.4	0	.0%	.0%	.1%	.0%
Carrier Corporation	.4	.0	.4	0	.0%	.0%	.1%	.0%
The CAD Group	.4	.0	.4	0	.0%	.0%	.1%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Radian Corporation	.4	.0	.3	0	.0%	.0%	.1%	.0%
Bechtel Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.1%	.0%
Geomath	.3	.0	.3	0	.0%	.0%	.1%	.0%
Geosoft	.3	.0	.3	0	.0%	.0%	.1%	.0%
Daniel Geophysical	.3	.0	.3	0	.0%	.0%	.1%	.0%
Academí Systems	.2	.0	.2	1	.0%	.0%	.1%	.0%
Bobcat Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Microtel Pacific Research	.2	.0	.2	0	.0%	.0%	.1%	.0%
Simutest	.2	.0	.2	0	.0%	.0%	.1%	.0%
Genasys II	.2	.1	.1	1	.0%	.0%	.0%	.0%
Ithaca Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
Genrad	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	3	.0%	.0%	.0%	.0%
Serbi	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
Synthesis	.1	.0	.1	0	.0%	.0%	.0%	.0%
Vision 3D	.1	.0	.0	0	.0%	.0%	.0%	.0%
Pacific Numeric	.1	.0	.1	0	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
DATAID Technologies	.1	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.1	.0	.1	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
MCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Aucotec	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	188.1	188.1	.0	49,545	17.5%	28.5%	.0%	34.4%
All Companies	1,072.1	659.0	367.8	144,059	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,060.5	656.0	360.0	143,904	98.9%	99.5%	97.9%	99.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	11.5	3.1	7.8	155	1.1%	.5%	2.1%	.1%
All Hardware Companies	676.6	646.5	.0	141,712	63.1%	98.1%	.0%	98.4%
All Turnkey & SW Companies	395.5	12.5	367.8	2,348	36.9%	1.9%	100.0%	1.6%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 10  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	197.7	197.7	.0	32,937	22.0%	32.7%	.0%	29.8%
IBM	83.5	79.3	.0	18,660	9.3%	13.1%	.0%	16.9%
Autodesk	70.8	.0	70.8	0	7.9%	.0%	28.6%	.0%
Hewlett-Packard	65.6	52.4	.0	10,178	7.3%	8.7%	.0%	9.2%
Apple Computer	52.4	46.2	.0	10,080	5.8%	7.6%	.0%	9.1%
Investronica SA	25.5	20.4	2.6	1,018	2.8%	3.4%	1.0%	.9%
Ziegler	18.2	.0	18.2	0	2.0%	.0%	7.3%	.0%
Wiechers Datentechnik	14.6	11.7	2.9	414	1.6%	1.9%	1.2%	.4%
Vero International Software	14.6	.0	14.6	0	1.6%	.0%	5.9%	.0%
Research Machines	14.0	14.0	.0	2,200	1.6%	2.3%	.0%	2.0%
Caditron	12.8	6.4	5.1	200	1.4%	1.1%	2.1%	.2%
Datagraph	10.0	8.0	2.0	50	1.1%	1.3%	.8%	.0%
Racal-Redac	10.0	.0	9.5	0	1.1%	.0%	3.8%	.0%
Intergraph	9.8	.0	9.2	0	1.1%	.0%	3.7%	.0%
LPKF	9.8	6.4	2.4	400	1.1%	1.1%	1.0%	.4%
CADAM	9.1	2.3	6.3	1,000	1.0%	.4%	2.5%	.9%
DAT Standard Information syste	7.6	.0	7.2	0	.8%	.0%	2.9%	.0%
Micrograph	7.3	2.7	3.7	135	.8%	.4%	1.5%	.1%
Aucotec	7.3	2.9	3.6	224	.8%	.5%	1.5%	.2%
ISICAD	7.0	.0	7.0	0	.8%	.0%	2.8%	.0%
BATISOFT	6.9	1.0	3.5	225	.8%	.2%	1.4%	.2%
Kloekner-Moeller	6.7	4.0	2.3	72	.7%	.7%	.9%	.1%
Ground Modelling Systems	5.9	3.9	2.9	36	.7%	.7%	1.2%	.0%
Robocom	5.5	.0	5.5	0	.6%	.0%	2.2%	.0%
Computervision	4.8	2.2	1.1	126	.5%	.4%	.4%	.1%
Serbi	4.7	.0	4.7	0	.5%	.0%	1.9%	.0%
Olivetti	4.7	4.0	.0	793	.5%	.7%	.0%	.7%
Westward	4.7	4.7	.0	279	.5%	.8%	.0%	.3%
Engineering Computer Services	4.7	1.5	1.7	112	.5%	.3%	.7%	.1%
EEsof	3.9	.0	3.5	3	.4%	.0%	1.4%	.0%
Intercad	3.9	2.0	1.1	189	.4%	.3%	.4%	.2%
Cimatron	3.5	1.6	1.6	103	.4%	.3%	.6%	.1%
Datagraphic	3.4	1.7	1.3	55	.4%	.3%	.5%	.0%

(Continued)

# Market Share

TABLE NUMBER: 10

TITLE: 1990 Preliminary Market Share Estimates

APPLICATION: All Applications

PLATFORM: Personal Computer

REGION: Europe

UNITS: Millions of Dollars/Actual Units

Company	Total		Hardware		Software		Wkstns		Market Share	
	Revenue	Wkstns	Revenue	Wkstns	Revenue	Wkstns	Revenue	Wkstns	Revenue	Wkstns
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
Pathtrace	3.3	.9	2.2	46	.4%	.1%	.9%	.0%		
rotring euroCAD	3.1	1.7	1.4	74	.3%	.3%	.5%	.1%		
Cadtronic	2.8	1.5	1.3	84	.3%	.3%	.5%	.1%		
Dell Computer	2.8	2.8	.0	698	.3%	.5%	.0%	.6%		
Xilinx	2.7	.0	2.5	0	.3%	.0%	1.0%	.0%		
Altera	2.6	.0	2.2	0	.3%	.0%	.9%	.0%		
ALS Design	2.5	.0	2.5	0	.3%	.0%	1.0%	.0%		
PAFEC	2.4	.0	2.4	0	.3%	.0%	1.0%	.0%		
Kewill Systems	2.3	.7	1.2	23	.3%	.1%	.5%	.0%		
Superdraft	2.2	1.0	1.1	123	.2%	.2%	.4%	.1%		
BETRONEX	2.2	.0	2.2	0	.2%	.0%	.9%	.0%		
Whesoe Computing Systems	2.2	.0	2.2	0	.2%	.0%	.9%	.0%		
Sycotronic AG	1.8	.0	1.5	4	.2%	.0%	.6%	.0%		
Viewlogic Systems	1.7	.0	1.5	0	.2%	.0%	.6%	.0%		
CAD-UL	1.7	.0	1.7	0	.2%	.0%	.7%	.0%		
Elstree Computing	1.6	.7	.9	50	.2%	.1%	.4%	.0%		
Hahn & Kolb	1.5	.9	.5	30	.2%	.2%	.2%	.0%		
Moda CAD	1.5	.4	1.0	13	.2%	.1%	.4%	.0%		
Teradyne	1.5	.0	1.2	0	.2%	.0%	.5%	.0%		
Everex Systems	1.4	1.4	.0	443	.2%	.2%	.0%	.4%		
CADKEY	1.4	.9	.4	145	.2%	.1%	.2%	.1%		
Acedemi Systems	1.3	.1	1.1	5	.1%	.0%	.4%	.0%		
Data I/O	1.3	.0	1.3	0	.1%	.0%	.5%	.0%		
European Silicon Structures	1.3	.1	1.2	4	.1%	.0%	.5%	.0%		
CAD Software	1.3	.0	1.1	0	.1%	.0%	.6%	.0%		
FEA Limited	1.2	.3	.3	24	.1%	.0%	.1%	.0%		
Micrografx	1.2	.0	1.2	0	.1%	.0%	.5%	.0%		
ETAK	1.1	.1	1.1	3	.1%	.0%	.4%	.0%		
ESRI	1.0	.0	1.0	0	.1%	.0%	.4%	.0%		
DATAID Technologies	1.0	.0	.2	0	.1%	.0%	.1%	.0%		
Marcus Computer Systems	1.0	.5	.3	31	.1%	.1%	.1%	.0%		
Aucos elektronische Gerate	1.0	.3	.7	100	.1%	.0%	.3%	.1%		
ARKTEC	1.0	.2	.8	22	.1%	.0%	.3%	.0%		

(Continued)

# Market Share

TABLE NUMBER: 10  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CNC Software	.9	.0	.9	0	.1%	.0%	.4%	.0%
CAP Electronic Sweet's	.9	.0	.7	0	.1%	.0%	.3%	.0%
S.T.L.D. s.r.l.	.8	.0	.8	0	.1%	.0%	.3%	.0%
CADWorks	.8	.0	.7	0	.1%	.0%	.3%	.0%
Number One Systems	.8	.1	.7	20	.1%	.0%	.3%	.0%
Schlumberger	.8	.2	.3	6	.1%	.0%	.1%	.0%
Vision 3D	.7	.0	.2	6	.1%	.1%	.1%	.0%
ERDAS	.7	.1	.6	5	.1%	.0%	.2%	.0%
MCS	.7	.0	.6	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	.6	.0	.6	0	.1%	.0%	.2%	.0%
ADRA Systems	.6	.0	.5	0	.1%	.0%	.2%	.0%
Swanson Analysis	.6	.0	.6	0	.1%	.0%	.2%	.0%
ACERI SA	.5	.1	.3	3	.1%	.0%	.1%	.0%
CAD-Capture	.5	.0	.1	0	.1%	.0%	.0%	.0%
Inca	.5	.0	.5	0	.1%	.0%	.2%	.0%
Foresight Resources	.5	.0	.4	0	.1%	.0%	.2%	.0%
CAD Lab	.4	.0	.4	0	.0%	.0%	.2%	.0%
Accel Technologies	.4	.0	.4	0	.0%	.0%	.1%	.0%
Norsk Data	.4	.2	.1	7	.0%	.0%	.0%	.0%
Omaton	.4	.0	.4	0	.0%	.0%	.1%	.0%
Evolution Computing	.3	.0	.3	0	.0%	.0%	.1%	.0%
Sigma Design	.3	.0	.3	0	.0%	.0%	.1%	.0%
D.C.A. Software, Inc.	.3	.0	.3	0	.0%	.0%	.1%	.0%
Kontron Instruments	.2	.1	.1	4	.0%	.0%	.0%	.0%
Facility Mapping Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Cascade Graphics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Point Control	.2	.0	.2	0	.0%	.0%	.1%	.0%
Aries Technology	.2	.0	.2	0	.0%	.0%	.1%	.0%
Ikos Systems	.2	.1	.1	1	.0%	.0%	.0%	.0%
American Small Business Comp.	.2	.0	.2	0	.0%	.0%	.1%	.0%
Mutoh Industries--NO OEM	.2	.1	.1	0	.0%	.0%	.0%	.0%
ESDU International	.2	.0	.2	0	.0%	.0%	.1%	.0%
Genasys II	.2	.1	.1	1	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 10  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Synthesis	.2	.0	.2	0	.0%	.0%	.1%	.0%
Genrad	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	2	.0%	.0%	.0%	.0%
Instrumatic Espanola	.1	.0	.1	0	.0%	.0%	.0%	.0%
Accugraph	.1	.0	.1	0	.0%	.0%	.0%	.0%
Imagine That	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
National Semiconductor	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.1	.0	.1	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.1	.0	.0	1	.0%	.0%	.0%	.0%
Other Companies	111.1	111.9	1.2	29,162	12.4%	18.5%	.5%	26.4%
All Companies	896.6	604.9	247.9	110,628	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	646.8	496.4	121.3	103,364	72.1%	82.1%	48.9%	93.4%
All Asian-Based Companies	.2	.1	.1	0	.0%	.0%	.0%	.0%
All European-Based Companies	249.6	108.4	126.6	7,264	27.8%	17.9%	51.1%	6.6%
All Hardware Companies	513.6	490.1	.0	102,062	57.3%	81.0%	.0%	92.3%
All Turnkey & SW Companies	383.0	114.9	247.9	8,566	42.7%	19.0%	100.0%	7.7%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 11  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
NEC	115.2	97.5	8.5	9,086	16.7%	22.7%	3.8%	13.1%
Hitachi	70.8	34.0	29.7	1,470	10.2%	7.9%	13.4%	2.1%
Fujitsu	61.0	29.6	28.0	2,826	8.8%	6.9%	12.6%	4.1%
IBM	52.2	49.6	.0	11,663	7.5%	11.5%	.0%	16.8%
Nakuto	40.9	19.6	19.2	1,184	5.9%	4.6%	8.7%	1.7%
Mutoh Industries--NO OEM	36.2	20.5	13.9	1,320	5.2%	4.8%	6.3%	1.9%
Wacom	27.0	7.8	16.6	1,684	3.9%	1.8%	7.5%	2.4%
Autodesk	26.6	.0	26.6	0	3.8%	.0%	12.0%	.0%
CADAM	22.7	5.7	15.7	2,500	3.3%	1.3%	7.1%	3.6%
Toshiba--NO OEM	20.4	10.2	8.1	1,453	2.9%	2.4%	3.7%	2.1%
Compaq	12.6	12.6	.0	2,102	1.8%	2.9%	.0%	3.0%
Andor	11.1	2.8	7.9	100	1.6%	.6%	3.5%	.1%
Hewlett-Packard	10.7	8.6	.0	1,665	1.6%	2.0%	.0%	2.4%
Design Automation	10.2	.0	8.8	0	1.5%	.0%	4.0%	.0%
Mitsubishi Electric	9.4	6.3	3.3	829	1.4%	1.5%	1.5%	1.2%
Apple Computer	8.7	7.7	.0	1,680	1.3%	1.8%	.0%	2.4%
CPU	7.6	.0	7.3	364	1.1%	.0%	3.3%	.5%
Technovision	4.7	.0	4.7	0	.7%	.0%	2.1%	.0%
Data I/O	3.5	.0	3.5	0	.5%	.0%	1.6%	.0%
Mitsui Engineering	3.0	2.8	.0	26	.4%	.7%	.0%	.0%
Viewlogic Systems	2.5	.0	2.1	0	.4%	.0%	1.0%	.0%
Xilinx	2.3	.0	2.1	0	.3%	.0%	.9%	.0%
Sophia Systems	2.2	.6	1.5	40	.3%	.1%	.7%	.1%
Sharp System Products--NO OEM	2.2	1.2	1.1	28	.3%	.3%	.5%	.0%
EEsof	1.4	.0	1.3	1	.2%	.0%	.6%	.0%
CAD Software	1.4	.0	1.2	0	.2%	.0%	.5%	.0%
Intergraph	1.1	.0	1.1	0	.2%	.0%	.5%	.0%
Altera	1.1	.0	.9	0	.2%	.0%	.4%	.0%
ADRA Systems	.9	.0	.8	0	.1%	.0%	.4%	.0%
CADKEY	.8	.0	.8	0	.1%	.0%	.4%	.0%
BETRONEX	.7	.0	.7	0	.1%	.0%	.3%	.0%
INS Engineering	.6	.4	.2	51	.1%	.1%	.1%	.1%
Noda CAD	.6	.2	.4	5	.1%	.0%	.2%	.0%

(Continued)



# Market Share

TABLE NUMBER: 11  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
===== Cimatron	.6	.3	.3	17	.1%	.1%	.1%	.0%
LPKF	.5	.3	.1	20	.1%	.1%	.1%	.0%
Whessoe Computing Systems	.4	.0	.4	0	.1%	.0%	.2%	.0%
Swanson Analysis	.4	.0	.4	0	.1%	.0%	.2%	.0%
ISICAD	.4	.0	.4	0	.1%	.0%	.2%	.0%
ETAK	.4	.0	.4	1	.1%	.0%	.2%	.0%
D.C.A. Software, Inc.	.4	.0	.4	0	.1%	.0%	.2%	.0%
Integrated Silicon Systems	.4	.1	.3	4	.1%	.0%	.1%	.0%
Everex Systems	.4	.4	.0	111	.1%	.1%	.0%	.2%
CADWorks	.3	.0	.3	0	.0%	.0%	.1%	.0%
CNC Software	.3	.0	.3	0	.0%	.0%	.1%	.0%
Aries Technology	.3	.0	.3	0	.0%	.0%	.1%	.0%
ESRI	.3	.0	.3	0	.0%	.0%	.1%	.0%
MCS	.3	.0	.3	0	.0%	.0%	.1%	.0%
Sigma Design	.3	.0	.3	0	.0%	.0%	.1%	.0%
Investronica SA	.3	.2	.0	11	.0%	.0%	.0%	.0%
Pasco	.3	.1	.1	6	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.2	.0	.2	0	.0%	.0%	.1%	.0%
Superdraft	.2	.1	.1	12	.0%	.0%	.0%	.0%
Point Control	.2	.0	.2	0	.0%	.0%	.1%	.0%
Ikos Systems	.2	.1	.1	1	.0%	.0%	.0%	.0%
Teradyne	.2	.0	.1	0	.0%	.0%	.1%	.0%
ERDAS	.1	.0	.1	1	.0%	.0%	.0%	.0%
Omaton	.1	.0	.1	0	.0%	.0%	.0%	.0%
Algor Interactive Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Accel Technologies	.1	.0	.1	0	.0%	.0%	.0%	.0%
Foresight Resources	.1	.0	.1	0	.0%	.0%	.0%	.0%
Schlumberger	.1	.0	.0	1	.0%	.0%	.0%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Premise	.1	.0	.1	0	.0%	.0%	.0%	.0%
Genasys II	.1	.0	.0	0	.0%	.0%	.0%	.0%
PAFEC	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 11  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
Facility Mapping Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pathtrace	.0	.0	.0	1	.0%	.0%	.0%	.0%
The CAD Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.0%	.0%
Daniel Geophysical	.0	.0	.0	0	.0%	.0%	.0%	.0%
Imagine That	.0	.0	.0	0	.0%	.0%	.0%	.0%
Meta-Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
SIMUCAD	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	111.2	111.2	.0	29,287	16.1%	25.8%	.0%	42.1%
All Companies	691.3	430.2	221.5	69,548	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	265.9	196.1	61.1	49,021	38.5%	45.6%	27.6%	70.5%
All Asian-Based Companies	422.7	233.2	158.7	20,466	61.1%	54.2%	71.7%	29.4%
All European-Based Companies	2.7	.9	1.7	60	.4%	.2%	.7%	.1%
All Hardware Companies	195.8	190.0	.0	46,508	28.3%	44.2%	.0%	66.9%
All Turnkey & SW Companies	495.6	240.3	221.5	23,040	71.7%	55.8%	100.0%	33.1%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 12  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	12.6	12.6	.0	2,102	21.3%	35.4%	.0%	28.2%
IBM	10.4	9.9	.0	2,333	17.6%	27.8%	.0%	31.3%
Orcad	4.6	.0	4.6	0	7.8%	.0%	21.5%	.0%
Autodesk	2.2	.0	2.2	0	3.7%	.0%	10.3%	.0%
Apple Computer	2.2	1.9	.0	420	3.7%	5.4%	.0%	5.6%
Intergraph	1.7	.0	1.6	0	2.9%	.0%	7.4%	.0%
Claris	1.6	.0	1.6	0	2.8%	.0%	7.7%	.0%
Engineering Mechanics	1.3	.5	.8	111	2.2%	1.3%	3.5%	1.5%
Hewlett-Packard	1.2	1.0	.0	185	2.0%	2.7%	.0%	2.5%
Mapinfo	1.0	.0	.8	0	1.6%	.0%	3.6%	.0%
International Software Systems	.9	.0	.9	0	1.6%	.0%	4.4%	.0%
Fujitsu	.8	.5	.3	38	1.4%	1.4%	1.3%	.5%
Genasys II	.8	.3	.5	4	1.3%	.8%	2.2%	.1%
Geobased Systems	.7	.1	.5	15	1.2%	.4%	2.4%	.2%
Strategic Mapping, Inc.	.7	.0	.7	0	1.1%	.0%	3.0%	.0%
Vero International Software	.6	.0	.6	0	1.0%	.0%	2.9%	.0%
CNC Software	.6	.0	.6	0	1.0%	.0%	2.8%	.0%
Viewlogic Systems	.5	.0	.4	0	.9%	.0%	2.0%	.0%
Altera	.5	.0	.4	0	.8%	.0%	2.0%	.0%
Data I/O	.4	.0	.4	0	.7%	.0%	2.0%	.0%
ETAK	.4	.0	.4	1	.6%	.1%	1.7%	.0%
Aura CAD/CAM Systems	.4	.0	.4	0	.6%	.0%	1.6%	.0%
Zycor	.4	.0	.2	0	.6%	.0%	1.1%	.0%
D.C.A. Software, Inc.	.3	.0	.3	0	.5%	.0%	1.4%	.0%
Xilinx	.3	.0	.3	0	.5%	.0%	1.3%	.0%
Computervision	.3	.0	.3	0	.5%	.0%	1.3%	.0%
Whesoe Computing Systems	.2	.0	.2	0	.4%	.0%	1.0%	.0%
Superdraft	.2	.1	.1	12	.4%	.3%	.5%	.2%
Investronica SA	.2	.2	.0	8	.3%	.4%	.1%	.1%
BATISOFT	.1	.0	.1	5	.2%	.1%	.3%	.1%
ESRI	.1	.0	.1	0	.2%	.0%	.7%	.0%
Sigma Design	.1	.0	.1	0	.2%	.0%	.7%	.0%
Spectrum Software	.1	.0	.1	0	.2%	.0%	.7%	.0%

(Continued)

# Market Share

TABLE NUMBER: 12  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CADAM	.1	.0	.1	0	.2%	.0%	.6%	.0%
EEsof	.1	.0	.1	0	.2%	.0%	.6%	.0%
BETRONEX	.1	.0	.1	0	.2%	.0%	.6%	.0%
Innovative Data Design	.1	.0	.1	0	.2%	.0%	.6%	.0%
LPKF	.1	.1	.0	5	.2%	.2%	.1%	.1%
CAD Software	.1	.0	.1	0	.2%	.0%	.4%	.0%
Engineering Systems Corp.	.1	.0	.1	0	.2%	.0%	.4%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.2%	.0%	.5%	.0%
American Small Business Comp.	.1	.0	.1	0	.2%	.0%	.5%	.0%
CADWorks	.1	.0	.1	0	.2%	.0%	.4%	.0%
ISICAD	.1	.0	.1	0	.2%	.0%	.4%	.0%
ERDAS	.1	.0	.1	1	.1%	.0%	.3%	.0%
Radian Corporation	.1	.0	.1	0	.1%	.0%	.2%	.0%
Facility Mapping Systems	.1	.0	.1	0	.1%	.0%	.3%	.0%
FEA Limited	.1	.0	.0	1	.1%	.0%	.0%	.0%
Ithaca Software	.1	.0	.1	0	.1%	.0%	.3%	.0%
Noda CAD	.1	.0	.0	1	.1%	.0%	.2%	.0%
Accugraph	.1	.0	.0	0	.1%	.0%	.2%	.0%
ACTEL	.1	.0	.1	0	.1%	.0%	.2%	.0%
Ikos Systems	.1	.0	.0	0	.1%	.1%	.1%	.0%
Serbi	.1	.0	.1	0	.1%	.0%	.2%	.0%
Swanson Analysis	.1	.0	.1	0	.1%	.0%	.2%	.0%
Algor Interactive Systems	.0	.0	.0	0	.1%	.0%	.2%	.0%
Capilano Computing	.0	.0	.0	0	.1%	.0%	.2%	.0%
Foresight Resources	.0	.0	.0	0	.1%	.0%	.1%	.0%
Pathtrace	.0	.0	.0	1	.1%	.0%	.1%	.0%
Teradyne	.0	.0	.0	0	.1%	.0%	.1%	.0%
Genrad	.0	.0	.0	0	.1%	.0%	.1%	.0%
Integrated Silicon Systems	.0	.0	.0	0	.1%	.0%	.1%	.0%
Massteck	.0	.0	.0	0	.1%	.0%	.1%	.0%
Sycotronic AG	.0	.0	.0	0	.1%	.0%	.1%	.0%
CAD-UL	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cimatron	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

## Market Share

TABLE NUMBER: 12  
 TITLE: 1990 Preliminary Market Share Estimates  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
=====	=====	=====	=====	=====	=====	=====	=====	=====
Computer-Aided Design Group	.0	.0	.0	0	.0%	.0%	.0%	.0%
ESDU International	.0	.0	.0	0	.0%	.0%	.0%	.0%
Vision 3D	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	8.4	8.4	.0	2,202	14.2%	23.5%	.0%	29.6%
All Companies	59.1	35.6	21.4	7,444	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	56.5	34.7	19.8	7,375	95.5%	97.5%	92.5%	99.1%
All Asian-Based Companies	.8	.5	.3	38	1.4%	1.4%	1.3%	.5%
All European-Based Companies	1.9	.4	1.3	31	3.1%	1.1%	6.2%	.4%
All Hardware Companies	34.8	33.8	.0	7,242	58.8%	94.9%	.0%	97.3%
All Turnkey & SW Companies	24.3	1.8	21.4	202	41.2%	5.1%	100.0%	2.7%

Source: Dataquest  
January 1991

# Market Share

TABLE NUMBER: 1  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	347.5	347.5	.0	57,916	15.3%	23.5%	.0%	20.9%
Apple Computer	208.0	183.0	.0	40,000	9.2%	12.4%	.0%	14.4%
IBM	183.1	173.9	.0	36,931	8.1%	11.8%	.0%	13.3%
Autodesk	170.3	.0	170.3	0	7.5%	.0%	25.2%	.0%
Hewlett-Packard	100.1	82.1	.0	16,650	4.4%	5.6%	.0%	6.0%
NEC	98.6	85.2	5.6	6,544	4.3%	5.8%	.8%	2.4%
Hitachi	61.2	24.8	30.3	3,067	2.7%	1.7%	4.5%	1.1%
Mutoh Industries	52.9	29.0	21.8	1,994	2.3%	2.0%	3.2%	.7%
Fujitsu	46.8	25.8	18.1	2,332	2.1%	1.7%	2.7%	.8%
Hakuto	35.6	19.3	14.3	875	1.6%	1.3%	2.1%	.3%
Wacom	27.8	11.9	13.1	610	1.2%	.8%	1.9%	.2%
Investronica SA	25.0	20.0	2.5	1,000	1.1%	1.4%	.4%	.4%
Intergraph	23.1	.0	21.7	0	1.0%	.0%	3.2%	.0%
ARGO GRAPHICS	21.6	11.8	8.5	600	1.0%	.8%	1.3%	.2%
CADAM	16.0	.0	14.7	0	.7%	.0%	2.2%	.0%
Everex Systems	15.6	15.6	.0	4,755	.7%	1.1%	.0%	1.7%
Dell Computer	15.5	15.5	.0	3,875	.7%	1.0%	.0%	1.4%
Computervision	15.4	2.1	11.9	122	.7%	.1%	1.8%	.0%
Ziegler	15.0	.6	13.7	495	.7%	.0%	2.0%	.2%
CADKEY	14.5	.0	14.5	0	.6%	.0%	2.1%	.0%
Xilinx	14.3	.0	12.8	0	.6%	.0%	1.9%	.0%
Toshiba	14.2	7.1	5.7	1,080	.6%	.5%	.8%	.4%
View Logic	13.8	.0	11.3	0	.6%	.0%	1.7%	.0%
Olivetti	13.6	3.9	5.9	2,351	.6%	.3%	.9%	.8%
Vero International Software	12.8	.0	12.8	0	.6%	.0%	1.9%	.0%
Datagraph	12.2	9.8	2.4	50	.5%	.7%	.4%	.0%
EEsof	12.1	.1	10.9	3	.5%	.0%	1.6%	.0%
Wiechers Datentechnik	11.9	6.0	5.9	280	.5%	.4%	.9%	.1%
Design Automation	10.8	.0	9.7	0	.5%	.0%	1.4%	.0%
Date I/O	9.7	.0	8.2	0	.4%	.0%	1.2%	.0%
Andor	9.3	1.6	7.4	76	.4%	.1%	1.1%	.0%
Altera	9.0	.0	7.9	0	.4%	.0%	1.2%	.0%
Orcad	8.1	.0	7.7	0	.4%	.0%	1.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
DAT Standard Information syste	7.7	.0	7.7	0	.3%	.0%	1.1%	.0%
LPKF	7.5	4.5	2.3	750	.3%	.3%	.3%	.3%
Cadtronic	7.5	5.7	1.0	51	.3%	.4%	.1%	.0%
Micrograph	7.2	3.7	2.8	171	.3%	.3%	.4%	.1%
Mitsubishi Electric	7.2	4.5	2.7	794	.3%	.3%	.4%	.3%
ETAK	7.0	.8	6.0	22	.3%	.1%	.9%	.0%
Infinite Graphics	6.9	.0	6.9	0	.3%	.0%	1.0%	.0%
Kanematsu Computer Systems	6.7	3.5	3.3	156	.3%	.2%	.5%	.1%
ISICAD	6.3	.0	6.3	0	.3%	.0%	.9%	.0%
Engineering Computer Services	6.2	2.5	2.1	169	.3%	.2%	.3%	.1%
Club Informatico SA	5.9	4.4	1.2	130	.3%	.3%	.2%	.0%
CPU	5.9	.0	5.6	309	.3%	.0%	.8%	.1%
BETRONEX	5.8	.0	5.8	0	.3%	.0%	.9%	.0%
Geobased Systems	5.7	1.1	4.0	0	.2%	.1%	.6%	.0%
ERDAS	5.5	2.5	2.5	36	.2%	.2%	.4%	.0%
Computer Aided Planning	5.4	.0	4.3	0	.2%	.0%	.6%	.0%
Westward	5.2	5.2	.0	343	.2%	.4%	.0%	.1%
Sumisho Electronics	5.0	3.1	1.9	555	.2%	.2%	.3%	.2%
Pathtrace	4.7	1.3	3.1	88	.2%	.1%	.5%	.0%
Aucotec	4.7	1.9	2.3	520	.2%	.1%	.3%	.2%
Aries Technology	4.5	.6	3.6	480	.2%	.0%	.5%	.2%
Microsim	4.5	.0	4.1	0	.2%	.0%	.6%	.0%
CAD Software	4.2	.0	3.5	0	.2%	.0%	.5%	.0%
Mapinfo	4.1	.0	4.1	0	.2%	.0%	.6%	.0%
BATISOFT	4.0	.6	3.0	227	.2%	.0%	.4%	.1%
Teradyne	4.0	.0	3.3	0	.2%	.0%	.5%	.0%
Robocom	4.0	.0	4.0	0	.2%	.0%	.6%	.0%
Rotring EURCAD	4.0	2.2	1.7	109	.2%	.2%	.3%	.0%
Superdraft	4.0	.2	3.6	0	.2%	.0%	.5%	.0%
Claris	3.9	.0	3.9	0	.2%	.0%	.6%	.0%
ACTEL	3.8	.0	3.8	0	.2%	.0%	.6%	.0%
Serbi	3.8	.0	3.8	0	.2%	.0%	.6%	.0%
Engineering Mechanics	3.8	1.3	2.1	100	.2%	.1%	.3%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
D.C.A. Engineering	3.8	.0	3.8	0	.2%	.0%	.6%	.0%
Manufacturing Consultants	3.7	.0	3.2	0	.2%	.0%	.5%	.0%
Datagraphic	3.6	1.6	1.3	60	.2%	.1%	.2%	.0%
Technovision	3.6	.0	3.6	0	.2%	.0%	.5%	.0%
InterCAD	3.3	1.6	1.0	168	.1%	.1%	.1%	.1%
ESRI	3.2	.0	3.2	0	.1%	.0%	.5%	.0%
Foresight Resources	3.2	.0	2.9	0	.1%	.0%	.4%	.0%
CADWorks	3.1	.0	2.5	0	.1%	.0%	.4%	.0%
Algor Interactive Systems	3.0	.0	3.0	0	.1%	.0%	.4%	.0%
Endeco Systems	3.0	.0	3.0	0	.1%	.0%	.4%	.0%
Visionics	2.9	.1	2.2	5	.1%	.0%	.3%	.0%
Philips International	2.9	1.0	1.4	10	.1%	.1%	.2%	.0%
ALS Design	2.9	.3	2.3	50	.1%	.0%	.3%	.0%
American Small Business Comp.	2.9	.0	2.9	0	.1%	.0%	.4%	.0%
LandCadd	2.6	.0	2.5	0	.1%	.0%	.4%	.0%
Innovative Data Design	2.5	.0	2.5	0	.1%	.0%	.4%	.0%
Strategic Locations Planning	2.4	.0	2.4	0	.1%	.0%	.4%	.0%
Micrografx	2.2	.0	2.2	0	.1%	.0%	.3%	.0%
Sigma Design	2.2	.0	2.2	0	.1%	.0%	.3%	.0%
Bentley	2.2	.0	2.2	0	.1%	.0%	.3%	.0%
Info. Services Int'l. Dentsu	2.1	.3	1.1	25	.1%	.0%	.2%	.0%
Accel Technologies	2.0	.0	1.8	0	.1%	.0%	.3%	.0%
Omaton	2.0	.0	2.0	0	.1%	.0%	.3%	.0%
Aptos	1.8	.0	1.8	0	.1%	.0%	.3%	.0%
Evolution Computing	1.8	.0	1.8	0	.1%	.0%	.3%	.0%
PacSoft	1.8	.0	1.8	0	.1%	.0%	.3%	.0%
Sycotronic AG	1.7	.0	1.3	3	.1%	.0%	.2%	.0%
Swanson Analysis	1.7	.0	1.7	0	.1%	.0%	.2%	.0%
Micro CAD/CAM Systems	1.6	.0	1.6	0	.1%	.0%	.2%	.0%
Dennis Klein & Associates	1.6	.0	1.6	2	.1%	.0%	.2%	.0%
Accugraph	1.5	.9	.5	38	.1%	.1%	.1%	.0%
Automated Images	1.5	.0	1.3	0	.1%	.0%	.2%	.0%
European Silicon Systems	1.5	.4	1.1	13	.1%	.0%	.2%	.0%

(Continued)



# Market Share

TABLE NUMBER: 1  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total Revenue			Market Share		
	Revenue	Hardware Revenue	Software Revenue	Revenue	Hardware Revenue	Software Revenue
Automated Images	1.5	.0	1.3	.1%	.0%	.2%
European Silicon Systems	1.5	.4	1.1	.1%	.0%	.2%
Micro Engineering Solutions	1.5	.4	.9	.1%	.0%	.1%
Cimatron	1.4	.7	.6	.1%	.0%	.1%
Vision 3D	1.4	.7	.4	.1%	.1%	.1%
Mitsui Engineering Circuits & Systems	1.4	1.3	.0	.1%	.1%	.0%
Racal-Redac	1.4	.0	1.4	.1%	.0%	.2%
Sophia Systems	1.4	.1	1.2	.1%	.0%	.2%
MacMeal-Schwendler	1.4	.3	.9	.1%	.0%	.1%
Massteck	1.4	.0	1.3	.1%	.0%	.2%
A.I. Systems	1.4	.0	1.4	.1%	.0%	.2%
CIVILSOFT	1.3	.0	1.3	.1%	.0%	.2%
Pafecs	1.3	.0	1.3	.1%	.0%	.2%
Terr-Mar	1.3	.6	.7	.1%	.0%	.1%
Zycor	1.3	.0	.9	.1%	.0%	.1%
Ikos Systems	1.2	1.0	.2	.1%	.1%	.0%
Challenger Software	1.2	.0	1.2	.1%	.0%	.2%
Engineering Software	1.2	.1	1.0	.1%	.0%	.1%
Integrated Silicon Systems	1.2	.3	.9	.1%	.0%	.1%
Mega CAD	1.2	.0	1.2	.1%	.0%	.2%
Spectrum Software	1.2	.0	1.2	.1%	.0%	.2%
ECOM Associates	1.1	.1	.8	.0%	.0%	.1%
CAD-UL	1.1	.1	.8	.0%	.0%	.1%
Conshoppe	1.1	.3	.8	.0%	.0%	.1%
Land Innovation	1.1	.0	1.1	.0%	.0%	.2%
Phase Three Logic	1.1	.0	1.0	.0%	.0%	.1%
The Great Softwestern Co.	1.1	.0	1.1	.0%	.0%	.2%
Cadsys	1.0	.0	.0	.0%	.0%	.0%
Geographix	1.0	.0	1.0	.0%	.0%	.1%
GRAHSOFT	1.0	.0	1.0	.0%	.0%	.1%
Microcomputer Graphics	1.0	.0	1.0	.0%	.0%	.1%
Terra Sciences	1.0	.0	1.0	.0%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
ACERI SA	.8	.3	.3	14	.0%	.0%	.0%	.0%
Cascade Graphics	.8	.0	.8	0	.0%	.0%	.1%	.0%
Marcus Computer Systems	.7	.4	.2	25	.0%	.0%	.0%	.0%
Douglas Electronics	.7	.0	.7	0	.0%	.0%	.1%	.0%
Engineering Systems Corp.	.7	.0	.5	0	.0%	.0%	.1%	.0%
Capilano Computing	.6	.0	.6	0	.0%	.0%	.1%	.0%
MATC CAD	.6	.2	.3	3	.0%	.0%	.0%	.0%
Vamp	.6	.0	.6	0	.0%	.0%	.1%	.0%
CAD Lab	.6	.0	.5	0	.0%	.0%	.1%	.0%
A/E Microsystems	.5	.3	.2	74	.0%	.0%	.0%	.0%
Caddlink	.5	.0	.5	0	.0%	.0%	.1%	.0%
IGC Technology	.5	.0	.5	0	.0%	.0%	.1%	.0%
ALDEC	.5	.0	.5	0	.0%	.0%	.1%	.0%
Dynaware	.5	.0	.5	0	.0%	.0%	.1%	.0%
Enabling Technologies	.5	.0	.5	0	.0%	.0%	.1%	.0%
Ithaca Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Machinery Sales	.5	.0	.5	0	.0%	.0%	.1%	.0%
Maptek	.5	.0	.5	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Pelton Engineering	.5	.0	.5	0	.0%	.0%	.1%	.0%
PLUS Logic	.5	.0	.5	0	.0%	.0%	.1%	.0%
Radian Corporation	.5	.0	.4	0	.0%	.0%	.1%	.0%
Tanner Research	.5	.0	.5	0	.0%	.0%	.1%	.0%
The CAD Group	.5	.0	.5	0	.0%	.0%	.1%	.0%
Uniras	.5	.0	.5	0	.0%	.0%	.1%	.0%
Synthesis	.5	.0	.5	0	.0%	.0%	.1%	.0%
GEOVISION Inc.	.4	.0	.4	0	.0%	.0%	.1%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
INS Engineering	.4	.3	.1	43	.0%	.0%	.0%	.0%
Norsk Data	.4	.1	.2	42	.0%	.0%	.0%	.0%
Albert Nestler	.4	.2	.1	28	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Microtel Pacific Research	.3	.0	.3	1	.0%	.0%	.0%	.0%
Academi Systems	.3	.1	.2	3	.0%	.0%	.0%	.0%
Carrier Corporation	.3	.0	.3	0	.0%	.0%	.0%	.0%
Schlumberger (Applicon)	.3	.1	.1	3	.0%	.0%	.0%	.0%
Genrad	.3	.0	.2	0	.0%	.0%	.0%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.0%	.0%
Bechtel Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
EDA Systems	.2	.0	.2	4	.0%	.0%	.0%	.0%
Geomath	.2	.0	.2	0	.0%	.0%	.0%	.0%
Geosoft	.2	.0	.2	0	.0%	.0%	.0%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.0%	.0%
Pasco	.2	.1	.1	4	.0%	.0%	.0%	.0%
Secmai	.2	.1	.0	2	.0%	.0%	.0%	.0%
Ashlar	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	4	.0%	.0%	.0%	.0%
Pacific Numeric	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	4	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Unisys	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	714.8	429.8	263.7	96,620	31.5%	29.1%	39.0%	34.8%
All Companies	2,271.0	1,477.4	676.5	277,447	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,727.5	1,201.4	449.8	253,554	76.1%	81.3%	66.5%	91.4%
All Asian-Based Companies	354.1	198.5	129.3	16,806	15.6%	13.4%	19.1%	6.1%
All European-Based Companies	189.4	77.5	97.3	7,087	8.3%	5.2%	14.4%	2.6%
All Hardware Companies	1,238.1	1,184.4	.0	252,215	54.5%	80.2%	.0%	90.9%
All Turnkey & SW Companies	1,032.9	293.0	676.5	25,232	45.5%	19.8%	100.0%	9.1%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 2  
 TITLE: 1989 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					..... Market Share .....			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Compaq	184.2	184.2	.0	30,695	16.3%	23.4%	.0%	21.3%
IBM	100.7	95.7	.0	20,312	8.9%	12.2%	.0%	14.1%
Apple Computer	93.6	82.4	.0	18,000	8.3%	10.5%	.0%	12.5%
Autodesk	69.6	.0	69.6	0	6.1%	.0%	24.0%	.0%
Hewlett-Packard	61.1	50.1	.0	10,162	5.4%	6.4%	.0%	7.1%
Hitachi	54.0	21.9	26.7	2,707	4.8%	2.8%	9.2%	1.9%
Mutoh Industries	42.8	23.4	17.6	1,613	3.8%	3.0%	6.1%	1.1%
NEC	38.8	32.8	2.9	2,574	3.4%	4.2%	1.0%	1.8%
Hakuto	35.6	19.3	14.3	875	3.1%	2.4%	4.9%	.6%
Investronica SA	25.0	20.0	2.5	1,000	2.2%	2.5%	.9%	.7%
ARGO GRAPHICS	21.6	11.8	8.5	600	1.9%	1.5%	2.9%	.4%
Fujitsu	18.7	10.0	7.6	933	1.7%	1.3%	2.6%	.6%
Toshiba	14.2	7.1	5.7	1,080	1.3%	.9%	2.0%	.8%
CADKEY	13.9	.0	13.9	0	1.2%	.0%	4.8%	.0%
Vero International Software	12.8	.0	12.8	0	1.1%	.0%	4.4%	.0%
Datagraph	12.2	9.8	2.4	50	1.1%	1.2%	.8%	.0%
Wiechers Datentechnik	11.9	6.0	5.9	280	1.1%	.8%	2.0%	.2%
Computervision	11.2	1.9	8.1	107	1.0%	.2%	2.8%	.1%
Design Automation	10.8	.0	9.7	0	1.0%	.0%	3.4%	.0%
Olivetti	8.3	2.0	4.2	1,340	.7%	.2%	1.4%	.9%
CADAM	7.5	.0	7.1	0	.7%	.0%	2.4%	.0%
DAT Standard Information syste	7.3	.0	7.3	0	.6%	.0%	2.5%	.0%
Wacom	7.0	3.0	3.3	53	.6%	.4%	1.1%	.0%
Intergraph	6.9	.0	6.5	0	.6%	.0%	2.2%	.0%
Andor	6.9	1.2	5.5	54	.6%	.1%	1.9%	.0%
Dell Computer	6.4	6.4	.0	1,589	.6%	.8%	.0%	1.1%
Engineering Computer Services	6.2	2.5	2.1	169	.5%	.3%	.7%	.1%
Ziegler	5.8	.2	5.3	193	.5%	.0%	1.8%	.1%
Pathtrace	4.7	1.3	3.1	88	.4%	.2%	1.1%	.1%
Westward	4.7	4.7	.0	308	.4%	.6%	.0%	.2%
Aries Technology	4.5	.6	3.6	480	.4%	.1%	1.3%	.3%
Everex Systems	4.2	4.2	.0	1,284	.4%	.5%	.0%	.9%
Micrograph	4.0	2.0	1.5	94	.3%	.3%	.5%	.1%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1989 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Superdraft	4.0	.2	3.6	0	.3%	.0%	1.2%	.0%
Engineering Mechanics	3.8	1.3	2.1	100	.3%	.2%	.7%	.1%
Manufacturing Consultants	3.7	.0	3.2	0	.3%	.0%	1.1%	.0%
Algor Interactive Systems	3.0	.0	3.0	0	.3%	.0%	1.0%	.0%
Mitsubishi Electric	2.9	1.8	1.1	317	.3%	.2%	.4%	.2%
Philips International	2.9	1.0	1.4	10	.3%	.1%	.5%	.0%
Sumisho Electronics	2.8	1.7	1.0	309	.2%	.2%	.4%	.2%
Infinite Graphics	2.4	.0	2.4	0	.2%	.0%	.8%	.0%
Intercad	2.3	1.2	.7	118	.2%	.1%	.2%	.1%
Claris	2.3	.0	2.3	0	.2%	.0%	.8%	.0%
Info. Services Int'l. Dentsu	2.1	.3	1.1	25	.2%	.0%	.4%	.0%
Robocom	1.9	.0	1.9	0	.2%	.0%	.7%	.0%
Serbi	1.9	.0	1.9	0	.2%	.0%	.7%	.0%
Rotring EURCAD	1.8	1.0	.8	48	.2%	.1%	.3%	.0%
American Small Business Comp.	1.7	.0	1.7	0	.2%	.0%	.6%	.0%
Swanson Analysis	1.7	.0	1.7	0	.1%	.0%	.6%	.0%
Micro Engineering Solutions	1.5	.4	.9	103	.1%	.1%	.3%	.1%
Cimatron	1.4	.7	.6	33	.1%	.1%	.2%	.0%
Vision 3D	1.4	.7	.4	15	.1%	.1%	.1%	.0%
Mitsui Engineering	1.4	1.3	.0	19	.1%	.2%	.0%	.0%
MacNeal-Schwendler	1.4	.0	1.3	0	.1%	.0%	.4%	.0%
Foresight Resources	1.3	.0	1.1	0	.1%	.0%	.4%	.0%
ISICAD	1.2	.0	1.2	0	.1%	.0%	.4%	.0%
Evolution Computing	1.1	.0	1.1	0	.1%	.0%	.4%	.0%
Micro CAD/CAM Systems	1.1	.0	1.1	0	.1%	.0%	.4%	.0%
A.I. Systems	1.1	.0	1.1	0	.1%	.0%	.4%	.0%
Micrografx	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
Club Informatico SA	1.0	.8	.2	22	.1%	.1%	.1%	.0%
Challenger Software	.9	.0	.9	0	.1%	.0%	.3%	.0%
ACERI SA	.8	.3	.3	14	.1%	.0%	.1%	.0%
CADWorks	.8	.0	.6	0	.1%	.0%	.2%	.0%
PafecS	.8	.0	.8	0	.1%	.0%	.3%	.0%
Cadtronic	.8	.6	.1	3	.1%	.1%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1989 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total			Wkstns Shipped	Market Share		
	Revenue	Hardware Revenue	Software Revenue		Revenue	Hardware Revenue	Software Revenue
Marcus Computer Systems	.7	.4	.2	25	.1%	.1%	.1%
MATC CAD	.6	.2	.3	3	.1%	.0%	.1%
Microcomputer Graphics	.6	.0	.6	0	.1%	.0%	.2%
Innovative Data Design	.6	.0	.6	0	.0%	.0%	.2%
Ithaca Software	.5	.0	.5	0	.0%	.0%	.2%
Machinery Sales	.5	.0	.5	0	.0%	.0%	.2%
Engineering Software	.5	.0	.4	20	.0%	.0%	.1%
Synthesis	.5	.0	.5	0	.0%	.0%	.2%
GRAPHISOFT	.5	.0	.5	0	.0%	.0%	.2%
CAD Lab	.4	.0	.4	0	.0%	.0%	.1%
Albert Nestler	.4	.2	.1	28	.0%	.0%	.0%
Norsk Data	.4	.1	.2	42	.0%	.0%	.1%
Accugraph	.4	.2	.1	9	.0%	.0%	.0%
Bentley	.3	.0	.3	0	.0%	.0%	.1%
Cascade Graphics	.3	.0	.3	0	.0%	.0%	.1%
Enabling Technologies	.3	.0	.3	0	.0%	.0%	.1%
Pelton Engineering	.3	.0	.3	0	.0%	.0%	.1%
Schlumberger (Applicon)	.3	.1	.1	3	.0%	.0%	.0%
Uniras	.3	.0	.3	0	.0%	.0%	.1%
Engineering Systems Corp.	.3	.0	.2	0	.0%	.0%	.1%
Mega CADD	.3	.0	.3	0	.0%	.0%	.1%
Mc2 Engineering Software	.3	.0	.3	0	.0%	.0%	.1%
Caddlink	.2	.0	.2	0	.0%	.0%	.1%
Carrier Corporation	.2	.0	.2	0	.0%	.0%	.1%
A/E MicroSystems	.1	.1	.0	19	.0%	.0%	.0%
Comshoppe	.1	.0	.1	0	.0%	.0%	.0%
IGC Technology	.1	.0	.1	0	.0%	.0%	.0%
Ashlar	.1	.0	.1	0	.0%	.0%	.0%
Unisys	.0	.0	.0	0	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	330.8	222.4	101.5	49,641	29.2%	28.3%	35.1%	34.5%
All Companies	1,132.3	785.8	289.6	144,020	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	802.7	621.8	147.8	130,890	70.9%	79.1%	51.0%	90.9%
All Asian-Based Companies	213.9	111.3	86.4	9,417	18.9%	14.2%	29.8%	6.5%
All European-Based Companies	115.8	52.7	55.4	3,713	10.2%	6.7%	19.1%	2.6%
All Hardware Companies	641.5	612.6	.0	129,878	56.7%	78.0%	.0%	90.2%
All Turnkey & SW Companies	490.8	173.2	289.6	14,143	43.3%	22.0%	100.0%	9.8%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 3  
 TITLE: 1989 Market Share  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Apple Computer	89.5	78.7	.0	17,200	14.8%	18.8%	.0%	20.4%
Compaq	79.9	79.9	.0	13,321	13.2%	19.0%	.0%	15.8%
Autodesk	70.2	.0	70.2	0	11.6%	.0%	44.2%	.0%
IBM	64.1	60.9	.0	12,926	10.6%	14.5%	.0%	15.3%
NEC	36.0	30.5	2.7	2,391	5.9%	7.3%	1.7%	2.8%
Hewlett-Packard	15.0	12.3	.0	2,496	2.5%	2.9%	.0%	3.0%
Fujitsu	14.0	7.5	5.7	700	2.3%	1.8%	3.6%	.8%
Hitachi	7.2	2.9	3.6	361	1.2%	.7%	2.2%	.4%
Intergraph	6.9	.0	6.5	0	1.1%	.0%	4.1%	.0%
Mutoh Industries	6.9	3.8	2.9	261	1.1%	.9%	1.8%	.3%
Kanematsu Computer Systems	6.7	3.5	3.3	156	1.1%	.8%	2.0%	.2%
Dell Computer	6.0	6.0	.0	1,511	1.0%	1.4%	.0%	1.8%
Everex Systems	5.9	5.9	.0	1,807	1.0%	1.4%	.0%	2.1%
CPU	5.9	.0	5.6	309	1.0%	.0%	3.5%	.4%
Computer Aided Planning	5.4	.0	4.3	0	.9%	.0%	2.7%	.0%
ISICAD	5.1	.0	5.1	0	.8%	.0%	3.2%	.0%
Club Informatico SA	4.9	3.7	1.0	108	.8%	.9%	.6%	.1%
Cadtronic	4.5	3.5	.6	30	.7%	.8%	.4%	.0%
BATISOFT	4.0	.6	3.0	227	.7%	.1%	1.9%	.3%
Datagraphic	3.6	1.6	1.3	60	.6%	.4%	.8%	.1%
Technovision	3.6	.0	3.6	0	.6%	.0%	2.3%	.0%
Olivetti	3.5	1.4	1.2	673	.6%	.3%	.7%	.8%
Endeco Systems	3.0	.0	3.0	0	.5%	.0%	1.9%	.0%
D.C.A. Engineering	2.8	.0	2.8	0	.5%	.0%	1.8%	.0%
CADWorks	2.3	.0	1.9	0	.4%	.0%	1.2%	.0%
Infinite Graphics	2.3	.0	2.3	0	.4%	.0%	1.4%	.0%
Sigma Design	2.2	.0	2.2	0	.4%	.0%	1.4%	.0%
Computervision	2.0	.1	1.8	5	.3%	.0%	1.1%	.0%
Ziegler	1.8	.1	1.7	59	.3%	.0%	1.0%	.1%
Andor	1.8	.3	1.4	16	.3%	.1%	.9%	.0%
Robocom	1.8	.0	1.8	0	.3%	.0%	1.1%	.0%
Innovative Data Design	1.7	.0	1.7	0	.3%	.0%	1.1%	.0%
Claris	1.5	.0	1.5	0	.3%	.0%	1.0%	.0%

(Continued)



# Market Share

TABLE NUMBER: 3  
 TITLE: 1989 Market Share  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CADAM	1.5	.0	1.4	0	.2%	.0%	.9%	.0%
Sumisho Electronics	1.5	.9	.5	160	.2%	.2%	.3%	.2%
Bentley	1.4	.0	1.4	0	.2%	.0%	.9%	.0%
CIVILSOFT	1.3	.0	1.3	0	.2%	.0%	.8%	.0%
Foresight Resources	1.2	.0	1.1	0	.2%	.0%	.7%	.0%
Micrografx	1.2	.0	1.2	0	.2%	.0%	.8%	.0%
Accugraph	1.2	.7	.4	29	.2%	.2%	.2%	.0%
ECCM Associates	1.1	.1	.8	51	.2%	.0%	.5%	.1%
Land Innovation	1.1	.0	1.1	0	.2%	.0%	.7%	.0%
Comshoppe	1.0	.0	1.0	0	.2%	.0%	.6%	.0%
Serbi	1.0	.0	1.0	0	.2%	.0%	.6%	.0%
Mega CADD	.9	.0	.9	0	.2%	.0%	.6%	.0%
American Small Business Comp.	.7	.0	.7	0	.1%	.0%	.5%	.0%
Engineering Software	.7	.1	.6	30	.1%	.0%	.4%	.0%
Micrograph	.7	.4	.3	17	.1%	.1%	.2%	.0%
Mitsubishi Electric	.7	.5	.3	79	.1%	.1%	.2%	.1%
Evolution Computing	.7	.0	.7	0	.1%	.0%	.4%	.0%
CADKEY	.6	.0	.6	0	.1%	.0%	.4%	.0%
GRAPHSOFT	.5	.0	.5	0	.1%	.0%	.3%	.0%
Sycotronic AG	.5	.0	.4	1	.1%	.0%	.3%	.0%
PafecS	.5	.0	.5	0	.1%	.0%	.3%	.0%
Dynaware	.5	.0	.5	0	.1%	.0%	.3%	.0%
Micro CAD/CAM Systems	.5	.0	.5	0	.1%	.0%	.3%	.0%
IGC Technology	.4	.0	.4	0	.1%	.0%	.3%	.0%
INS Engineering	.4	.3	.1	43	.1%	.1%	.1%	.1%
DAT Standard Information syste	.4	.0	.4	0	.1%	.0%	.2%	.0%
Cascade Graphics	.3	.0	.3	0	.0%	.0%	.2%	.0%
Challenger Software	.3	.0	.3	0	.0%	.0%	.2%	.0%
Westward	.3	.3	.0	17	.0%	.1%	.0%	.0%
Computer-Aided Design Group	.3	.0	.2	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.3	.0	.3	0	.0%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 3 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Bechtel Software	.2	.0	.2	0	.0%	.0%	.2%	.0%
A/E Microsystems	.2	.1	.1	33	.0%	.0%	.0%	.0%
Engineering Systems Corp.	.2	.0	.1	0	.0%	.0%	.1%	.0%
Enabling Technologies	.2	.0	.2	0	.0%	.0%	.1%	.0%
Microcomputer Graphics	.2	.0	.2	0	.0%	.0%	.1%	.0%
Pelton Engineering	.2	.0	.2	0	.0%	.0%	.1%	.0%
Caddlink	.2	.0	.2	0	.0%	.0%	.1%	.0%
A.I. Systems	.2	.0	.2	0	.0%	.0%	.1%	.0%
Carrier Corporation	.2	.0	.2	0	.0%	.0%	.1%	.0%
CAD Lab	.1	.0	.1	0	.0%	.0%	.1%	.0%
TOOL Software	.1	.0	.1	4	.0%	.0%	.0%	.0%
Uniras	.1	.0	.1	0	.0%	.0%	.1%	.0%
Ashlar	.0	.0	.0	0	.0%	.0%	.0%	.0%
Norsk Data	.0	.0	.0	0	.0%	.0%	.0%	.0%
Synthesis	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	191.4	130.1	56.7	30,740	31.6%	31.0%	35.7%	36.4%
All Companies	606.1	419.8	158.8	84,455	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	503.9	364.0	120.4	79,204	83.1%	86.7%	75.8%	93.8%
All Asian-Based Companies	73.9	44.3	24.6	4,055	12.2%	10.5%	15.5%	4.8%
All European-Based Companies	28.4	11.5	13.8	1,196	4.7%	2.7%	8.7%	1.4%
All Hardware Companies	379.6	363.0	.0	79,056	62.6%	86.5%	.0%	93.6%
All Turnkey & SW Companies	226.6	56.8	158.8	5,399	37.4%	13.5%	100.0%	6.4%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 4  
 TITLE: 1989 Market Share  
 APPLICATION: GIS/Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	17.4	17.4	.0	2,896	12.5%	26.2%	.0%	23.7%
Autodesk	15.4	.0	15.4	0	11.1%	.0%	23.1%	.0%
IBM	11.0	10.4	.0	2,216	7.9%	15.7%	.0%	18.2%
Apple Computer	10.4	9.2	.0	2,000	7.5%	13.8%	.0%	16.4%
Intergraph	9.3	.0	8.7	0	6.7%	.0%	13.0%	.0%
ETAK	7.0	.8	6.0	22	5.0%	1.2%	9.0%	.2%
Geobased Systems	5.7	1.1	4.0	0	4.1%	1.7%	5.9%	.0%
ERDAS	5.5	2.5	2.5	36	4.0%	3.7%	3.7%	.3%
Fujitsu	4.7	2.5	1.9	233	3.4%	3.8%	2.8%	1.9%
Mapinfo	4.1	.0	4.1	0	3.0%	.0%	6.2%	.0%
ESRI	3.2	.0	3.2	0	2.3%	.0%	4.8%	.0%
Mutoh Industries	3.2	1.7	1.3	119	2.3%	2.6%	2.0%	1.0%
Mitsubishi Electric	2.9	1.8	1.1	317	2.1%	2.7%	1.6%	2.6%
LandCadd	2.6	.0	2.5	0	1.9%	.0%	3.7%	.0%
Strategic Locations Planning	2.4	.0	2.4	0	1.7%	.0%	3.6%	.0%
Cadtronic	2.2	1.7	.3	19	1.6%	2.6%	.4%	.2%
PacSoft	1.8	.0	1.8	0	1.3%	.0%	2.7%	.0%
Dennis Klein & Associates	1.6	.0	1.6	2	1.2%	.0%	2.4%	.0%
Olivetti	1.5	.4	.4	249	1.1%	.6%	.7%	2.0%
Ziegler	1.3	.0	1.2	45	1.0%	.1%	1.8%	.4%
Terr-Mar	1.3	.6	.7	36	.9%	.9%	1.1%	.3%
Zycor	1.3	.0	.9	0	.9%	.0%	1.3%	.0%
Dell Computer	1.1	1.1	.0	271	.8%	1.6%	.0%	2.2%
Geographix	1.0	.0	1.0	0	.7%	.0%	1.5%	.0%
Terra Sciences	1.0	.0	1.0	0	.7%	.0%	1.5%	.0%
D.C.A. Engineering	.9	.0	.9	0	.7%	.0%	1.4%	.0%
Everex Systems	.9	.9	.0	285	.7%	1.4%	.0%	2.3%
NEC	.7	.6	.1	49	.5%	.9%	.1%	.4%
Micrograph	.6	.3	.2	14	.4%	.5%	.3%	.1%
Bentley	.5	.0	.5	0	.4%	.0%	.8%	.0%
Maptek	.5	.0	.5	0	.4%	.0%	.7%	.0%
Radian Corporation	.5	.0	.4	0	.4%	.0%	.6%	.0%

(Continued)

# Market Share

TABLE NUMBER: 4 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: GIS/Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
GEOVISION Inc.	.4	.0	.4	0	.3%	.0%	.6%	.0%
Foresight Resources	.4	.0	.4	0	.3%	.0%	.5%	.0%
Sumisho Electronics	.4	.2	.1	43	.3%	.4%	.2%	.4%
Andor	.3	.1	.2	4	.2%	.1%	.4%	.0%
Robocom	.3	.0	.3	0	.2%	.0%	.4%	.0%
Engineering Systems Corp.	.2	.0	.1	0	.2%	.0%	.2%	.0%
Computervision	.2	.0	.2	1	.1%	.0%	.3%	.0%
Geomath	.2	.0	.2	0	.1%	.0%	.3%	.0%
Geosoft	.2	.0	.2	0	.1%	.0%	.3%	.0%
Pasco	.2	.1	.1	4	.1%	.1%	.1%	.0%
Caddlink	.2	.0	.2	0	.1%	.0%	.3%	.0%
A/E Microsystems	.1	.1	.0	15	.1%	.1%	.0%	.1%
Kork Systems	.1	.0	.1	4	.1%	.0%	.1%	.0%
Uniras	.1	.0	.1	0	.1%	.0%	.1%	.0%
A.I. Systems	.1	.0	.1	0	.1%	.0%	.1%	.0%
American Small Business Comp.	.1	.0	.1	0	.1%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.1%	.0%
Accugraph	.0	.0	.0	1	.0%	.0%	.0%	.0%
Norsk Data	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	57.1	20.9	33.8	3,571	41.1%	31.5%	50.6%	29.3%
All Companies	139.1	66.3	66.8	12,206	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	122.4	57.7	60.2	11,201	88.0%	87.0%	90.2%	91.8%
All Asian-Based Companies	10.7	6.1	4.1	680	7.7%	9.2%	6.2%	5.6%
All European-Based Companies	6.0	2.5	2.5	326	4.3%	3.7%	3.7%	2.7%
All Hardware Companies	54.4	52.6	.0	11,084	39.1%	79.3%	.0%	90.8%
All Turnkey & SW Companies	84.6	13.7	66.8	1,122	60.9%	20.7%	100.0%	9.2%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 5  
 TITLE: 1989 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	66.0	66.0	.0	11,004	16.8%	32.1%	.0%	29.9%
Hewlett-Packard	24.0	19.7	.0	3,991	6.1%	9.6%	.0%	10.9%
NEC	23.1	21.2	.0	1,530	5.9%	10.3%	.0%	4.2%
Wacom	20.9	9.0	9.8	558	5.3%	4.4%	6.1%	1.5%
Autodesk	15.1	.0	15.1	0	3.8%	.0%	9.4%	.0%
Apple Computer	14.6	12.8	.0	2,800	3.7%	6.2%	.0%	7.6%
Xilinx	14.3	.0	12.8	0	3.6%	.0%	8.0%	.0%
View Logic	13.8	.0	11.3	0	3.5%	.0%	7.0%	.0%
EEsof	12.1	.1	10.9	3	3.1%	.0%	6.7%	.0%
Data I/O	9.7	.0	8.2	0	2.5%	.0%	5.1%	.0%
Fujitsu	9.4	5.8	3.0	466	2.4%	2.8%	1.9%	1.3%
Altera	9.0	.0	7.9	0	2.3%	.0%	4.9%	.0%
Orcad	8.1	.0	7.7	0	2.1%	.0%	4.7%	.0%
LPKF	7.5	4.5	2.3	750	1.9%	2.2%	1.4%	2.0%
IBM	7.3	7.0	.0	1,477	1.9%	3.4%	.0%	4.0%
CADAM	7.0	.0	6.3	0	1.8%	.0%	3.9%	.0%
Ziegler	6.1	.2	5.5	198	1.5%	.1%	3.4%	.5%
BETRONEX	5.8	.0	5.8	0	1.5%	.0%	3.6%	.0%
Aucotec	4.7	1.9	2.3	520	1.2%	.9%	1.4%	1.4%
Everex Systems	4.5	4.5	.0	1,379	1.1%	2.2%	.0%	3.8%
Microsim	4.5	.0	4.1	0	1.1%	.0%	2.6%	.0%
CAD Software	4.2	.0	3.5	0	1.1%	.0%	2.2%	.0%
Teradyne	4.0	.0	3.3	0	1.0%	.0%	2.0%	.0%
ACTEL	3.8	.0	3.8	0	1.0%	.0%	2.4%	.0%
Visionics	2.9	.1	2.2	5	.7%	.1%	1.3%	.0%
ALS Design	2.9	.3	2.3	50	.7%	.1%	1.4%	.1%
Infinite Graphics	2.3	.0	2.3	0	.6%	.0%	1.4%	.0%
Rotring EURCAD	2.2	1.2	1.0	61	.6%	.6%	.6%	.2%
Computervision	2.1	.1	1.8	9	.5%	.1%	1.1%	.0%
Dell Computer	2.0	2.0	.0	504	.5%	1.0%	.0%	1.4%
Accel Technologies	2.0	.0	1.8	0	.5%	.0%	1.1%	.0%
Micrograph	2.0	1.0	.8	46	.5%	.5%	.5%	.1%
Omaton	2.0	.0	2.0	0	.5%	.0%	1.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 5  
 TITLE: 1989 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Aptos	1.8	.0	1.8	0	.5%	.0%	1.1%	.0%
Automated Images	1.5	.0	1.3	0	.4%	.0%	.8%	.0%
European Silicon Systems	1.5	.4	1.1	13	.4%	.2%	.7%	.0%
Circuits & Systems	1.4	.0	1.4	0	.4%	.0%	.9%	.0%
Racal-Redac	1.4	.1	1.2	10	.4%	.0%	.8%	.0%
Sophia Systems	1.4	.3	.9	18	.3%	.2%	.5%	.0%
Massteck	1.4	.0	1.4	0	.3%	.0%	.8%	.0%
Ikos Systems	1.2	1.0	.2	6	.3%	.5%	.1%	.0%
Integrated Silicon Systems	1.2	.3	.9	12	.3%	.1%	.6%	.0%
Spectrum Software	1.2	.0	1.2	0	.3%	.0%	.7%	.0%
Sycotronic AG	1.1	.0	.9	2	.3%	.0%	.6%	.0%
CAD-UL	1.1	.3	.8	40	.3%	.2%	.5%	.1%
Phase Three Logic	1.1	.0	1.0	15	.3%	.0%	.6%	.0%
The Great Softwestern Co.	1.1	.0	1.1	0	.3%	.0%	.7%	.0%
CadisyS	1.0	.0	.0	0	.3%	.0%	.0%	.0%
Intercad	1.0	.5	.3	50	.3%	.2%	.2%	.1%
Serbi	1.0	.0	1.0	0	.2%	.0%	.6%	.0%
Mitsubishi Electric	.7	.5	.3	79	.2%	.2%	.2%	.2%
Douglas Electronics	.7	.0	.7	0	.2%	.0%	.4%	.0%
Capilano Computing	.6	.0	.6	0	.2%	.0%	.4%	.0%
Vamp	.6	.0	.6	0	.2%	.0%	.4%	.0%
ALDEC	.5	.0	.5	0	.1%	.0%	.3%	.0%
PLUS Logic	.5	.0	.5	0	.1%	.0%	.3%	.0%
Tanner Research	.5	.0	.5	0	.1%	.0%	.3%	.0%
The CAD Group	.5	.0	.5	0	.1%	.0%	.3%	.0%
BV Engineering	.4	.0	.4	0	.1%	.0%	.2%	.0%
Sumisho Electronics	.4	.2	.1	43	.1%	.1%	.1%	.1%
American Small Business Comp.	.3	.0	.3	0	.1%	.0%	.2%	.0%
Foresight Resources	.3	.0	.3	0	.1%	.0%	.2%	.0%
Microtel Pacific Research	.3	.0	.3	1	.1%	.0%	.2%	.0%
Academi Systems	.3	.1	.2	3	.1%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 5 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Andor	.3	.0	.3	2	.1%	.0%	.2%	.0%
Olivetti	.3	.1	.1	89	.1%	.1%	.1%	.2%
Genrad	.3	.0	.2	0	.1%	.0%	.1%	.0%
Westward	.3	.3	.0	17	.1%	.1%	.0%	.0%
EDA Systems	.2	.0	.2	4	.1%	.0%	.1%	.0%
Instrumatic Espanola	.2	.0	.2	0	.1%	.0%	.1%	.0%
Microcomputer Graphics	.2	.0	.2	0	.1%	.0%	.1%	.0%
Innovative Data Design	.2	.0	.2	0	.0%	.0%	.1%	.0%
Secmai	.2	.1	.0	2	.0%	.0%	.0%	.0%
Cascade Graphics	.1	.0	.1	0	.0%	.0%	.1%	.0%
Pacific Numeric	.1	.0	.1	0	.0%	.0%	.1%	.0%
A/E Microsystems	.1	.0	.0	7	.0%	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Robocom	.0	.0	.0	0	.0%	.0%	.0%	.0%
DAT Standard Information syste	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	135.4	56.5	71.7	12,668	34.4%	27.5%	44.4%	34.5%
All Companies	393.5	205.5	161.3	36,765	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	298.6	157.8	121.5	32,259	75.9%	76.8%	75.3%	87.7%
All Asian-Based Companies	55.7	36.8	14.2	2,654	14.1%	17.9%	8.8%	7.2%
All European-Based Companies	39.3	10.9	25.7	1,853	10.0%	5.3%	15.9%	5.0%
All Hardware Companies	162.6	156.2	.0	32,197	41.3%	76.0%	.0%	87.6%
All Turnkey & SW Companies	230.9	49.3	161.3	4,568	58.7%	24.0%	100.0%	12.4%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 6  
 TITLE: 1989 Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					Market Share			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	29.5	29.5	.0	4,923	12.7%	30.4%	.0%	29.2%
Macom	20.9	9.0	9.8	199	9.0%	9.2%	8.3%	1.2%
Xilinx	14.3	.0	12.8	0	6.1%	.0%	10.8%	.0%
View Logic	13.8	.0	11.3	0	5.9%	.0%	9.5%	.0%
Autodesk	13.2	.0	13.2	0	5.7%	.0%	11.2%	.0%
EEsof	12.1	.1	10.9	3	5.2%	.1%	9.2%	.0%
NEC	9.8	9.0	.0	651	4.2%	9.3%	.0%	3.9%
Data I/O	9.7	.0	8.2	0	4.2%	.0%	6.9%	.0%
Altera	9.0	.0	7.9	0	3.9%	.0%	6.7%	.0%
Apple Computer	6.2	5.5	.0	1,200	2.7%	5.6%	.0%	7.1%
Orcad	5.8	.0	5.5	0	2.5%	.0%	4.6%	.0%
Aucotec	4.7	1.9	2.3	520	2.0%	1.9%	2.0%	3.1%
Hewlett-Packard	4.5	3.7	.0	745	1.9%	3.8%	.0%	4.4%
Microsim	4.5	.0	4.1	0	1.9%	.0%	3.5%	.0%
Teradyne	4.0	.0	3.3	0	1.7%	.0%	2.8%	.0%
ACTEL	3.8	.0	3.8	0	1.7%	.0%	3.2%	.0%
Fujitsu	3.7	2.0	1.5	187	1.6%	2.1%	1.3%	1.1%
IBM	3.7	3.5	.0	739	1.6%	3.6%	.0%	4.4%
Ziegler	3.1	.1	2.8	99	1.3%	.1%	2.4%	.6%
Everex Systems	2.3	2.4	.0	713	1.0%	2.4%	.0%	4.2%
Infinite Graphics	2.3	.0	2.3	0	1.0%	.0%	1.9%	.0%
Rotring EURCAD	2.2	1.2	1.0	61	1.0%	1.3%	.8%	.4%
Omaton	2.0	.0	2.0	0	.8%	.0%	1.6%	.0%
Automated Images	1.5	.0	1.3	0	.7%	.0%	1.1%	.0%
ALS Design	1.4	.1	1.1	25	.6%	.1%	1.0%	.1%
Circuits & Systems	1.4	.0	1.4	0	.6%	.0%	1.2%	.0%
Micrograph	1.3	.7	.5	31	.6%	.7%	.4%	.2%
Ikos Systems	1.2	1.0	.2	6	.5%	1.0%	.2%	.0%
Spectrum Software	1.2	.0	1.2	0	.5%	.0%	1.0%	.0%
Phase Three Logic	1.1	.0	1.0	15	.5%	.0%	.8%	.1%
Sophia Systems	1.1	.3	.7	14	.5%	.3%	.6%	.1%
Dell Computer	1.1	1.1	.0	271	.5%	1.1%	.0%	1.6%
Intercad	1.0	.5	.3	50	.4%	.5%	.3%	.3%

(Continued)



# Market Share

TABLE NUMBER: 6  
 TITLE: 1989 Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total			Units Shipped	Market Share		
	Revenue	Hardware Revenue	Software Revenue		Revenue	Hardware Revenue	Software Revenue
Serbi	1.0	.0	1.0	0	.4%	.0%	.8%
Visionics	.8	.0	.6	1	.3%	.0%	.5%
ComputerVision	.8	.0	.7	2	.3%	.0%	.6%
Douglas Electronics	.7	.0	.7	0	.3%	.0%	.6%
Capitlano Computing	.6	.0	.6	0	.3%	.0%	.5%
ALDEC	.5	.0	.5	0	.2%	.0%	.4%
PLUS Logic	.5	.0	.5	0	.2%	.0%	.4%
The CAD Group	.5	.0	.5	0	.2%	.0%	.4%
CAD Software	.5	.0	.4	0	.2%	.0%	.4%
Accel Technologies	.4	.0	.4	0	.2%	.0%	.3%
BV Engineering	.4	.0	.4	0	.2%	.0%	.3%
Sumisho Electronics	.4	.2	.1	43	.2%	.2%	.1%
Racal-Redac	.4	.0	.4	2	.2%	.0%	.3%
Genrad	.3	.0	.2	0	.1%	.0%	.1%
Westward	.3	.3	.0	17	.1%	.3%	.0%
Foresight Resources	.3	.0	.2	0	.1%	.0%	.2%
EDA Systems	.2	.0	.2	4	.1%	.0%	.1%
American Small Business Comp.	.2	.0	.2	0	.1%	.0%	.2%
Microcomputer Graphics	.2	.0	.2	0	.1%	.0%	.2%
Vamp	.2	.0	.2	0	.1%	.0%	.1%
Tanner Research	.2	.0	.1	0	.1%	.0%	.1%
Cascade Graphics	.1	.0	.1	0	.1%	.0%	.1%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.1%
A/E Microsystems	.1	.0	.0	7	.0%	.0%	.0%
NCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%
Academi Systems	.0	.0	.0	0	.0%	.0%	.0%
DAT Standard Information syste	.0	.0	.0	0	.0%	.0%	.0%
Secmai	.0	.0	.0	0	.0%	.0%	.0%
Sycotronic AG	.0	.0	.0	0	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 6 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
-----	-----	-----	-----	-----	-----	-----	-----	-----
Other Companies	78.9	31.5	43.8	7,118	34.0%	32.4%	36.9%	42.2%
All Companies	231.8	97.3	118.7	16,851	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	181.1	72.3	97.3	14,995	78.1%	74.3%	82.0%	89.0%
All Asian-Based Companies	35.5	20.3	12.0	1,050	15.3%	20.8%	10.1%	6.2%
All European-Based Companies	15.3	4.8	9.3	806	6.6%	4.9%	7.9%	4.8%
All Hardware Companies	72.8	71.1	.0	14,956	31.4%	73.0%	.0%	88.8%
All Turnkey & SW Companies	159.0	26.2	118.7	1,895	68.6%	27.0%	100.0%	11.2%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 7  
 TITLE: 1989 Market Share  
 APPLICATION: IC Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Fujitsu	1.9	1.8	.0	93	25.5%	37.7%	.0%	11.0%
European Silicon Systems	1.5	.4	1.1	13	19.9%	7.5%	46.2%	1.6%
Integrated Silicon Systems	1.2	.3	.9	12	16.3%	5.5%	40.2%	1.4%
Hewlett-Packard	1.0	.8	.0	166	13.6%	17.9%	.0%	19.7%
Everex Systems	.6	.6	.0	190	8.4%	13.2%	.0%	22.5%
Tanner Research	.4	.0	.3	0	4.7%	.0%	13.7%	.0%
Other Companies	3.9	1.5	2.3	244	52.5%	31.1%	100.0%	28.9%
All Companies	7.4	4.7	2.3	846	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	4.0	2.6	1.3	588	54.5%	54.8%	53.8%	69.5%
All Asian-Based Companies	1.9	1.8	.0	245	25.5%	37.7%	.0%	28.9%
All European-Based Companies	1.5	.4	1.1	13	19.9%	7.5%	46.2%	1.6%
All Hardware Companies	2.5	2.3	.0	575	33.5%	49.3%	.0%	68.0%
All Turnkey & SW Companies	4.9	2.4	2.3	270	66.5%	50.5%	99.6%	32.0%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 8  
 TITLE: 1989 Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					Market Share			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	36.5	36.5	.0	6,081	23.7%	35.3%	.0%	31.9%
Hewlett-Packard	18.5	15.2	.0	3,080	12.0%	14.7%	.0%	16.2%
NEC	13.3	12.2	.0	879	8.6%	11.8%	.0%	4.6%
Apple Computer	8.3	7.3	.0	1,600	5.4%	7.1%	.0%	8.4%
LPKF	7.5	4.5	2.3	750	4.9%	4.3%	5.6%	3.9%
CADAM	7.0	.0	6.3	0	4.5%	.0%	15.5%	.0%
BETRONEX	5.8	.0	5.8	0	3.7%	.0%	14.3%	.0%
Fujitsu	3.7	2.0	1.5	187	2.4%	1.9%	3.7%	1.0%
IBM	3.7	3.5	.0	739	2.4%	3.4%	.0%	3.9%
CAD Software	3.7	.0	3.1	0	2.4%	.0%	7.7%	.0%
Ziegler	3.0	.1	2.7	99	1.9%	.1%	6.7%	.5%
Orcad	2.3	.0	2.2	0	1.5%	.0%	5.3%	.0%
Visionics	2.1	.1	1.6	4	1.4%	.1%	3.9%	.0%
Autodesk	1.9	.0	1.9	0	1.2%	.0%	4.6%	.0%
Aptos	1.8	.0	1.8	0	1.2%	.0%	4.5%	.0%
Accel Technologies	1.6	.0	1.4	0	1.0%	.0%	3.6%	.0%
Everex Systems	1.6	1.6	.0	475	1.0%	1.5%	.0%	2.5%
ALS Design	1.4	.1	1.1	25	.9%	.1%	2.8%	.1%
Massteck	1.4	.0	1.4	0	.9%	.0%	3.3%	.0%
Computervision	1.3	.1	1.1	6	.8%	.1%	2.8%	.0%
Sycotronic AG	1.1	.0	.9	2	.7%	.0%	2.2%	.0%
CAD-UL	1.1	.3	.8	40	.7%	.3%	1.9%	.2%
The Great Softwestern Co.	1.1	.0	1.1	0	.7%	.0%	2.7%	.0%
Cadisys	1.0	.0	.0	0	.6%	.0%	.0%	.0%
Racal-Redac	1.0	.0	.9	8	.6%	.0%	2.2%	.0%
Dell Computer	.9	.9	.0	233	.6%	.9%	.0%	1.2%
Mitsubishi Electric	.7	.5	.3	79	.5%	.4%	.7%	.4%
Micrograph	.7	.3	.3	15	.4%	.3%	.6%	.1%
Vamp	.4	.0	.4	0	.3%	.0%	1.1%	.0%
Microtel Pacific Research	.3	.0	.3	1	.2%	.0%	.7%	.0%
Andor	.3	.0	.3	2	.2%	.0%	.6%	.0%
Academi Systems	.3	.1	.2	3	.2%	.1%	.5%	.0%

(Continued)

# Market Share

TABLE NUMBER: 8 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Olivetti	.3	.1	.1	89	.2%	.1%	.3%	.5%
Sophia Systems	.3	.1	.2	4	.2%	.1%	.4%	.0%
Instrumatic Espanola	.2	.0	.2	0	.1%	.0%	.4%	.0%
American Small Business Comp.	.1	.0	.1	0	.1%	.0%	.3%	.0%
Secmai	.1	.1	.0	2	.1%	.1%	.0%	.0%
Pacific Numeric	.1	.0	.1	0	.1%	.0%	.2%	.0%
Foresight Resources	.1	.0	.1	0	.1%	.0%	.2%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.2%	.0%
Robocom	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	52.7	23.5	25.6	5,306	34.1%	22.7%	63.4%	27.8%
All Companies	154.3	103.5	40.3	19,069	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	113.5	83.0	22.9	16,677	73.6%	80.2%	56.7%	87.5%
All Asian-Based Companies	18.3	14.8	2.2	1,359	11.9%	14.3%	5.5%	7.1%
All European-Based Companies	22.5	5.7	15.2	1,034	14.6%	5.5%	37.8%	5.4%
All Hardware Companies	87.3	82.8	.0	16,666	56.6%	80.0%	.0%	87.4%
All Turnkey & SW Companies	67.0	20.7	40.3	2,403	43.4%	20.0%	100.0%	12.6%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 9  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	191.1	191.1	.0	31,854	18.5%	27.7%	.0%	21.5%
Apple Computer	147.7	130.0	.0	28,400	14.3%	18.8%	.0%	19.2%
Autodesk	93.3	.0	93.3	0	9.1%	.0%	31.2%	.0%
IBM	54.9	52.2	.0	11,079	5.3%	7.6%	.0%	7.5%
Hewlett-Packard	40.0	32.8	.0	6,658	3.9%	4.8%	.0%	4.5%
Dell Computer	14.7	14.7	.0	3,681	1.4%	2.1%	.0%	2.5%
CADKEY	14.5	.0	14.5	0	1.4%	.0%	4.8%	.0%
Everex Systems	14.0	14.0	.0	4,279	1.4%	2.0%	.0%	2.9%
Intergraph	13.2	.0	12.4	0	1.3%	.0%	4.1%	.0%
EEsof	12.1	.1	10.9	3	1.2%	.0%	3.6%	.0%
Computervision	9.8	.0	9.8	0	1.0%	.0%	3.3%	.0%
View Logic	8.3	.0	6.8	0	.8%	.0%	2.3%	.0%
Infinite Graphics	6.9	.0	6.9	0	.7%	.0%	2.3%	.0%
Xilinx	5.7	.0	5.1	0	.6%	.0%	1.7%	.0%
Altera	5.4	.0	4.8	0	.5%	.0%	1.6%	.0%
Computer Aided Planning	5.4	.0	4.3	0	.5%	.0%	1.4%	.0%
ETAK	5.3	.6	4.5	17	.5%	.1%	1.5%	.0%
Geobased Systems	5.1	1.0	3.6	0	.5%	.1%	1.2%	.0%
CADAM	4.9	.0	4.6	0	.5%	.0%	1.5%	.0%
ERDAS	4.8	2.2	2.2	31	.5%	.3%	.7%	.0%
Orcad	4.2	.0	4.0	0	.4%	.0%	1.3%	.0%
Mapinfo	3.8	.0	3.8	0	.4%	.0%	1.3%	.0%
Aries Technology	3.6	.5	2.9	384	.3%	.1%	1.0%	.3%
D.C.A. Engineering	3.4	.0	3.4	0	.3%	.0%	1.1%	.0%
ACTEL	3.1	.0	3.1	0	.3%	.0%	1.0%	.0%
CAD Software	3.1	.0	2.7	0	.3%	.0%	.9%	.0%
Algor Interactive Systems	3.0	.0	3.0	0	.3%	.0%	1.0%	.0%
Teradyne	3.0	.0	2.5	0	.3%	.0%	.8%	.0%
Data I/O	2.9	.0	2.5	0	.3%	.0%	.8%	.0%
Visionics	2.9	.1	2.2	5	.3%	.0%	.7%	.0%
Manufacturing Consultants	2.9	.0	2.5	0	.3%	.0%	.8%	.0%
Microsim	2.7	.0	2.5	0	.3%	.0%	.8%	.0%
LandCadd	2.6	.0	2.5	0	.3%	.0%	.8%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Total Hardware Revenue			Wkstns Shipped	Total Hardware Revenue			Wkstns Shipped
	Revenue	Revenue	Revenue		Revenue	Revenue	Revenue	
Forestight Resources	2.6	.0	2.5	0	.2%	.0%	.8%	.0%
Engineering Mechanics	2.4	.9	1.5	65	.2%	.1%	.4%	.0%
Innovative Data Design	2.4	.0	2.4	0	.2%	.0%	.8%	.0%
American Small Business Comp.	2.3	.0	2.3	0	.2%	.0%	.6%	.0%
ESRI	2.3	.0	2.3	0	.2%	.0%	.8%	.0%
Endeco Systems	2.3	.0	2.3	0	.2%	.0%	.8%	.0%
Micrografx	2.2	.0	2.2	0	.2%	.0%	.7%	.0%
Bentley	2.2	.0	2.2	0	.2%	.0%	.7%	.0%
Strategic Locations Planning	2.2	.0	2.2	0	.2%	.0%	.7%	.0%
Claris	2.1	.0	2.1	0	.2%	.0%	.7%	.0%
ISICAD	1.9	.0	1.9	0	.2%	.0%	.6%	.0%
Evolution Computing	1.8	.0	1.8	0	.2%	.0%	.6%	.0%
PacSoft	1.8	.0	1.8	0	.2%	.0%	.6%	.0%
BETRONEX	1.6	.0	1.6	0	.2%	.0%	.5%	.0%
Dennis Klein & Associates	1.6	.0	1.6	2	.2%	.0%	.5%	.0%
Omation	1.6	.0	1.6	0	.2%	.0%	.5%	.0%
Automated Images	1.5	.0	1.5	0	.1%	.0%	.4%	.0%
Accel Technologies	1.5	.0	1.4	0	.1%	.0%	.5%	.0%
Micro Engineering Solutions	1.5	.4	.9	103	.1%	.1%	.3%	.1%
Aptos	1.4	.0	1.4	0	.1%	.0%	.5%	.0%
Accugraph	1.4	.8	.4	34	.1%	.1%	.1%	.0%
Circuits & Systems	1.4	.0	1.4	0	.1%	.0%	.5%	.0%
Micro CAD/CAM Systems	1.4	.0	1.4	0	.1%	.0%	.5%	.0%
Sigma Design	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
A.I. Systems	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
CIVILSOFT	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
Pafecs	1.3	.0	1.3	0	.1%	.0%	.4%	.0%
Terr-Mar	1.3	.6	.7	36	.1%	.1%	.2%	.0%
Challenger Software	1.2	.0	1.2	0	.1%	.0%	.4%	.0%
CADworks	1.2	.0	.9	0	.1%	.0%	.3%	.0%
Comshoppe	1.1	.0	1.1	0	.1%	.0%	.4%	.0%
Land Innovation	1.1	.0	1.1	0	.1%	.0%	.4%	.0%
Phase Three Logic	1.1	.0	1.0	15	.1%	.0%	.3%	.0%

(Continued)

# Market Share

TABLE NUMBER:

9

TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Total		Hardware		Software		Wkstns		Market Share	
	Revenue	Wkstns	Revenue	Wkstns	Revenue	Wkstns	Revenue	Wkstns	Revenue	Wkstns
The Great Softwestern Co.	1.1	0	1.1	0	1.1	0	.1%	.4%	.0%	.0%
ECOM Associates	1.1	49	.8	49	.1	0	.1%	.3%	.0%	.0%
Spectrum Software	1.1	0	1.1	0	.0	0	.1%	.4%	.0%	.0%
Engineering Software	1.1	45	.9	45	.1	0	.1%	.3%	.0%	.0%
Swanson Analysis	1.1	0	1.1	0	.0	0	.1%	.4%	.0%	.0%
Cadisy	1.0	0	.0	0	.0	0	.1%	.0%	.0%	.0%
Geographix	1.0	0	.0	0	.0	0	.1%	.3%	.0%	.0%
GRAPHISOFT	1.0	0	.0	0	.0	0	.1%	.3%	.0%	.0%
Investronica SA	1.0	40	.8	40	.1	0	.1%	.0%	.0%	.0%
Microcomputer Graphics	1.0	0	.0	0	.0	0	.1%	.3%	.0%	.0%
Terra Sciences	1.0	0	.0	0	.0	0	.1%	.3%	.0%	.0%
Massteck	1.0	0	.0	0	.0	0	.1%	.3%	.0%	.0%
Mega CADD	.8	0	.0	0	.8	0	.1%	.3%	.0%	.0%
Pathtrace	.8	0	.2	0	.5	0	.1%	.2%	.0%	.0%
Ikos Systems	.8	6	.6	6	.2	0	.1%	.1%	.0%	.0%
MacNeal-Schwendler	.8	0	.0	0	.7	0	.1%	.2%	.0%	.0%
Cascade Graphics	.8	0	.0	0	.8	0	.1%	.3%	.0%	.0%
Integrated Silicon Systems	.7	7	.2	7	.6	0	.1%	.2%	.0%	.0%
Zycor	.6	0	.0	0	.4	0	.1%	.1%	.0%	.0%
Engineering Systems Corp.	.6	0	.4	0	.4	0	.1%	.1%	.0%	.0%
MATC CAD	.6	3	.2	3	.3	0	.1%	.1%	.0%	.0%
Vamp	.6	0	.6	0	.0	0	.1%	.2%	.0%	.0%
A/E Microsystems	.5	74	.3	74	.2	0	.0%	.1%	.0%	.1%
Caddlink	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
Capilano Computing	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
ICC Technology	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
ALDEC	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
Dynaware	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
Enabling Technologies	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
Machinery Sales	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
Meptek	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
Pelton Engineering	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%
PLUS Logic	.5	0	.0	0	.5	0	.0%	.2%	.0%	.0%

(Cont Inued)



# Market Share

TABLE NUMBER: 9  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Tanner Research	.5	.0	.5	0	.0%	.0%	.2%	.0%
The CAD Group	.5	.0	.5	0	.0%	.0%	.2%	.0%
Uniras	.5	.0	.5	0	.0%	.0%	.2%	.0%
Douglas Electronics	.5	.0	.5	0	.0%	.0%	.2%	.0%
Ithaca Software	.5	.0	.5	0	.0%	.0%	.2%	.0%
GEOVISION Inc.	.4	.0	.4	0	.0%	.0%	.1%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Mc2 Engineering Software	.4	.0	.4	0	.0%	.0%	.1%	.0%
Carrier Corporation	.3	.0	.3	0	.0%	.0%	.1%	.0%
Schlumberger (Applicon)	.3	.1	.1	3	.0%	.0%	.0%	.0%
Synthesis	.3	.0	.3	0	.0%	.0%	.1%	.0%
Radian Corporation	.3	.0	.2	0	.0%	.0%	.1%	.0%
Bechtel Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Computer-Aided Design Group	.2	.0	.2	0	.0%	.0%	.1%	.0%
EDA Systems	.2	.0	.2	4	.0%	.0%	.1%	.0%
Microtel Pacific Research	.2	.0	.2	1	.0%	.0%	.1%	.0%
Geomath	.2	.0	.2	0	.0%	.0%	.1%	.0%
Geosoft	.2	.0	.2	0	.0%	.0%	.1%	.0%
Cimatron	.2	.1	.1	0	.0%	.0%	.0%	.0%
Vision 3D	.1	.1	.0	2	.0%	.0%	.0%	.0%
Genrad	.1	.0	.1	0	.0%	.0%	.0%	.0%
Serbi	.1	.0	.1	0	.0%	.0%	.0%	.0%
Ashlar	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	4	.0%	.0%	.0%	.0%
Pacific Numeric	.1	.0	.1	0	.0%	.0%	.0%	.0%
Racal-Redac	.1	.0	.1	0	.0%	.0%	.0%	.0%
BATISOFT	.1	.0	.0	0	.0%	.0%	.0%	.0%
Academi Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
MCR Microelectronics	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	403.7	253.2	142.3	62,086	39.2%	36.7%	47.6%	41.9%
All Companies	1,030.9	689.8	299.3	148,117	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,024.7	688.6	294.4	148,076	99.4%	99.8%	98.4%	100.0%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	6.3	1.2	4.9	42	.6%	.2%	1.6%	.0%
All Hardware Companies	707.5	679.8	.0	147,185	68.6%	98.5%	.0%	99.4%
All Turnkey & SW Companies	323.5	10.0	299.3	933	31.4%	1.5%	100.0%	.6%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 10  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	139.0	139.0	.0	23,166	20.0%	30.2%	.0%	27.4%
IBM	73.3	69.6	.0	14,772	10.5%	15.1%	.0%	17.4%
Autodesk	56.1	.0	56.1	0	8.1%	.0%	28.9%	.0%
Hewlett-Packard	50.0	41.0	.0	8,322	7.2%	8.9%	.0%	9.8%
Apple Computer	49.9	43.9	.0	9,600	7.2%	9.5%	.0%	11.3%
Investronica SA	23.6	18.9	2.4	943	3.4%	4.1%	1.2%	1.1%
Ziegler	15.0	.6	13.7	495	2.2%	.1%	7.0%	.6%
Olivetti	12.8	3.6	5.5	2,229	1.8%	.8%	2.8%	2.6%
Vero International Software	12.3	.0	12.3	0	1.8%	.0%	6.3%	.0%
Datagraph	12.2	9.8	2.4	50	1.8%	2.1%	1.3%	.1%
Wiechers Datentechnik	11.9	6.0	5.9	280	1.7%	1.3%	3.0%	.3%
CADAM	8.7	.0	7.8	0	1.2%	.0%	4.0%	.0%
Intergraph	7.7	.0	7.3	0	1.1%	.0%	3.7%	.0%
DAT Standard Information syste	7.7	.0	7.7	0	1.1%	.0%	4.0%	.0%
LPKF	7.5	4.5	2.3	750	1.1%	1.0%	1.2%	.9%
Cadtronic	7.5	5.7	1.0	51	1.1%	1.2%	.5%	.1%
Micrograph	7.2	3.7	2.8	171	1.0%	.8%	1.4%	.2%
Engineering Computer Services	6.2	2.5	2.1	169	.9%	.5%	1.1%	.2%
Club Informatico SA	5.9	4.4	1.2	130	.8%	1.0%	.6%	.2%
Westward	5.2	5.2	.0	343	.7%	1.1%	.0%	.4%
Aucotec	4.7	1.9	2.3	520	.7%	.4%	1.2%	.6%
Computervision	4.6	2.1	1.0	122	.7%	.5%	.5%	.1%
Xilinx	4.3	.0	3.9	0	.6%	.0%	2.0%	.0%
ISICAD	4.1	.0	4.1	0	.6%	.0%	2.1%	.0%
Robocom	4.0	.0	4.0	0	.6%	.0%	2.1%	.0%
BATISOFT	4.0	.6	3.0	227	.6%	.1%	1.5%	.3%
Rotring EURCAD	4.0	2.2	1.7	109	.6%	.5%	.9%	.1%
Superdraft	4.0	.2	3.6	0	.6%	.0%	1.8%	.0%
Pathtrace	3.8	1.0	2.5	88	.5%	.2%	1.3%	.1%
Serbi	3.6	.0	3.6	0	.5%	.0%	1.9%	.0%
Datagraphic	3.6	1.6	1.3	60	.5%	.4%	.7%	.1%
Intercad	3.3	1.6	1.0	168	.5%	.4%	.5%	.2%
BETRONEX	3.1	.0	3.1	0	.4%	.0%	1.6%	.0%

(Continued)

# Market Share

TABLE NUMBER: 10  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Philips International	2.9	1.0	1.4	10	.4%	.2%	.7%	.0%
ALS Design	2.9	.3	2.3	50	.4%	.1%	1.2%	.1%
View Logic	2.8	.0	2.3	0	.4%	.0%	1.2%	.0%
Orcad	2.6	.0	2.5	0	.4%	.0%	1.3%	.0%
Altera	2.3	.0	2.0	0	.3%	.0%	1.0%	.0%
Sycotronic AG	1.6	.0	1.3	3	.2%	.0%	.7%	.0%
European Silicon Systems	1.5	.4	1.1	13	.2%	.1%	.6%	.0%
Everex Systems	1.2	1.3	.0	380	.2%	.3%	.0%	.4%
Vision 3D	1.2	.6	.4	12	.2%	.1%	.2%	.0%
Microsim	1.1	.0	1.0	0	.2%	.0%	.5%	.0%
Cimatron	1.1	.5	.5	33	.2%	.1%	.3%	.0%
CAD-UL	1.1	.3	.8	40	.2%	.1%	.4%	.0%
CADWorks	1.1	.0	.9	0	.2%	.0%	.4%	.0%
ETAK	1.1	.1	.9	3	.2%	.0%	.5%	.0%
Data I/O	1.0	.0	.8	0	.1%	.0%	.4%	.0%
ACERI SA	.8	.3	.3	14	.1%	.1%	.2%	.0%
Teradyne	.8	.0	.7	0	.1%	.0%	.3%	.0%
Claris	.8	.0	.8	0	.1%	.0%	.4%	.0%
Dell Computer	.8	.8	.0	194	.1%	.2%	.0%	.2%
CAD Software	.8	.0	.6	0	.1%	.0%	.3%	.0%
Marcus Computer Systems	.7	.4	.2	25	.1%	.1%	.1%	.0%
ESRI	.7	.0	.7	0	.1%	.0%	.4%	.0%
Engineering Mechanics	.7	.2	.4	18	.1%	.1%	.2%	.0%
ACTEL	.6	.0	.6	0	.1%	.0%	.3%	.0%
Manufacturing Consultants	.6	.0	.5	0	.1%	.0%	.3%	.0%
CAD Lab	.6	.0	.5	0	.1%	.0%	.3%	.0%
Foresight Resources	.5	.0	.4	0	.1%	.0%	.2%	.0%
Aries Technology	.5	.1	.4	48	.1%	.0%	.2%	.1%
American Small Business Comp.	.4	.0	.4	0	.1%	.0%	.2%	.0%
Accel Technologies	.4	.0	.4	0	.1%	.0%	.2%	.0%
Norsk Data	.4	.1	.2	42	.1%	.0%	.1%	.0%
Zycor	.4	.0	.3	0	.1%	.0%	.1%	.0%
Albert Nestler	.4	.2	.1	28	.1%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 10  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Massteck	.3	.0	.3	0	.0%	.0%	.2%	.0%
Swanson Analysis	.3	.0	.3	0	.0%	.0%	.2%	.0%
Sigma Design	.3	.0	.3	0	.0%	.0%	.2%	.0%
Aptos	.3	.0	.3	0	.0%	.0%	.2%	.0%
Omaton	.3	.0	.3	0	.0%	.0%	.2%	.0%
Academi Systems	.3	.1	.2	3	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.3	.0	.3	0	.0%	.0%	.1%	.0%
Mega_CADD	.2	.0	.2	0	.0%	.0%	.1%	.0%
Instrumatic Espanola	.2	.0	.2	0	.0%	.0%	.1%	.0%
Radian Corporation	.2	.0	.2	0	.0%	.0%	.1%	.0%
Synthesis	.2	.0	.2	0	.0%	.0%	.1%	.0%
D.C.A. Engineering	.2	.0	.2	0	.0%	.0%	.1%	.0%
Secmai	.2	.1	.0	2	.0%	.0%	.0%	.0%
Engineering Software	.1	.0	.1	5	.0%	.0%	.1%	.0%
Ikos Systems	.1	.1	.0	0	.0%	.0%	.0%	.0%
Douglas Electronics	.1	.0	.1	0	.0%	.0%	.1%	.0%
Genrad	.1	.0	.1	0	.0%	.0%	.0%	.0%
Accugraph	.1	.1	.0	3	.0%	.0%	.0%	.0%
Microtel Pacific Research	.1	.0	.1	0	.0%	.0%	.0%	.0%
TOOL Software	.1	.0	.1	4	.0%	.0%	.0%	.0%
Racal-Redac	.1	.0	.1	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.1	.0	.1	1	.0%	.0%	.0%	.0%
Capilano Computing	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pacific Numeric	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 10 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	224.6	133.5	81.0	24,115	32.3%	29.0%	41.6%	28.5%
All Companies	694.5	460.3	194.5	84,664	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	516.0	384.8	105.4	77,769	74.3%	83.6%	54.2%	91.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	178.6	75.5	89.1	6,895	25.7%	16.4%	45.8%	8.1%
All Hardware Companies	398.1	379.4	.0	77,400	57.3%	82.4%	.0%	91.4%
All Turnkey & SW Companies	296.5	80.8	194.5	7,264	42.7%	17.6%	100.0%	8.6%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 11  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
NEC	98.6	85.2	5.6	6,544	19.8%	29.2%	3.2%	17.5%
Hitachi	61.2	24.8	30.3	3,067	12.3%	8.5%	17.7%	8.2%
Mutoh Industries	52.9	29.0	21.8	1,994	10.6%	9.9%	12.7%	5.3%
Fujitsu	45.9	25.3	17.8	2,288	9.2%	8.7%	10.4%	6.1%
IBM	45.8	43.5	.0	9,233	9.2%	14.9%	.0%	24.7%
Hakuto	35.6	19.3	14.3	875	7.2%	6.6%	8.3%	2.3%
Wacom	27.8	11.9	13.1	610	5.6%	4.1%	7.6%	1.6%
ARGO GRAPHICS	21.6	11.8	8.5	600	4.3%	4.0%	5.0%	1.6%
Autodesk	19.3	.0	19.3	0	3.9%	.0%	11.2%	.0%
Toshiba	14.2	7.1	5.7	1,080	2.9%	2.4%	3.3%	2.9%
Design Automation	10.8	.0	9.7	0	2.2%	.0%	5.7%	.0%
Andor	9.3	1.6	7.4	76	1.9%	.5%	4.3%	.2%
Hewlett-Packard	9.0	7.4	.0	1,504	1.8%	2.5%	.0%	4.0%
Apple Computer	8.3	7.3	.0	1,600	1.7%	2.5%	.0%	4.3%
Mitsubishi Electric	7.2	4.5	2.7	794	1.4%	1.6%	1.6%	2.1%
Compaq	7.0	7.0	.0	1,158	1.4%	2.4%	.0%	3.1%
Kanematsu Computer Systems	6.7	3.5	3.3	156	1.3%	1.2%	1.9%	.4%
CPU	5.9	.0	5.6	309	1.2%	.0%	3.3%	.8%
Data I/O	5.3	.0	4.5	0	1.1%	.0%	2.6%	.0%
Sumisho Electronics	5.0	3.1	1.9	555	1.0%	1.1%	1.1%	1.5%
Technovision	3.6	.0	3.6	0	.7%	.0%	2.1%	.0%
Xilinx	3.6	.0	3.2	0	.7%	.0%	1.9%	.0%
CADAM	2.3	.0	2.2	0	.5%	.0%	1.3%	.0%
View Logic	2.3	.0	1.9	0	.5%	.0%	1.1%	.0%
Info. Services Int'l. Dentsu	2.1	.3	1.1	25	.4%	.1%	.6%	.1%
Mitsui Engineering	1.4	1.3	.0	19	.3%	.4%	.0%	.1%
Sophia Systems	1.4	.3	.9	18	.3%	.1%	.5%	.0%
Altera	1.4	.0	1.2	0	.3%	.0%	.7%	.0%
Racal-Redac	1.2	.1	1.1	10	.2%	.0%	.6%	.0%
Orcad	1.1	.0	1.0	0	.2%	.0%	.6%	.0%
BETRONEX	.9	.0	.9	0	.2%	.0%	.5%	.0%
CADWorks	.9	.0	.7	0	.2%	.0%	.4%	.0%
Intergraph	.9	.0	.8	0	.2%	.0%	.5%	.0%

(Continued)

# Market Share

TABLE NUMBER: 11  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Computervision	.8	.0	.8	0	.2%	.0%	.4%	.0%
Microsim	.7	.0	.6	0	.1%	.0%	.4%	.0%
Aries Technology	.5	.1	.4	48	.1%	.0%	.2%	.1%
Engineering Mechanics	.5	.2	.3	12	.1%	.1%	.1%	.0%
INS Engineering	.4	.3	.1	43	.1%	.1%	.0%	.1%
Claris	.4	.0	.4	0	.1%	.0%	.2%	.0%
Integrated Silicon Systems	.4	.1	.3	4	.1%	.0%	.2%	.0%
ETAK	.4	.0	.3	1	.1%	.0%	.2%	.0%
Sigma Design	.3	.0	.3	0	.1%	.0%	.2%	.0%
Everex Systems	.3	.3	.0	95	.1%	.1%	.0%	.3%
MacNeal-Schwendler	.3	.0	.3	0	.1%	.0%	.2%	.0%
Manufacturing Consultants	.3	.0	.2	0	.1%	.0%	.1%	.0%
Investronica SA	.3	.2	.0	10	.1%	.1%	.0%	.0%
Ikos Systems	.2	.2	.1	0	.0%	.1%	.0%	.0%
CAD Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Swanson Analysis	.2	.0	.2	0	.0%	.0%	.1%	.0%
ESRI	.2	.0	.2	0	.0%	.0%	.1%	.0%
ISICAD	.2	.0	.2	0	.0%	.0%	.1%	.0%
Pasco	.2	.1	.1	4	.0%	.0%	.1%	.0%
Teradyne	.2	.0	.1	0	.0%	.0%	.1%	.0%
D.C.A. Engineering	.2	.0	.2	0	.0%	.0%	.1%	.0%
Cimatron	.1	.1	.1	0	.0%	.0%	.0%	.0%
Douglas Electronics	.1	.0	.1	0	.0%	.0%	.1%	.0%
Vision 3D	.1	.1	.0	2	.0%	.0%	.0%	.0%
Mega CADD	.1	.0	.1	0	.0%	.0%	.1%	.0%
Accel Technologies	.1	.0	.1	0	.0%	.0%	.1%	.0%
American Small Business Comp.	.1	.0	.1	0	.0%	.0%	.0%	.0%
Omaton	.1	.0	.1	0	.0%	.0%	.0%	.0%
Aptos	.1	.0	.1	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	1	.0%	.0%	.0%	.0%
ACTEL	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)



# Market Share

TABLE NUMBER: 11 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Capilano Computing	.0	.0	.0	0	.0%	.0%	.0%	.0%
Genrad	.0	.0	.0	0	.0%	.0%	.0%	.0%
Massteck	.0	.0	.0	0	.0%	.0%	.0%	.0%
Pathtrace	.0	.0	.0	0	.0%	.0%	.0%	.0%
Synthesis	.0	.0	.0	0	.0%	.0%	.0%	.0%
Mc2 Engineering Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
ECON Associates	.0	.0	.0	1	.0%	.0%	.0%	.0%
Other Companies	68.1	30.6	35.0	7,432	13.7%	10.5%	20.4%	19.9%
All Companies	497.4	292.1	171.5	37,355	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	141.5	93.7	40.5	20,572	28.5%	32.1%	23.6%	55.1%
All Asian-Based Companies	353.2	198.0	128.9	16,761	71.0%	67.8%	75.2%	44.9%
All European-Based Companies	2.7	.4	2.1	22	.5%	.1%	1.2%	.1%
All Hardware Companies	98.1	91.5	.0	20,505	19.7%	31.3%	.0%	54.9%
All Turnkey & SW Companies	399.3	200.6	171.5	16,850	80.3%	68.7%	100.0%	45.1%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER: 12  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	10.4	10.4	.0	1,738	21.7%	29.6%	.0%	23.8%
IBM	9.1	8.7	.0	1,847	19.0%	24.7%	.0%	25.3%
Apple Computer	2.1	1.8	.0	400	4.3%	5.2%	.0%	5.5%
Autodesk	1.6	.0	1.6	0	3.3%	.0%	14.2%	.0%
Intergraph	1.4	.0	1.3	0	2.8%	.0%	11.6%	.0%
Hewlett-Packard	1.0	.8	.0	166	2.1%	2.3%	.0%	2.3%
Fujitsu	.9	.5	.4	44	1.9%	1.4%	3.1%	.6%
Olivetti	.8	.3	.4	122	1.7%	.8%	3.5%	1.7%
Endeco Systems	.8	.0	.8	0	1.6%	.0%	6.7%	.0%
ERDAS	.7	.3	.3	5	1.5%	.9%	2.9%	.1%
Xilinx	.7	.0	.6	0	1.5%	.0%	5.7%	.0%
Clarix	.6	.0	.6	0	1.2%	.0%	5.2%	.0%
Geobased Systems	.6	.1	.4	0	1.2%	.3%	3.6%	.0%
Vero International Software	.5	.0	.5	0	1.1%	.0%	4.6%	.0%
Data I/O	.5	.0	.4	0	1.0%	.0%	3.7%	.0%
View Logic	.4	.0	.3	0	.9%	.0%	3.0%	.0%
ETAK	.4	.0	.3	1	.7%	.1%	2.7%	.0%
Mapinfo	.3	.0	.3	0	.6%	.0%	2.6%	.0%
Computervision	.3	.0	.3	0	.6%	.0%	2.5%	.0%
Zycor	.3	.0	.2	0	.5%	.0%	1.6%	.0%
Micro CAD/CAM Systems	.2	.0	.2	0	.5%	.0%	2.2%	.0%
Sigma Design	.2	.0	.2	0	.5%	.0%	1.9%	.0%
Engineering Mechanics	.2	.1	.1	5	.4%	.2%	.9%	.1%
Strategic Locations Planning	.2	.0	.2	0	.4%	.0%	1.7%	.0%
Investronica SA	.2	.1	.0	7	.4%	.4%	.2%	.1%
BETRONEX	.2	.0	.2	0	.4%	.0%	1.5%	.0%
Orcad	.2	.0	.2	0	.4%	.0%	1.3%	.0%
Foresight Resources	.2	.0	.1	0	.3%	.0%	1.3%	.0%
Spectrum Software	.1	.0	.1	0	.2%	.0%	1.0%	.0%
CADAM	.1	.0	.1	0	.2%	.0%	.8%	.0%
Engineering Systems Corp.	.1	.0	.1	0	.2%	.0%	.6%	.0%
Innovative Data Design	.1	.0	.1	0	.2%	.0%	.8%	.0%
ISICAD	.1	.0	.1	0	.2%	.0%	.8%	.0%

(Continued)

# Market Share

TABLE NUMBER: 12  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CAD Software	.1	.0	.1	0	.2%	.0%	.6%	.0%
D.C.A. Engineering	.1	.0	.1	0	.2%	.0%	.7%	.0%
Mc2 Engineering Software	.1	.0	.1	0	.2%	.0%	.7%	.0%
Pathtrace	.1	.0	.1	0	.1%	.1%	.4%	.0%
ESRI	.1	.0	.1	0	.1%	.0%	.5%	.0%
Ikos Systems	.1	.1	.0	0	.1%	.1%	.1%	.0%
Integrated Silicon Systems	.1	.0	.1	1	.1%	.0%	.4%	.0%
Radian Corporation	.1	.0	.0	0	.1%	.0%	.4%	.0%
ACTEL	.0	.0	.0	0	.1%	.0%	.4%	.0%
American Small Business Comp.	.0	.0	.0	0	.1%	.0%	.4%	.0%
Ithaca Software	.0	.0	.0	0	.1%	.0%	.4%	.0%
MacNeal-Schwendler	.0	.0	.0	0	.1%	.0%	.4%	.0%
Serbi	.0	.0	.0	0	.1%	.0%	.4%	.0%
Sycotronic AG	.0	.0	.0	0	.1%	.0%	.3%	.0%
Teradyne	.0	.0	.0	0	.1%	.0%	.3%	.0%
Capilano Computing	.0	.0	.0	0	.1%	.0%	.3%	.0%
Cimatron	.0	.0	.0	0	.1%	.0%	.1%	.0%
Massteck	.0	.0	.0	0	.1%	.0%	.3%	.0%
Swanson Analysis	.0	.0	.0	0	.1%	.0%	.3%	.0%
Unisys	.0	.0	.0	0	.1%	.0%	.3%	.0%
ECOM Associates	.0	.0	.0	1	.0%	.0%	.1%	.0%
CAD-UL	.0	.0	.0	0	.0%	.0%	.1%	.0%
Computer-Aided Design Group	.0	.0	.0	0	.0%	.0%	.1%	.0%
Genrad	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 12 (Continued)  
 TITLE: 1989 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	18.4	12.5	5.5	2,987	38.1%	35.6%	49.0%	40.9%
All Companies	48.2	35.2	11.2	7,310	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	45.4	34.2	9.6	7,137	94.2%	97.3%	85.8%	97.6%
All Asian-Based Companies	.9	.5	.4	44	1.9%	1.4%	3.1%	.6%
All European-Based Companies	1.9	.5	1.2	129	3.9%	1.3%	11.0%	1.8%
All Hardware Companies	34.5	33.6	.0	7,125	71.7%	95.6%	.0%	97.5%
All Turnkey & SW Companies	13.6	1.6	11.2	185	28.3%	4.4%	100.0%	2.5%

Source: Dataquest  
May 1990

# Market Share

TABLE NUMBER:

1

TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total Revenue		Hardware Revenue		Software Revenue		Wkstns Shipped		Market Share	
	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
Compaq	250.0	250.0	.0	48,000	14.0%	20.5%	.0%	19.9%		
IBM	170.6	164.4	5.2	26,966	9.6%	13.5%	1.0%	11.2%		
Apple Computer	150.0	132.0	.0	35,000	8.4%	10.8%	.0%	14.5%		
Autodesk	111.4	.0	111.4	0	6.3%	.0%	20.8%	.0%		
NEC	93.0	93.0	.0	9,978	5.2%	7.6%	.0%	4.1%		
Mutoh Industries	56.8	34.6	20.3	1,355	3.2%	2.8%	3.8%	.6%		
Hewlett-Packard	50.0	50.0	.0	10,000	2.8%	4.1%	.0%	4.1%		
Fujitsu	44.5	27.5	10.6	2,031	2.5%	2.3%	2.0%	.8%		
Hitachi	38.5	23.1	11.6	700	2.2%	1.9%	2.2%	.3%		
Prime Computer	35.8	4.3	28.7	257	2.0%	.4%	5.4%	.1%		
Hakuto	26.2	13.1	10.4	298	1.5%	1.1%	1.9%	.1%		
Zenith	23.6	23.6	.0	8,000	1.3%	1.9%	.0%	3.3%		
Racal-Redac	22.6	.0	22.5	0	1.3%	.0%	4.2%	.0%		
CADAM	16.9	.0	15.1	0	1.0%	.0%	2.8%	.0%		
Olivetti	16.7	6.8	6.4	2,992	.9%	.6%	1.2%	1.2%		
Daisy Systems	14.8	4.2	7.7	265	.8%	.3%	1.4%	.1%		
Intergraph	14.2	.0	13.4	0	.8%	.0%	2.5%	.0%		
Ziegler Instruments GmbH	14.1	.0	13.3	0	.8%	.0%	2.5%	.0%		
Everex	13.5	13.5	.0	6,750	.8%	1.1%	.0%	2.8%		
Futurenet	12.0	.0	10.8	0	.7%	.0%	2.0%	.0%		
Wacom	11.6	4.4	6.5	752	.6%	.4%	1.2%	.3%		
Xilinx	10.8	.0	9.7	0	.6%	.0%	1.8%	.0%		
Hitachi Seiko	10.5	4.9	5.6	177	.6%	.4%	1.0%	.1%		
CADKEY	10.3	.0	10.3	0	.6%	.0%	1.9%	.0%		
Logotec	8.5	5.2	2.5	50	.5%	.4%	.5%	.0%		
Andor	8.4	1.7	6.3	90	.5%	.1%	1.2%	.0%		
Rotring euroCAD	8.0	3.5	3.7	140	.4%	.3%	.7%	.1%		
Mitsubishi Electric	7.9	.0	3.9	20	.4%	.0%	.7%	.0%		
View Logic	7.7	.0	6.7	0	.4%	.0%	1.2%	.0%		
ETAK	7.2	1.1	5.8	0	.4%	.1%	1.1%	.0%		
Toshiba	7.2	.0	.0	307	.4%	.0%	.0%	.1%		
EESOF	7.1	.4	6.1	8	.4%	.0%	1.1%	.0%		
Generic Software	7.1	.0	7.1	0	.4%	.0%	1.3%	.0%		

# Market Share

TABLE NUMBER: 1

TITLE: 1988 Market Share

APPLICATION: All Applications

PLATFORM: Personal Computer

REGION: Worldwide

UNITS: Millions of Dollars/Actual Units

Company	Total Revenue		Hardware Revenue		Software Revenue		Mkstrs Shipped		Market Share	
	Revenue	Units	Revenue	Units	Revenue	Units	Revenue	Units	Revenue	Units
Interac	6.5	3.4	3.4	1.8	3.36	336	.4%	.3%	.3%	.1%
Seiko Instruments	6.3	2.8	2.8	2.8	350	350	.4%	.2%	.5%	.1%
Altera	6.0	.0	.0	5.2	0	0	.3%	.0%	1.0%	.0%
Valid	5.5	2.5	2.5	2.0	83	83	.3%	.2%	.4%	.0%
RHV Software Systems	5.5	.0	.0	5.5	0	0	.3%	.0%	1.0%	.0%
Aucotec	5.4	2.0	2.0	2.5	495	495	.3%	.2%	.5%	.2%
CPU	5.4	1.4	1.4	3.8	300	300	.3%	.1%	.7%	.1%
Design Automation	5.4	.0	.0	5.4	0	0	.3%	.0%	1.0%	.0%
Engineering Computer Services	5.3	2.3	2.3	1.7	158	158	.3%	.2%	.3%	.1%
ISICAD	5.2	.0	.0	5.2	0	0	.3%	.0%	1.0%	.0%
ESRI	5.2	.0	.0	5.1	0	0	.3%	.0%	.9%	.0%
Orcad	5.0	.0	.0	4.9	0	0	.3%	.0%	.9%	.0%
Aries Technology	4.9	1.9	1.9	2.5	105	105	.3%	.2%	.5%	.0%
Yamashita Electronic	4.6	1.9	1.9	2.3	100	100	.3%	.2%	.4%	.0%
Teradyne	4.5	.0	.0	3.6	0	0	.3%	.0%	.7%	.0%
Robocom	4.1	.0	.0	4.1	0	0	.2%	.0%	.8%	.0%
Computer Aided Planning	4.0	.0	.0	3.2	0	0	.2%	.0%	.6%	.0%
Sigma Design	3.8	.0	.0	3.4	0	0	.2%	.0%	.6%	.0%
Omaton	3.5	.0	.0	3.5	0	0	.2%	.0%	.7%	.0%
Sumisho Electronics	3.4	1.0	1.0	2.0	65	65	.2%	.1%	.4%	.0%
Sumisho Electronics	3.4	1.0	1.0	2.1	65	65	.2%	.1%	.4%	.0%
Manufacturing Consultants	3.3	.0	.0	2.9	0	0	.2%	.0%	.5%	.0%
American Small Business Comp.	3.3	.0	.0	3.3	0	0	.2%	.0%	.6%	.0%
CAD Software	3.3	.0	.0	2.9	0	0	.2%	.0%	.5%	.0%
Technovision	3.2	.0	.0	3.2	0	0	.2%	.0%	.6%	.0%
Aptos	3.1	.0	.0	3.1	0	0	.2%	.0%	.6%	.0%
Foresight Resources	3.1	.0	.0	3.1	0	0	.2%	.0%	.6%	.0%
Microsim	3.1	.0	.0	3.1	0	0	.2%	.0%	.6%	.0%
Marubeni Hytech	3.0	.0	.0	2.7	0	0	.2%	.0%	.5%	.0%
Micrografx	3.0	.0	.0	3.0	0	0	.2%	.0%	.6%	.0%
Superdraft	2.9	.2	.2	2.6	0	0	.2%	.0%	.5%	.0%
Cadtronic	2.8	1.8	1.8	.8	36	36	.2%	.1%	.1%	.0%
Visionics	2.8	.0	.0	2.8	0	0	.2%	.0%	.5%	.0%

# Market Share

TABLE NUMBER: 1  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Innovative Data Design	2.5	.0	2.5	0	.1%	.0%	.5%	.0%
Automated Images	2.5	.0	2.5	0	.1%	.0%	.5%	.0%
Philips International	2.5	.0	2.1	0	.1%	.0%	.4%	.0%
Westward	2.3	1.7	.3	833	.1%	.1%	.1%	.3%
Mapinfo	2.3	.0	2.3	0	.1%	.0%	.4%	.0%
Cascade Graphics	2.3	.0	1.9	0	.1%	.0%	.3%	.0%
D.C.A. Engineering	2.3	.0	2.3	0	.1%	.0%	.4%	.0%
Strategic Locations Planning	2.3	.0	2.3	0	.1%	.0%	.4%	.0%
Swanson Analysis	2.1	.0	2.1	0	.1%	.0%	.4%	.0%
Mega CADD	2.1	.0	2.1	0	.1%	.0%	.4%	.0%
Accel Technologies	2.0	.0	2.0	0	.1%	.0%	.4%	.0%
Endeco Systems	2.0	.0	1.8	0	.1%	.0%	.3%	.0%
Algor Interactive Systems	1.9	.0	1.9	0	.1%	.0%	.4%	.0%
Micro Engineering Solutions	1.8	.5	1.1	157	.1%	.0%	.2%	.1%
Evolution Computing	1.8	.0	1.8	0	.1%	.0%	.3%	.0%
Micro CAD/CAM Systems	1.8	.0	1.8	0	.1%	.0%	.3%	.0%
Control Data	1.8	1.2	.4	80	.1%	.1%	.1%	.0%
MacNeal-Schwendler	1.8	.0	1.7	0	.1%	.0%	.3%	.0%
Terr-Mar	1.7	.8	.8	45	.1%	.1%	.2%	.0%
Bentley	1.6	.0	1.6	0	.1%	.0%	.3%	.0%
ERDAS	1.5	.8	.8	41	.1%	.1%	.1%	.0%
Graphtec Engineering	1.5	.8	.6	0	.1%	.1%	.1%	.0%
Mitsui Engineering	1.5	1.4	.0	24	.1%	.1%	.0%	.0%
Spectrum Software	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Ashton-Tate	1.5	.0	1.4	0	.1%	.0%	.3%	.0%
LandCadd	1.4	.0	1.3	0	.1%	.0%	.2%	.0%
Sycotronic AG	1.4	.0	1.2	0	.1%	.0%	.2%	.0%
Accugraph	1.3	.5	.8	46	.1%	.0%	.1%	.0%
Cimatron	1.3	.9	.4	34	.1%	.1%	.1%	.0%
The Great Softwestern Co.	1.3	.0	1.3	0	.1%	.0%	.2%	.0%
Calma	1.3	.0	1.2	0	.1%	.0%	.2%	.0%
A.I. Systems	1.2	.0	1.2	0	.1%	.0%	.2%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.1%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CIVILSOFT	1.2	.0	1.1	0	.1%	.0%	.2%	.0%
Vision 3D	1.2	1.2	.0	15	.1%	.1%	.0%	.0%
Zycor	1.2	.0	1.1	0	.1%	.0%	.2%	.0%
Geographic Data Technologies	1.2	.0	1.1	0	.1%	.0%	.2%	.0%
Ikos Systems	1.0	1.1	.0	16	.1%	.1%	.0%	.0%
CAD-UL	1.0	.3	.7	27	.1%	.0%	.1%	.0%
C.H. Guernsey	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
CAD Lab	1.0	.0	.8	0	.1%	.0%	.1%	.0%
Cadisys	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Challenger Software	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Engineering Software	1.0	.0	.9	0	.1%	.0%	.2%	.0%
Dennis Klein & Associates	.9	.0	.9	0	.0%	.0%	.2%	.0%
Norsk Data	.9	.1	.2	36	.0%	.0%	.0%	.0%
GRAPHSOFT	.8	.0	.8	0	.0%	.0%	.2%	.0%
Comshoppe	.8	.0	.8	0	.0%	.0%	.1%	.0%
Integrated Silicon Systems	.8	.3	.5	17	.0%	.0%	.1%	.0%
Phase Three Logic	.8	.0	.7	0	.0%	.0%	.1%	.0%
Vamp	.7	.0	.7	0	.0%	.0%	.1%	.0%
Douglas Electronics	.7	.0	.4	0	.0%	.0%	.1%	.0%
MATC CAD	.7	.2	.5	5	.0%	.0%	.1%	.0%
European Silicon Structures	.7	.0	.7	0	.0%	.0%	.1%	.0%
Kanematsu Semiconductor	.7	.0	.6	0	.0%	.0%	.1%	.0%
Elite Software Development	.6	.2	.4	0	.0%	.0%	.1%	.0%
Rikei	.6	.2	.3	0	.0%	.0%	.1%	.0%
Ithaca Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
CRTC	.5	.0	.5	0	.0%	.0%	.1%	.0%
IGC Technology	.5	.0	.5	0	.0%	.0%	.1%	.0%
Albert Nestler	.5	.3	.1	32	.0%	.0%	.0%	.0%
Dynaware	.4	.0	.4	0	.0%	.0%	.1%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
EDA Systems	.3	.0	.2	0	.0%	.0%	.0%	.0%
CLM/Systems	.3	.0	.3	0	.0%	.0%	.1%	.0%

(Continued)



# Market Share

TABLE NUMBER: 1 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company *****					----- Market Share -----			
	Total Revenue *****	Hardware Revenue *****	Software Revenue *****	Wkstns Shipped *****	Total Revenue *****	Hardware Revenue *****	Software Revenue *****	Wkstns Shipped *****
DFI	.3	.1	.2	11	.0%	.0%	.0%	.0%
Bechtel Software	.2	.0	.2	0	.0%	.0%	.0%	.0%
EDSA Micro	.2	.0	.2	0	.0%	.0%	.0%	.0%
Secmai	.2	.1	.0	3	.0%	.0%	.0%	.0%
International Microelectronic	.2	.0	.1	0	.0%	.0%	.0%	.0%
Geomath	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	4	.0%	.0%	.0%	.0%
Other Companies	568.3	381.9	226.3	94,022	31.9%	31.3%	42.2%	39.0%
All Companies	1,781.4	1,220.9	536.3	241,122	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,341.4	986.0	372.1	219,155	75.3%	80.8%	69.4%	90.9%
All Asian-Based Companies	326.6	206.7	90.6	16,672	18.3%	16.9%	16.9%	6.9%
All European-Based Companies	113.4	28.2	73.6	5,295	6.4%	2.3%	13.7%	2.2%
All Hardware Companies	989.8	1,029.6	.0	225,519	55.6%	84.3%	.0%	93.5%
All Turnkey & SW Companies	791.6	191.3	536.3	15,603	44.4%	15.7%	100.0%	6.5%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 2

TITLE: 1988 Software Market Share

APPLICATION: All Applications

PLATFORM: Personal Computer

REGION: Worldwide

UNITS: Millions of Dollars/Actual Units

Company	Software Revenue		Software Units		Market Share	
	Revenue	Units	Revenue	Units	Revenue	Units
Autodesk	111.4	94,194	31,084	63,110	20.7%	11.7%
Prime Computer	28.7	15,880	0	15,880	5.3%	.0%
Racal-Redac	22.5	5,760	0	5,760	4.2%	.0%
Nutch Industries - No OEM	20.3	2,317	0	2,317	3.8%	.0%
CADAM	15.9	3,037	0	3,037	3.0%	.0%
Intergraph	13.4	8,645	0	8,645	2.5%	.0%
Ziegler Instruments GmbH	13.3	1,000	0	1,000	2.5%	.0%
Hitachi	11.6	1,171	0	1,171	2.1%	.0%
Futurenet	10.8	3,613	0	3,613	2.0%	.0%
Fujitsu	10.6	2,760	0	2,760	2.0%	.0%
Hakuto	10.4	582	0	582	1.9%	.0%
CADKEY	10.3	7,360	0	7,360	1.9%	.0%
Xilinx	9.7	1,900	0	1,900	1.8%	.0%
Daisy Systems	7.2	319	0	319	1.3%	.0%
Generic Software	7.1	66,000	66,000	0	1.3%	24.8%
View Logic	6.7	2,625	0	2,625	1.2%	.0%
Wacom	6.5	1,000	0	1,000	1.2%	.0%
Olivetti	6.4	901	0	901	1.2%	.0%
Andor	6.3	2,130	0	2,130	1.2%	.0%
EESOF	6.1	610	0	610	1.1%	.0%
ETAK	5.8	1,160	0	1,160	1.1%	.0%
Hitachi Seiko	5.6	210	0	210	1.0%	.0%
RHV Software Systems	5.5	1,800	0	1,800	1.0%	.0%
Design Automation	5.4	4,000	0	4,000	1.0%	.0%
ISICAD	5.2	5,200	0	5,200	1.0%	.0%
Altera	5.2	1,000	0	1,000	1.0%	.0%
IBM	5.2	1,190	0	1,190	1.0%	.0%
ESRI	5.1	1,200	0	1,200	.9%	.0%
Orcad	4.9	13,514	13,514	0	.9%	5.1%
Robocom	4.1	4,925	0	4,925	.8%	1.0%
Mitsubishi Electric	3.9	332	0	332	.7%	.0%
CPU	3.8	1,200	0	1,200	.7%	.0%
Rotring euroCAD	3.7	200	0	200	.7%	.0%

# Market Share

TABLE NUMBER: 2  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software Revenue		Software Units		Market Share	
	Revenue	Units	< \$500	> \$500	Revenue	Units
Teredyne	3.6	180	0	180	.7%	.0%
Omatron	3.5	11,666	0	0	.7%	4.4%
Valid	3.5	305	0	305	.6%	.1%
Sigma Design	3.4	2,194	0	2,194	.6%	.5%
American Small Business Comp.	3.3	21,667	21,667	0	.6%	4.6%
Computer Aided Planning	3.2	400	0	400	.6%	.1%
Technovision	3.2	460	0	460	.6%	.1%
Aptos	3.1	900	99	801	.6%	.2%
Foreright Resources	3.1	15,500	15,500	0	.6%	3.3%
Microsim	3.1	1,860	0	1,860	.6%	.4%
Micrografx	3.0	13,333	13,333	0	.5%	2.8%
CAD Software	2.9	1,400	0	1,400	.5%	.3%
Manufacturing Consultants	2.9	1,450	0	1,450	.5%	.3%
Seiko I&E - Turkey	2.8	52	0	52	.5%	.0%
Visiconics	2.8	1,700	0	1,700	.5%	.4%
Superdraft	2.6	8,944	8,944	0	.5%	1.9%
Aries Technology	2.5	190	0	190	.5%	.0%
Innovative Data Design	2.5	18,000	18,000	0	.5%	3.8%
Automated Images	2.5	250	0	250	.5%	.1%
Logotec	2.5	300	0	300	.5%	.1%
Aucotec	2.5	540	0	540	.5%	.1%
Toshiba - No OEM	2.3	307	0	307	.4%	.1%
Yamaha Electronic	2.3	200	0	200	.4%	.0%
Mapinfo	2.3	2,000	0	2,000	.4%	.4%
D.C.A. Engineering	2.3	1,535	0	1,535	.4%	.3%
Strategic Locations Planning	2.3	5,000	0	5,000	.4%	1.1%
Shanson Analysis	2.1	1,050	0	1,050	.4%	.2%
Phillips International	2.1	140	0	140	.4%	.0%
Mega CADD	2.1	2,380	0	2,380	.4%	.5%
Sumisho Electronics	2.0	256	0	256	.4%	.1%
Accel Technologies	2.0	5,000	0	5,000	.4%	1.1%
Algor Interactive Systems	1.9	2,000	0	2,000	.4%	.4%
Cascade Graphics	1.9	1,000	0	1,000	.3%	.2%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
InterCAD	1.8	1,070	0	1,070	.3%	.2%	.0%	.5%
Endeco Systems	1.8	500	0	500	.3%	.1%	.0%	.2%
Evolution Computing	1.8	35,750	35,035	715	.3%	7.5%	13.2%	.3%
Micro CAD/CAM Systems	1.8	3,500	0	3,500	.3%	.7%	.0%	1.7%
MacNeal-Schwendler	1.7	850	0	850	.3%	.2%	.0%	.4%
Engineering Computer Services	1.7	157	0	157	.3%	.0%	.0%	.1%
Bentley	1.6	1,070	0	1,070	.3%	.2%	.0%	.5%
Spectrum Software	1.5	3,000	3,000	0	.3%	.6%	1.1%	.0%
Ashton-Tate	1.4	3,600	3,600	0	.3%	.8%	1.4%	.0%
LandCadd	1.3	1,162	0	1,162	.2%	.2%	.0%	.6%
The Great Softwestern Co..	1.3	942	0	942	.2%	.2%	.0%	.4%
A.I. Systems	1.2	2,200	0	2,200	.2%	.5%	.0%	1.0%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	.2%	.5%	.0%	1.1%
Sycotronic AG	1.2	58	0	58	.2%	.0%	.0%	.0%
CIVILSOFT	1.1	8,000	0	8,000	.2%	1.7%	.0%	3.8%
Zycor	1.1	145	0	145	.2%	.0%	.0%	.1%
Micro Engineering Solutions	1.1	110	0	110	.2%	.0%	.0%	.1%
Geographic Data Technologies	1.1	220	0	220	.2%	.0%	.0%	.1%
Cadisys	1.0	400	0	400	.2%	.1%	.0%	.2%
Challenger Software	1.0	4,000	4,000	0	.2%	.8%	1.5%	.0%
C.N. Guernsey	1.0	333	0	333	.2%	.1%	.0%	.2%
Engineering Software	.9	2,000	2,000	0	.2%	.4%	.8%	.0%
Dennis Klein & Associates	.9	281	0	281	.2%	.1%	.0%	.1%
GRAPHSOFT	.8	3,000	3,000	0	.2%	.6%	1.1%	.0%
Terr-Mar	.8	40	0	40	.2%	.0%	.0%	.0%
CAD Lab	.8	800	0	800	.1%	.2%	.0%	.4%
Comshoppe	.8	2,500	2,500	0	.1%	.5%	.9%	.0%
Accugraph	.8	500	0	500	.1%	.1%	.0%	.2%
Cadtronic	.8	145	0	145	.1%	.0%	.0%	.1%
ERDAS	.8	32	0	32	.1%	.0%	.0%	.0%
Vamp	.7	2,800	2,800	0	.1%	.6%	1.1%	.0%
CAD-UL	.7	53	0	53	.1%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
European Silicon Structures	.7	32	0	32	.1%	.0%	.0%	.0%
Phase Three Logic	.7	2,000	2,000	0	.1%	.4%	.8%	.0%
Graphtec Engineering	.6	40	0	40	.1%	.0%	.0%	.0%
Kanematsu Semiconductor	.6	110	0	110	.1%	.0%	.0%	.1%
MATC CAD	.5	764	764	0	.1%	.2%	.3%	.0%
Ithaca Software	.5	1,250	1,250	0	.1%	.3%	.5%	.0%
CRTC	.5	600	0	600	.1%	.1%	.0%	.3%
IGC Technology	.5	800	0	800	.1%	.2%	.0%	.4%
Integrated Silicon Systems	.5	35	0	35	.1%	.0%	.0%	.0%
Control Data	.4	92	0	92	.1%	.0%	.0%	.0%
Dynaware	.4	900	0	900	.1%	.2%	.0%	.4%
Elite Software Development	.4	1,600	1,600	0	.1%	.3%	.6%	.0%
Douglas Electronics	.4	750	0	750	.1%	.2%	.0%	.4%
BV Engineering	.4	4,000	4,000	0	.1%	.8%	1.5%	.0%
Cimatron	.4	50	0	50	.1%	.0%	.0%	.0%
Rikei	.3	50	0	50	.1%	.0%	.0%	.0%
CLM/Systems	.3	25	0	25	.1%	.0%	.0%	.0%
EDA Systems	.2	3	0	3	.0%	.0%	.0%	.0%
GEOVISION Inc.	.2	400	0	400	.0%	.1%	.0%	.2%
Bechtel Software	.2	25	0	25	.0%	.0%	.0%	.0%
EDSA Micro	.2	40	0	40	.0%	.0%	.0%	.0%
Norsk Data	.2	50	0	50	.0%	.0%	.0%	.0%
DFI	.2	115	0	115	.0%	.0%	.0%	.1%
International Microelectronic	.1	20	0	20	.0%	.0%	.0%	.0%
Albert Nestler	.1	25	0	25	.0%	.0%	.0%	.0%
Geomath	.1	10	0	10	.0%	.0%	.0%	.0%
Kork Systems	.1	25	0	25	.0%	.0%	.0%	.0%
Vision 3D	.0	15	0	15	.0%	.0%	.0%	.0%
Other Companies	4.6	852	257	596	.9%	.2%	.1%	.3%
All Companies	538.4	476,094	265,613	210,481	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 3  
 TITLE: 1988 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Compaq	155.0	155.0	.0	29,760	16.0%	21.1%	.0%	20.9%
IBM	111.5	105.9	4.7	17,269	11.5%	14.4%	2.1%	12.1%
Apple Computer	75.0	66.0	.0	17,500	7.7%	9.0%	.0%	12.3%
NEC	58.6	58.6	.0	6,286	6.0%	8.0%	.0%	4.4%
Autodesk	47.9	.0	47.9	0	4.9%	.0%	21.4%	.0%
Mutoh Industries	45.7	27.9	16.3	1,118	4.7%	3.8%	7.3%	.8%
Hitachi	28.9	17.3	8.7	525	3.0%	2.4%	3.9%	.4%
Hakuto	23.6	11.7	9.3	268	2.4%	1.6%	4.2%	.2%
Hewlett-Packard	23.3	23.3	.0	4,654	2.4%	3.2%	.0%	3.3%
Prime Computer	23.0	3.0	17.9	180	2.4%	.4%	8.0%	.1%
Zenith	20.5	20.5	.0	6,960	2.1%	2.8%	.0%	4.9%
Fujitsu	20.4	12.6	4.9	932	2.1%	1.7%	2.2%	.7%
Olivetti	10.8	4.1	4.6	1,879	1.1%	.6%	2.1%	1.3%
Hitachi Seiko	10.5	4.9	5.6	177	1.1%	.7%	2.5%	.1%
CADKEY	10.3	.0	10.3	0	1.1%	.0%	4.6%	.0%
Everex	8.1	8.1	.0	4,050	.8%	1.1%	.0%	2.8%
Mitsubishi Electric	7.9	.0	3.9	20	.8%	.0%	1.8%	.0%
Toshiba	7.2	.0	.0	307	.7%	.0%	.0%	.2%
Logotec	6.4	3.9	1.9	38	.7%	.5%	.8%	.0%
Andor	6.3	1.3	4.7	68	.6%	.2%	2.1%	.0%
Seiko Instruments	5.3	2.4	2.4	296	.6%	.3%	1.1%	.2%
Engineering Computer Services	5.3	2.3	1.7	158	.5%	.3%	.8%	.1%
Aries Technology	4.9	1.9	2.5	105	.5%	.3%	1.1%	.1%
Design Automation	4.9	.0	4.9	0	.5%	.0%	2.2%	.0%
Rotring euroCAD	4.8	2.1	2.2	84	.5%	.3%	1.0%	.1%
Yamashita Electronic	4.6	1.9	2.3	100	.5%	.3%	1.0%	.1%
RHV Software Systems	4.6	.0	4.6	0	.5%	.0%	2.0%	.0%
Intergraph	4.3	.0	4.0	0	.4%	.0%	1.8%	.0%
Ziegler Instruments GmbH	4.2	.0	4.0	0	.4%	.0%	1.8%	.0%
Manufacturing Consultants	3.3	.0	2.9	0	.3%	.0%	1.3%	.0%
Technovision	3.2	.0	3.2	0	.3%	.0%	1.4%	.0%
Intercad	3.1	1.6	.9	161	.3%	.2%	.4%	.1%
Sumisho Electronics	3.1	.9	1.8	59	.3%	.1%	.8%	.0%

(Continued)

# Market Share

TABLE NUMBER: 3  
 TITLE: 1988 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Sumisho Electronics	3.1	.9	1.9	59	.3%	.1%	.8%	.0%
Generic Software	3.0	.0	3.0	0	.3%	.0%	1.3%	.0%
Superdraft	2.9	.2	2.6	0	.3%	.0%	1.1%	.0%
Philips International	2.5	.0	2.1	0	.3%	.0%	1.0%	.0%
American Small Business Comp.	2.4	.0	2.4	0	.2%	.0%	1.1%	.0%
Westward	2.2	1.6	.3	792	.2%	.2%	.1%	.6%
Swanson Analysis	2.1	.0	2.1	0	.2%	.0%	1.0%	.0%
Robocom	2.0	.0	2.0	0	.2%	.0%	.9%	.0%
Algor Interactive Systems	1.9	.0	1.9	0	.2%	.0%	.8%	.0%
Micro Engineering Solutions	1.8	.5	1.1	157	.2%	.1%	.5%	.1%
MacNeal-Schwendler	1.8	.0	1.7	0	.2%	.0%	.8%	.0%
ISICAD	1.7	.0	1.7	0	.2%	.0%	.7%	.0%
Control Data	1.5	1.1	.4	70	.2%	.1%	.2%	.0%
Graphtec Engineering	1.5	.8	.6	0	.2%	.1%	.3%	.0%
Mitsui Engineering	1.5	1.4	.0	24	.2%	.2%	.0%	.0%
Micrografx	1.5	.0	1.5	0	.2%	.0%	.7%	.0%
Cimatron	1.3	.9	.4	34	.1%	.1%	.2%	.0%
Micro CAD/CAM Systems	1.3	.0	1.3	0	.1%	.0%	.6%	.0%
Foresight Resources	1.3	.0	1.3	0	.1%	.0%	.6%	.0%
Vision 3D	1.2	1.2	.0	15	.1%	.2%	.0%	.0%
Evolution Computing	1.2	.0	1.2	0	.1%	.0%	.5%	.0%
Accugraph	1.1	.4	.7	39	.1%	.1%	.3%	.0%
A.I. Systems	1.0	.0	1.0	0	.1%	.0%	.5%	.0%
CADAM	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
Cascade Graphics	.8	.0	.7	0	.1%	.0%	.3%	.0%
Challenger Software	.8	.0	.8	0	.1%	.0%	.4%	.0%
Bentley	.8	.0	.8	0	.1%	.0%	.3%	.0%
Norsk Data	.7	.1	.2	36	.1%	.0%	.1%	.0%
CAD Lab	.7	.0	.6	0	.1%	.0%	.3%	.0%
Calma	.7	.0	.7	0	.1%	.0%	.3%	.0%
MATC CAD	.7	.2	.5	5	.1%	.0%	.2%	.0%
Wacom	.7	.3	.4	66	.1%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 3 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Innovative Data Design	.6	.0	.6	0	.1%	.0%	.3%	.0%
Ithaca Software	.5	.0	.5	0	.1%	.0%	.2%	.0%
Elite Software Development	.5	.1	.3	0	.0%	.0%	.1%	.0%
Albert Nestler	.5	.3	.1	32	.0%	.0%	.1%	.0%
Mega CADD	.5	.0	.5	0	.0%	.0%	.2%	.0%
GRAPHSOFT	.4	.0	.4	0	.0%	.0%	.2%	.0%
Engineering Software	.4	.0	.4	0	.0%	.0%	.2%	.0%
CRTC	.3	.0	.3	0	.0%	.0%	.1%	.0%
Cadtronic	.3	.2	.1	4	.0%	.0%	.0%	.0%
DFI	.2	.1	.1	8	.0%	.0%	.1%	.0%
EDSA Micro	.2	.0	.2	0	.0%	.0%	.1%	.0%
IGC Technology	.1	.0	.1	0	.0%	.0%	.0%	.0%
Comshoppe	.1	.0	.1	0	.0%	.0%	.0%	.0%
Other Companies	279.4	221.9	85.0	54,153	28.8%	30.2%	38.0%	38.0%
All Companies	969.9	735.9	223.8	142,533	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	692.6	580.4	131.8	128,933	71.4%	78.9%	58.9%	90.5%
All Asian-Based Companies	223.4	137.0	63.5	10,320	23.0%	18.6%	28.4%	7.2%
All European-Based Companies	53.9	18.4	28.5	3,280	5.6%	2.5%	12.7%	2.3%
All Hardware Companies	583.3	608.2	.0	132,476	60.1%	82.6%	.0%	92.9%
All Turnkey & SW Companies	386.6	127.7	223.8	10,057	39.9%	17.4%	100.0%	7.1%

Source: Dataquest  
May 1989



# Market Share

TABLE NUMBER: 4  
 TITLE: 1988 Software Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	47.9	40,504	13,366	27,138	21.9%	20.7%	11.5%	34.1%
Prime Computer	17.9	7,553	0	7,553	8.2%	3.9%	.0%	9.5%
Mutoh Industries - No OEM	16.3	1,864	0	1,864	7.5%	1.0%	.0%	2.3%
CADKEY	10.3	7,360	0	7,360	4.7%	3.8%	.0%	9.3%
Hakuto	9.3	524	0	524	4.3%	.3%	.0%	.7%
Hitachi	8.7	878	0	878	4.0%	.4%	.0%	1.1%
Hitachi Seiko	5.6	210	0	210	2.6%	.1%	.0%	.3%
Design Automation	4.9	3,637	0	3,637	2.2%	1.9%	.0%	4.6%
Fujitsu	4.9	1,267	0	1,267	2.2%	.6%	.0%	1.6%
IBM	4.7	1,082	0	1,082	2.2%	.6%	.0%	1.4%
Andor	4.7	1,600	0	1,600	2.2%	.8%	.0%	2.0%
Olivetti	4.6	646	0	646	2.1%	.3%	.0%	.8%
RNV Software Systems	4.6	1,501	0	1,501	2.1%	.8%	.0%	1.9%
Intergraph	4.0	2,603	0	2,603	1.8%	1.3%	.0%	3.3%
Ziegler Instruments GmbH	4.0	300	0	300	1.8%	.2%	.0%	.4%
Mitsubishi Electric	3.9	332	0	332	1.8%	.2%	.0%	.4%
Technovision	3.2	460	0	460	1.5%	.2%	.0%	.6%
Generic Software	3.0	27,662	27,662	0	1.4%	14.1%	23.8%	.0%
Manufacturing Consultants	2.9	1,450	0	1,450	1.3%	.7%	.0%	1.8%
Superdraft	2.6	8,944	8,944	0	1.2%	4.6%	7.7%	.0%
Aries Technology	2.5	190	0	190	1.2%	.1%	.0%	.2%
Seiko I&E - Turnkey	2.4	44	0	44	1.1%	.0%	.0%	.1%
American Small Business Comp.	2.4	15,692	15,692	0	1.1%	8.0%	13.5%	.0%
Toshiba - No OEM	2.3	307	0	307	1.1%	.2%	.0%	.4%
Yamashita Electronic	2.3	200	0	200	1.1%	.1%	.0%	.3%
Rotring euroCAD	2.2	120	0	120	1.0%	.1%	.0%	.2%
Swanson Analysis	2.1	1,050	0	1,050	1.0%	.5%	.0%	1.3%
Philips International	2.1	140	0	140	1.0%	.1%	.0%	.2%
Robocom	2.0	2,349	0	2,349	.9%	1.2%	.0%	3.0%
Algor Interactive Systems	1.9	2,000	0	2,000	.9%	1.0%	.0%	2.5%
Logotec	1.9	225	0	225	.9%	.1%	.0%	.3%
Sumisho Electronics	1.8	231	0	231	.8%	.1%	.0%	.3%
MacNeal-Schwendler	1.7	850	0	850	.8%	.4%	.0%	1.1%

(Continued)

# Market Share

TABLE NUMBER: 4  
 TITLE: 1988 Software Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Engineering Computer Services	1.7	157	0	157	.8%	.1%	.0%	.2%
ISICAD	1.7	1,657	0	1,657	.8%	.8%	.0%	2.1%
Micrografx	1.5	6,667	6,667	0	.7%	3.4%	5.7%	.0%
Micro CAD/CAM Systems	1.3	2,625	0	2,625	.6%	1.3%	.0%	3.3%
Foresight Resources	1.3	6,571	6,571	0	.6%	3.4%	5.7%	.0%
Evolution Computing	1.2	23,766	23,290	475	.5%	12.2%	20.1%	.6%
Micro Engineering Solutions	1.1	110	0	110	.5%	.1%	.0%	.1%
A.I. Systems	1.0	1,873	0	1,873	.5%	1.0%	.0%	2.4%
CADAM	1.0	624	0	624	.4%	.3%	.0%	.8%
InterCAD	.9	512	0	512	.4%	.3%	.0%	.6%
Challenger Software	.8	3,240	3,240	0	.4%	1.7%	2.8%	.0%
Bentley	.8	502	0	502	.3%	.3%	.0%	.6%
Cascade Graphics	.7	373	0	373	.3%	.2%	.0%	.5%
Accugraph	.7	429	0	429	.3%	.2%	.0%	.5%
Innovative Data Design	.6	4,518	4,518	0	.3%	2.3%	3.9%	.0%
Graphtec Engineering	.6	40	0	40	.3%	.0%	.0%	.1%
CAD Lab	.6	560	0	560	.3%	.3%	.0%	.7%
MATC CAD	.5	764	764	0	.2%	.4%	.7%	.0%
Ithaca Software	.5	1,250	1,250	0	.2%	.6%	1.1%	.0%
Mega CADD	.5	519	0	519	.2%	.3%	.0%	.7%
GRAPHSOFT	.4	1,500	1,500	0	.2%	.8%	1.3%	.0%
Control Data	.4	82	0	82	.2%	.0%	.0%	.1%
Wacom	.4	60	0	60	.2%	.0%	.0%	.1%
Engineering Software	.4	800	800	0	.2%	.4%	.7%	.0%
Cimatron	.4	50	0	50	.2%	.0%	.0%	.1%
CRTC	.3	396	0	396	.2%	.2%	.0%	.5%
Elite Software Development	.3	1,219	1,219	0	.1%	.6%	1.1%	.0%
EDSA Micro	.2	40	0	40	.1%	.0%	.0%	.1%
Norsk Data	.2	50	0	50	.1%	.0%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 4 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Albert Nestler	.1	25	0	25	.1%	.0%	.0%	.0%
DFI	.1	81	0	81	.1%	.0%	.0%	.1%
IGC Technology	.1	160	0	160	.0%	.1%	.0%	.2%
Cadtronic	.1	15	0	15	.0%	.0%	.0%	.0%
Comshoppe	.1	250	250	0	.0%	.1%	.2%	.0%
Other Companies	.7	261	258	4	.3%	.1%	.2%	.0%
All Companies	218.8	195,535	115,991	79,544	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 May 1989

# Market Share

TABLE NUMBER: 5  
 TITLE: 1988 Market Share  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Apple Computer	57.0	50.2	.0	13,300	14.8%	17.6%	.0%	21.5%
IBM	45.8	45.6	.2	7,579	11.9%	16.0%	.2%	12.3%
Compaq	45.0	45.0	.0	8,640	11.7%	15.8%	.0%	14.0%
Autodesk	33.4	.0	33.4	0	8.7%	.0%	34.0%	.0%
Fujitsu	15.3	9.5	3.6	699	4.0%	3.3%	3.7%	1.1%
Hewlett-Packard	13.7	13.7	.0	2,732	3.6%	4.8%	.0%	4.4%
NEC	12.1	12.1	.0	1,297	3.1%	4.2%	.0%	2.1%
Mutoh Industries	6.6	4.0	2.4	142	1.7%	1.4%	2.4%	.2%
Prime Computer	6.3	.6	5.4	33	1.6%	.2%	5.5%	.1%
Intergraph	6.0	.0	5.6	0	1.6%	.0%	5.7%	.0%
Hitachi	5.8	3.5	1.7	105	1.5%	1.2%	1.8%	.2%
CPU	5.4	1.4	3.8	300	1.4%	.5%	3.8%	.5%
Everex	4.7	4.7	.0	2,362	1.2%	1.7%	.0%	3.8%
Computer Aided Planning	4.0	.0	3.2	0	1.0%	.0%	3.3%	.0%
Sigma Design	3.8	.0	3.4	0	1.0%	.0%	3.5%	.0%
Olivetti	3.8	1.9	1.2	696	1.0%	.7%	1.2%	1.1%
ISICAD	3.6	.0	3.6	0	.9%	.0%	3.6%	.0%
Zenith	3.1	3.1	.0	1,040	.8%	1.1%	.0%	1.7%
Generic Software	3.1	.0	3.1	0	.8%	.0%	3.1%	.0%
Hakuto	2.6	1.3	1.0	30	.7%	.5%	1.1%	.0%
Endeco Systems	2.0	.0	1.8	0	.5%	.0%	1.8%	.0%
Ziegler Instruments GmbH	1.8	.0	1.7	0	.5%	.0%	1.8%	.0%
D.C.A. Engineering	1.8	.0	1.8	0	.5%	.0%	1.8%	.0%
Robocom	1.8	.0	1.8	0	.5%	.0%	1.8%	.0%
Cadtronic	1.7	1.1	.5	22	.4%	.4%	.5%	.0%
Mega CADD	1.7	.0	1.7	0	.4%	.0%	1.7%	.0%
Innovative Data Design	1.6	.0	1.6	0	.4%	.0%	1.7%	.0%
Micrografx	1.5	.0	1.5	0	.4%	.0%	1.5%	.0%
Andor	1.4	.3	1.1	15	.4%	.1%	1.1%	.0%
CIVILSOFT	1.2	.0	1.1	0	.3%	.0%	1.1%	.0%
Foresight Resources	1.1	.0	1.1	0	.3%	.0%	1.1%	.0%
Seiko Instruments	1.0	.4	.4	54	.3%	.2%	.4%	.1%
Comshoppe	.7	.0	.7	0	.2%	.0%	.7%	.0%

(Continued)

# Market Share

TABLE NUMBER: 5  
 TITLE: 1988 Market Share  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
American Small Business Comp.	.7	.0	.7	0	.2%	.0%	.7%	.0%
Engineering Software	.6	.0	.5	0	.2%	.0%	.5%	.0%
Evolution Computing	.6	.0	.6	0	.2%	.0%	.6%	.0%
Design Automation	.5	.0	.5	0	.1%	.0%	.5%	.0%
Micro CAD/CAM Systems	.4	.0	.4	0	.1%	.0%	.4%	.0%
Calma	.4	.0	.4	0	.1%	.0%	.4%	.0%
Bentley	.4	.0	.4	0	.1%	.0%	.4%	.0%
Dynaware	.4	.0	.4	0	.1%	.0%	.4%	.0%
GRAPHISOFT	.4	.0	.4	0	.1%	.0%	.4%	.0%
IGC Technology	.4	.0	.4	0	.1%	.0%	.4%	.0%
Sumisho Electronics	.3	.1	.2	6	.1%	.0%	.2%	.0%
Sumisho Electronics	.3	.1	.2	6	.1%	.0%	.2%	.0%
CAD Lab	.3	.0	.2	0	.1%	.0%	.2%	.0%
CLM/Systems	.3	.0	.3	0	.1%	.0%	.3%	.0%
Accugraph	.2	.1	.1	7	.1%	.0%	.1%	.0%
Bechtel Software	.2	.0	.2	0	.1%	.0%	.2%	.0%
CADAM	.2	.0	.2	0	.1%	.0%	.2%	.0%
Challenger Software	.2	.0	.2	0	.0%	.0%	.2%	.0%
CRTC	.2	.0	.2	0	.0%	.0%	.2%	.0%
Elite Software Development	.2	.1	.1	0	.0%	.0%	.1%	.0%
RHV Software Systems	.2	.0	.2	0	.0%	.0%	.2%	.0%
Cascade Graphics	.1	.0	.1	0	.0%	.0%	.1%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Westward	.1	.1	.0	42	.0%	.0%	.0%	.1%
Norsk Data	.1	.0	.0	0	.0%	.0%	.0%	.0%
DFI	.1	.0	.1	3	.0%	.0%	.1%	.0%
Control Data	.0	.0	.0	2	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 5 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: AEC  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	122.9	94.8	39.4	25,426	32.0%	33.2%	40.0%	41.2%
All Companies	384.6	285.7	98.4	61,780	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	325.4	251.1	78.5	58,293	84.6%	87.9%	79.8%	94.4%
All Asian-Based Companies	51.0	32.5	14.8	2,701	13.3%	11.4%	15.0%	4.4%
All European-Based Companies	8.2	2.0	5.1	787	2.1%	.7%	5.2%	1.3%
All Hardware Companies	251.2	258.9	.0	59,403	65.3%	90.6%	.0%	96.2%
All Turnkey & SW Companies	133.4	26.8	98.4	2,377	34.7%	9.4%	100.0%	3.8%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 6  
 TITLE: 1988 Software Market Share  
 APPLICATION: Facilities Design  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Market Share			
	Software Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	33.4	28,257	9,325	18,932
Intergraph	5.6	3,652	0	3,652
Prime Computer	5.4	4,673	0	4,673
CPU	3.8	1,200	0	1,200
Fujitsu	3.6	949	0	949
ISICAD	3.6	3,543	0	3,543
Sigma Design	3.4	2,194	0	2,194
Computer Aided Planning	3.2	400	0	400
Generic Software	3.1	28,312	28,312	0
Mutoh Industries - No OEM	2.4	272	0	272
D.C.A. Engineering	1.8	1,229	0	1,229
Endeco Systems	1.8	500	0	500
Robocom	1.8	2,109	0	2,109
Ziegler Instruments GmbH	1.7	131	0	131
Mitachi	1.7	175	0	175
Mega CADD	1.7	1,861	0	1,861
Innovative Data Design	1.6	11,689	11,689	0
Micrografx	1.5	6,667	6,667	0
Olivetti	1.2	161	0	161
CIVILSOFT	1.1	8,000	0	8,000
Andor	1.1	360	0	360
Foresight Resources	1.1	5,317	5,317	0
Hakuto	1.0	58	0	58
Comshoppe	.7	2,250	2,250	0
American Small Business Comp.	.7	4,333	4,333	0
Evolution Computing	.6	11,984	11,745	240
Engineering Software	.5	1,200	1,200	0
Design Automation	.5	363	0	363
Cadtronic	.5	87	0	87
Micro CAD/CAM Systems	.4	875	0	875
Seiko I&E - Turnkey	.4	8	0	8
Bentley	.4	281	0	281

(Continued)

# Market Share

TABLE NUMBER: 6 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: Facilities Design  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Dynaware	.4	900	0	900	.4%	.7%	.0%	1.6%
GRAPHSOFT	.4	1,500	1,500	0	.4%	1.1%	1.8%	.0%
IGC Technology	.4	640	0	640	.4%	.5%	.0%	1.2%
CLM/Systems	.3	25	0	25	.3%	.0%	.0%	.0%
CAD Lab	.2	240	0	240	.3%	.2%	.0%	.4%
Bechtel Software	.2	25	0	25	.2%	.0%	.0%	.0%
Sumisho Electronics	.2	25	0	25	.2%	.0%	.0%	.0%
CADAM	.2	122	0	122	.2%	.1%	.0%	.2%
Challenger Software	.2	760	760	0	.2%	.5%	.9%	.0%
IBM	.2	44	0	44	.2%	.0%	.0%	.1%
CRTC	.2	204	0	204	.2%	.1%	.0%	.4%
RHV Software Systems	.2	49	0	49	.2%	.0%	.0%	.1%
A.I. Systems	.1	218	0	218	.1%	.2%	.0%	.4%
Accugraph	.1	71	0	71	.1%	.1%	.0%	.1%
Cascade Graphics	.1	59	0	59	.1%	.0%	.0%	.1%
Elite Software Development	.1	381	381	0	.1%	.3%	.5%	.0%
DFI	.1	34	0	34	.1%	.0%	.0%	.1%
Other Companies	.4	1	(2)	2	.4%	.0%	-.0%	.0%
All Companies	95.2	138,391	83,477	54,913	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989



# Market Share

TABLE NUMBER: 7  
 TITLE: 1988 Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Autodesk	10.0	.0	10.0	0	12.8%	.0%	21.9%	.0%
ETAK	7.2	1.1	5.8	0	9.2%	3.6%	12.6%	.0%
Apple Computer	6.0	5.3	.0	1,400	7.7%	17.7%	.0%	28.1%
ESRI	5.2	.0	5.1	0	6.6%	.0%	11.1%	.0%
IBM	5.2	5.0	.1	809	6.6%	16.6%	.3%	16.3%
Fujitsu	5.1	3.2	1.2	233	6.5%	10.6%	2.7%	4.7%
Mutoh Industries	4.4	2.7	1.6	95	5.6%	9.0%	3.5%	1.9%
Intergraph	2.9	.0	2.7	0	3.7%	.0%	6.0%	.0%
Mapinfo	2.3	.0	2.3	0	2.9%	.0%	5.0%	.0%
Strategic Locations Planning	2.3	.0	2.3	0	2.9%	.0%	4.9%	.0%
Hitachi	1.9	1.2	.6	35	2.5%	3.8%	1.3%	.7%
Terr-Mar	1.7	.8	.8	45	2.1%	2.8%	1.8%	.9%
ERDAS	1.5	.8	.8	41	1.9%	2.6%	1.7%	.8%
Ashton-Tate	1.5	.0	1.4	0	1.9%	.0%	3.1%	.0%
Olivetti	1.5	.5	.5	287	1.9%	1.7%	1.0%	5.8%
LandCadd	1.4	.0	1.3	0	1.8%	.0%	2.9%	.0%
Zycor	1.2	.0	1.1	0	1.5%	.0%	2.4%	.0%
Geographic Data Technologies	1.2	.0	1.1	0	1.5%	.0%	2.3%	.0%
C.H. Guernsey	1.0	.0	1.0	0	1.3%	.0%	2.1%	.0%
Ziegler Instruments GmbH	1.0	.0	.9	0	1.2%	.0%	2.0%	.0%
Hewlett-Packard	.9	.9	.0	186	1.2%	3.1%	.0%	3.7%
Dennis Klein & Associates	.9	.0	.9	0	1.1%	.0%	1.9%	.0%
Cadtronic	.9	.5	.2	11	1.1%	1.8%	.5%	.2%
Prime Computer	.7	.0	.6	2	.8%	.1%	1.3%	.0%
Generic Software	.5	.0	.5	0	.6%	.0%	1.1%	.0%
Sycotronic AG	.5	.0	.4	0	.6%	.0%	.8%	.0%
D.C.A. Engineering	.5	.0	.5	0	.6%	.0%	1.0%	.0%
Bentley	.4	.0	.4	0	.5%	.0%	.9%	.0%
Andor	.3	.1	.3	4	.4%	.2%	.5%	.1%
Foresight Resources	.2	.0	.2	0	.3%	.0%	.5%	.0%
Robocom	.2	.0	.2	0	.2%	.0%	.4%	.0%
RHV Software Systems	.2	.0	.2	0	.2%	.0%	.3%	.0%

(Continued)

# Market Share

TABLE NUMBER: 7 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Geomath	.1	.0	.1	0	.1%	.0%	.2%	.0%
Kork Systems	.1	.0	.1	4	.1%	.1%	.1%	.1%
American Small Business Comp.	.1	.0	.1	0	.1%	.0%	.2%	.0%
A.I. Systems	.1	.0	.1	0	.1%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.1%	.0%
Norsk Data	.0	.0	.0	0	.1%	.0%	.0%	.0%
Other Companies	34.4	11.2	23.4	1,927	44.0%	37.5%	51.1%	38.8%
All Companies	78.3	29.9	45.8	4,974	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	63.1	22.3	40.0	4,292	80.6%	74.6%	87.4%	86.3%
All Asian-Based Companies	11.8	7.1	3.6	366	15.0%	23.6%	8.0%	7.4%
All European-Based Companies	3.4	.5	2.1	316	4.3%	1.8%	4.6%	6.3%
All Hardware Companies	17.0	17.7	.0	4,108	21.7%	59.0%	.0%	82.6%
All Turnkey & SW Companies	61.3	12.3	45.8	866	78.3%	41.0%	100.0%	17.4%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 8  
 TITLE: 1988 Software Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	10.0	8,478	2,798	5,680	22.1%	24.2%	21.4%	25.9%
ETAK	5.8	1,160	0	1,160	12.7%	3.3%	.0%	5.3%
ESRI	5.1	1,200	0	1,200	11.2%	3.4%	.0%	5.5%
Intergraph	2.7	1,768	0	1,768	6.0%	5.0%	.0%	8.1%
Mapinfo	2.3	2,000	0	2,000	5.1%	5.7%	.0%	9.1%
Strategic Locations Planning	2.3	5,000	0	5,000	5.0%	14.3%	.0%	22.8%
Mutoh Industries - No OEM	1.6	181	0	181	3.5%	.5%	.0%	.8%
Ashton-Tate	1.4	3,600	3,600	0	3.2%	10.3%	27.5%	.0%
LandCadd	1.3	1,162	0	1,162	2.9%	3.3%	.0%	5.3%
Fujitsu	1.2	318	0	318	2.7%	.9%	.0%	1.4%
Zycor	1.1	145	0	145	2.4%	.4%	.0%	.7%
Geographic Data Technologies	1.1	220	0	220	2.3%	.6%	.0%	1.0%
C.H. Guernsey	1.0	333	0	333	2.1%	1.0%	.0%	1.5%
Ziegler Instruments GmbH	.9	69	0	69	2.0%	.2%	.0%	.3%
Dennis Klein & Associates	.9	281	0	281	1.9%	.8%	.0%	1.3%
Terr-Mar	.8	40	0	40	1.8%	.1%	.0%	.2%
ERDAS	.8	32	0	32	1.7%	.1%	.0%	.1%
Prime Computer	.6	638	0	638	1.3%	1.8%	.0%	2.9%
Hitachi	.6	59	0	59	1.3%	.2%	.0%	.3%
Generic Software	.5	4,641	4,641	0	1.1%	13.3%	35.5%	.0%
D.C.A. Engineering	.5	306	0	306	1.0%	.9%	.0%	1.4%
Olivetti	.5	63	0	63	1.0%	.2%	.0%	.3%
Bentley	.4	288	0	288	.9%	.8%	.0%	1.3%
Sycotronic AG	.4	19	0	19	.8%	.1%	.0%	.1%
Andor	.3	85	0	85	.6%	.2%	.0%	.4%
Cadtronic	.2	43	0	43	.5%	.1%	.0%	.2%
Foresight Resources	.2	1,154	1,154	0	.5%	3.3%	8.8%	.0%
GEOVISION Inc.	.2	400	0	400	.5%	1.1%	.0%	1.8%
Robocom	.2	228	0	228	.4%	.7%	.0%	1.0%
RHV Software Systems	.2	49	0	49	.3%	.1%	.0%	.2%

(Continued)

# Market Share

TABLE NUMBER: 8 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
IBM	.1	32	0	32	.3%	.1%	.0%	.1%
Geomath	.1	10	0	10	.2%	.0%	.0%	.0%
American Small Business Comp.	.1	525	525	0	.2%	1.5%	4.0%	.0%
A.I. Systems	.1	109	0	109	.1%	.3%	.0%	.5%
Kork Systems	.1	25	0	25	.1%	.1%	.0%	.1%
Other Companies	.0	0	(1)	1	.0%	.0%	-.0%	.0%
All Companies	45.3	35,019	13,076	21,943	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 9  
 TITLE: 1988 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	50.0	50.0	.0	9,600	14.3%	29.5%	.0%	30.2%
Racal-Redac	22.6	.0	22.5	0	6.5%	.0%	13.4%	.0%
NEC	22.3	22.3	.0	2,395	6.4%	13.2%	.0%	7.5%
Autodesk	20.1	.0	20.1	0	5.8%	.0%	11.9%	.0%
CADAM	15.7	.0	14.0	0	4.5%	.0%	8.3%	.0%
Daisy Systems	14.8	4.2	7.7	265	4.2%	2.5%	4.5%	.8%
Futurenet	12.8	.0	10.8	0	3.7%	.0%	6.4%	.0%
Hewlett-Packard	12.1	12.1	.0	2,428	3.5%	7.2%	.0%	7.6%
Apple Computer	12.0	10.6	.0	2,800	3.5%	6.2%	.0%	8.8%
Wacom	10.9	4.1	6.1	633	3.1%	2.4%	3.6%	2.0%
Xilinx	10.8	.0	9.7	0	3.1%	.0%	5.8%	.0%
IBM	8.1	7.9	.1	1,309	2.3%	4.7%	.1%	4.1%
View Logic	7.7	.0	6.7	0	2.2%	.0%	4.0%	.0%
EESOF	7.1	.4	6.1	8	2.0%	.2%	3.6%	.0%
Ziegler Instruments GmbH	7.0	.0	6.7	0	2.0%	.0%	4.0%	.0%
Altera	6.0	.0	5.2	0	1.7%	.0%	3.1%	.0%
Prime Computer	6.0	.7	4.8	41	1.7%	.4%	2.9%	.1%
Valid	5.5	2.5	2.0	83	1.6%	1.5%	1.2%	.3%
Aucotec	5.4	2.0	2.5	495	1.6%	1.2%	1.5%	1.6%
Orcad	5.0	.0	4.9	0	1.4%	.0%	2.9%	.0%
Teradyne	4.5	.0	3.6	0	1.3%	.0%	2.1%	.0%
Fujitsu	3.7	2.3	.9	167	1.0%	1.3%	.5%	.5%
Omaton	3.5	.0	3.5	0	1.0%	.0%	2.1%	.0%
Intercad	3.4	1.7	1.0	175	1.0%	1.0%	.6%	.5%
CAD Software	3.3	.0	2.9	0	.9%	.0%	1.7%	.0%
Rotring euroCAD	3.2	1.4	1.5	56	.9%	.8%	.9%	.2%
Aptos	3.1	.0	3.1	0	.9%	.0%	1.8%	.0%
Microsim	3.1	.0	3.1	0	.9%	.0%	1.8%	.0%
Marubeni Hytech	3.0	.0	2.7	0	.9%	.0%	1.6%	.0%
Visionics	2.8	.0	2.8	0	.8%	.0%	1.7%	.0%
Automated Images	2.5	.0	2.5	0	.7%	.0%	1.5%	.0%
Logotec	2.1	1.3	.6	13	.6%	.8%	.4%	.0%
Accel Technologies	2.0	.0	2.0	0	.6%	.0%	1.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9  
 TITLE: 1988 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Hitachi	1.9	1.2	.6	35	.6%	.7%	.3%	.1%
Spectrum Software	1.5	.0	1.5	0	.4%	.0%	.9%	.0%
Cascade Graphics	1.3	.0	1.1	0	.4%	.0%	.6%	.0%
The Great Softwestern Co.	1.3	.0	1.3	0	.4%	.0%	.8%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.3%	.0%	.7%	.0%
Intergraph	1.1	.0	1.0	0	.3%	.0%	.6%	.0%
Ikos Systems	1.0	1.1	.0	16	.3%	.6%	.0%	.1%
CAD-UL	1.0	.3	.7	27	.3%	.2%	.4%	.1%
Cadisys	1.0	.0	1.0	0	.3%	.0%	.6%	.0%
Sycotronic AG	.9	.0	.8	0	.3%	.0%	.5%	.0%
Integrated Silicon Systems	.8	.3	.5	17	.2%	.2%	.3%	.1%
Phase Three Logic	.8	.0	.7	0	.2%	.0%	.4%	.0%
Vamp	.7	.0	.7	0	.2%	.0%	.4%	.0%
Douglas Electronics	.7	.0	.4	0	.2%	.0%	.2%	.0%
European Silicon Structures	.7	.0	.7	0	.2%	.0%	.4%	.0%
Everex	.7	.7	.0	338	.2%	.4%	.0%	1.1%
Kanematsu Semiconductor	.7	.0	.6	0	.2%	.0%	.4%	.0%
RHV Software Systems	.6	.0	.6	0	.2%	.0%	.4%	.0%
Generic Software	.6	.0	.6	0	.2%	.0%	.3%	.0%
Olivetti	.6	.3	.2	131	.2%	.2%	.1%	.4%
Rikei	.6	.2	.3	0	.2%	.1%	.2%	.0%
Foresight Resources	.5	.0	.5	0	.1%	.0%	.3%	.0%
BV Engineering	.4	.0	.4	0	.1%	.0%	.2%	.0%
Andor	.3	.1	.3	4	.1%	.0%	.1%	.0%
EDA Systems	.3	.0	.2	0	.1%	.0%	.1%	.0%
Innovative Data Design	.2	.0	.2	0	.1%	.0%	.1%	.0%
Robocom	.2	.0	.2	0	.1%	.0%	.1%	.0%
Control Data	.2	.1	.0	9	.1%	.1%	.0%	.0%
Secmai	.2	.1	.0	3	.1%	.1%	.0%	.0%
American Small Business Comp.	.2	.0	.2	0	.0%	.0%	.1%	.0%
International Microelectronic	.2	.0	.1	0	.0%	.0%	.1%	.0%
Calma	.1	.0	.1	0	.0%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	131.6	53.9	78.6	12,516	37.7%	31.8%	46.7%	39.3%
All Companies	348.6	169.4	168.4	31,834	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	260.3	132.1	121.7	27,637	74.7%	78.0%	72.3%	86.8%
All Asian-Based Companies	40.3	30.1	8.7	3,285	11.6%	17.8%	5.2%	10.3%
All European-Based Companies	47.9	7.2	37.9	912	13.8%	4.2%	22.5%	2.9%
All Hardware Companies	138.2	144.9	.0	29,532	39.7%	85.5%	.0%	92.8%
All Turnkey & SW Companies	210.3	24.6	168.4	2,302	60.3%	14.5%	100.0%	7.2%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 10  
 TITLE: 1988 Software Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Recal-Redac	22.5	5,760	0	5,760	12.6%	5.4%	.0%	10.7%
Autodesk	20.1	16,956	5,595	11,360	11.2%	15.8%	10.5%	21.0%
CADAM	14.7	2,290	0	2,290	8.2%	2.1%	.0%	4.2%
Futurenet	10.8	3,613	0	3,613	6.1%	3.4%	.0%	6.7%
Xilinx	9.7	1,900	0	1,900	5.4%	1.8%	.0%	3.5%
Daisy Systems	7.2	319	0	319	4.0%	.3%	.0%	.6%
View Logic	6.7	2,625	0	2,625	3.7%	2.4%	.0%	4.9%
Ziegler Instruments GmbH	6.7	500	0	500	3.7%	.5%	.0%	.9%
Wacom	6.1	940	0	940	3.4%	.9%	.0%	1.7%
EESOF	6.1	610	0	610	3.4%	.6%	.0%	1.1%
Altera	5.2	1,000	0	1,000	2.9%	.9%	.0%	1.8%
Orcad	4.9	13,514	13,514	0	2.7%	12.6%	25.5%	.0%
Prime Computer	4.8	3,016	0	3,016	2.7%	2.8%	.0%	5.6%
Teradyne	3.6	180	0	180	2.0%	.2%	.0%	.3%
Omaton	3.5	11,666	11,666	0	2.0%	10.9%	22.0%	.0%
Valid	3.5	305	0	305	1.9%	.3%	.0%	.6%
Aptos	3.1	900	99	801	1.7%	.8%	.2%	1.5%
Microsim	3.1	1,860	0	1,860	1.7%	1.7%	.0%	3.4%
CAD Software	2.9	1,400	0	1,400	1.6%	1.3%	.0%	2.6%
Visionics	2.8	1,700	0	1,700	1.6%	1.6%	.0%	3.1%
Automated Images	2.5	250	0	250	1.4%	.2%	.0%	.5%
Aucotec	2.5	540	0	540	1.4%	.5%	.0%	1.0%
Accel Technologies	2.0	5,000	0	5,000	1.1%	4.7%	.0%	9.2%
Spectrum Software	1.5	3,000	3,000	0	.8%	2.8%	5.7%	.0%
Rotring euroCAD	1.5	80	0	80	.8%	.1%	.0%	.1%
The Great Softwestern Co.	1.3	942	0	942	.7%	.9%	.0%	1.7%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	.7%	2.1%	.0%	4.3%
Cascade Graphics	1.1	568	0	568	.6%	.5%	.0%	1.0%
Cadisys	1.0	400	0	400	.6%	.4%	.0%	.7%
Intercad	1.0	558	0	558	.5%	.5%	.0%	1.0%
Intergraph	1.0	622	0	622	.5%	.6%	.0%	1.1%
Fujitsu	.9	227	0	227	.5%	.2%	.0%	.4%

(Continued)



# Market Share

TABLE NUMBER: 10 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Sycotronic AG	.8	39	0	39	.4%	.0%	.0%	.1%
Vamp	.7	2,800	2,800	0	.4%	2.6%	5.3%	.0%
CAD-UL	.7	53	0	53	.4%	.0%	.0%	.1%
European Silicon Structures	.7	32	0	32	.4%	.0%	.0%	.1%
Phase Three Logic	.7	2,000	2,000	0	.4%	1.9%	3.8%	.0%
Logotec	.6	75	0	75	.3%	.1%	.0%	.1%
RMV Software Systems	.6	200	0	200	.3%	.2%	.0%	.4%
Kanemitsu Semiconductor	.6	110	0	110	.3%	.1%	.0%	.2%
Generic Software	.6	5,384	5,384	0	.3%	5.0%	10.1%	.0%
Mitachi	.6	59	0	59	.3%	.1%	.0%	.1%
Foresight Resources	.5	2,458	2,458	0	.3%	2.3%	4.6%	.0%
Integrated Silicon Systems	.5	35	0	35	.3%	.0%	.0%	.1%
Douglas Electronics	.4	750	0	750	.2%	.7%	.0%	1.4%
BV Engineering	.4	4,000	4,000	0	.2%	3.7%	7.5%	.0%
Rikei	.3	50	0	50	.2%	.0%	.0%	.1%
Andor	.3	85	0	85	.1%	.1%	.0%	.2%
EDA Systems	.2	3	0	3	.1%	.0%	.0%	.0%
Olivetti	.2	31	0	31	.1%	.0%	.0%	.1%
Innovative Data Design	.2	1,434	1,434	0	.1%	1.3%	2.7%	.0%
Robocom	.2	240	0	240	.1%	.2%	.0%	.4%
American Small Business Comp.	.2	1,116	1,116	0	.1%	1.0%	2.1%	.0%
IBM	.1	32	0	32	.1%	.0%	.0%	.1%
International Microelectronic	.1	20	0	20	.1%	.0%	.0%	.0%
Control Data	.0	8	0	8	.0%	.0%	.0%	.0%
Other Companies	3.6	590	4	586	2.0%	.6%	.0%	1.1%
All Companies	179.2	107,149	53,071	54,078	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 11

TITLE: 1988 Market Share

APPLICATION: Electronic CAE

PLATFORM: Personal Computer

REGION: Worldwide

UNITS: Millions of Dollars/Actual Units

Company	Total Hardware		Software		Wkstns Shipped	Total Hardware		Software		Wkstns Shipped
	Revenue	Revenue	Revenue	Revenue		Revenue	Revenue	Revenue	Revenue	
Compaq	25.0	25.0	.0	.0	4,800	14.0%	29.1%	.0%	30.2%	
Futurenet	12.8	.0	10.8	0	0	7.1%	.0%	12.8%	.0%	
Xilinx	10.8	.0	9.7	0	0	6.0%	.0%	11.5%	.0%	
NEC	9.3	9.3	.0	998	182	5.2%	10.8%	.0%	6.3%	
Daisy Systems	8.4	2.6	3.9	182	0	4.7%	3.1%	4.6%	1.1%	
View Logic	7.7	.0	6.7	0	0	4.3%	.0%	7.9%	.0%	
ESSOF	7.1	.4	6.1	8	8	4.0%	.4%	7.2%	.1%	
Hewlett-Packard	6.6	6.6	.0	1,315	0	3.7%	7.7%	.0%	8.3%	
Altera	6.0	.0	5.2	0	0	3.4%	.0%	6.2%	.0%	
Valid	5.5	2.5	2.0	83	83	3.1%	2.9%	2.4%	.5%	
Aucotec	5.4	2.0	2.5	495	495	3.0%	2.3%	2.9%	3.1%	
Wacom	5.1	1.9	2.9	239	239	2.8%	2.3%	3.4%	1.5%	
Orcad	5.0	.0	4.9	0	0	2.8%	.0%	5.8%	.0%	
Apple Computer	4.5	4.0	.0	1,050	0	2.5%	4.6%	.0%	6.6%	
IBM	4.5	4.5	.0	750	0	2.5%	5.2%	.0%	4.7%	
Teradyne	4.5	.0	3.6	0	0	2.5%	.0%	4.3%	.0%	
Ziegler Instruments GmbH	4.2	.0	4.0	0	0	2.4%	.0%	4.7%	.0%	
Racal-Redac	4.0	.0	4.0	0	0	2.2%	.0%	4.7%	.0%	
Omaton	3.5	.0	3.5	0	0	2.0%	.0%	4.1%	.0%	
Autodesk	3.4	.0	3.4	0	0	1.9%	.0%	4.0%	.0%	
Rotring euroCAD	3.2	1.4	1.5	56	56	1.8%	1.6%	1.7%	.4%	
Microsoft	3.1	.0	3.1	0	0	1.7%	.0%	3.6%	.0%	
Marubeni Hytech	3.0	.0	2.7	0	0	1.7%	.0%	3.2%	.0%	
Automated Images	2.5	.0	2.5	0	0	1.4%	.0%	3.0%	.0%	
Logotec	2.1	1.3	.6	13	13	1.2%	1.5%	.7%	.1%	
Fujitsu	2.0	1.3	.5	93	93	1.1%	1.5%	.6%	.6%	
Spectrum Software	1.5	.0	1.5	0	0	.8%	.0%	1.8%	.0%	
Prime Computer	1.4	.2	1.0	13	13	.8%	.2%	1.2%	.1%	
Intercad	1.3	.7	.4	67	67	.7%	.8%	.4%	.4%	
Cascade Graphics	1.2	.0	1.0	0	0	.7%	.0%	1.1%	.0%	
Ikos Systems	1.0	1.1	.0	16	16	.6%	1.3%	.0%	.1%	
Visionics	.8	.0	.8	0	0	.5%	.0%	1.0%	.0%	

(Continued)

# Market Share

TABLE NUMBER: 11 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Phase Three Logic	.8	.0	.7	0	.4%	.0%	.8%	.0%
RHV Software Systems	.6	.0	.6	0	.3%	.0%	.7%	.0%
BV Engineering	.4	.0	.4	0	.2%	.0%	.5%	.0%
Everex	.4	.4	.0	202	.2%	.5%	.0%	1.3%
Foresight Resources	.4	.0	.4	0	.2%	.0%	.4%	.0%
Kanematsu Semiconductor	.3	.0	.3	0	.2%	.0%	.4%	.0%
CAD Software	.3	.0	.3	0	.2%	.0%	.3%	.0%
EDA Systems	.3	.0	.2	0	.2%	.0%	.3%	.0%
Generic Software	.3	.0	.3	0	.2%	.0%	.3%	.0%
Vamp	.2	.0	.2	0	.1%	.0%	.2%	.0%
Accel Technologies	.2	.0	.2	0	.1%	.0%	.2%	.0%
American Small Business Comp.	.2	.0	.2	0	.1%	.0%	.2%	.0%
International Microelectronic	.2	.0	.1	0	.1%	.0%	.2%	.0%
Robocom	.1	.0	.1	0	.1%	.0%	.2%	.0%
Intergraph	.1	.0	.1	0	.1%	.0%	.1%	.0%
Control Data	.1	.1	.0	5	.1%	.1%	.0%	.0%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.1%	.0%
Calma	.1	.0	.1	0	.0%	.0%	.1%	.0%
Sycotronic AG	.1	.0	.0	0	.0%	.0%	.0%	.0%
Secmai	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	83.9	28.4	53.9	6,528	46.9%	33.1%	63.7%	41.1%
All Companies	179.0	85.8	84.7	15,873	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	141.2	67.9	67.4	13,912	78.9%	79.2%	79.5%	87.6%
All Asian-Based Companies	16.8	12.5	3.7	1,330	9.4%	14.6%	4.3%	8.4%
All European-Based Companies	21.0	5.4	13.7	631	11.7%	6.3%	16.2%	4.0%
All Hardware Companies	67.5	70.7	.0	14,611	37.7%	82.4%	.0%	92.0%
All Turnkey & SW Companies	111.5	15.1	84.7	1,263	62.3%	17.6%	100.0%	8.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 12  
 TITLE: 1988 Software Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software				Market Share			
	Revenue	Units	Units < \$500	Units > \$500	Revenue	Units	Units < \$500	Units > \$500
Futurenet	10.8	3,613	0	3,613	11.5%	5.8%	.0%	17.9%
Xilinx	9.7	1,900	0	1,900	10.3%	3.0%	.0%	9.4%
View Logic	6.7	2,625	0	2,625	7.1%	4.2%	.0%	13.0%
EESOF	6.1	610	0	610	6.4%	1.0%	.0%	3.0%
Altera	5.2	1,000	0	1,000	5.5%	1.6%	.0%	5.0%
Orcad	4.9	13,514	13,514	0	5.2%	21.7%	32.0%	.0%
Ziegler Instruments GmbH	4.0	300	0	300	4.2%	.5%	.0%	1.5%
Racal-Redac	4.0	1,013	0	1,013	4.2%	1.6%	.0%	5.0%
Teradyne	3.6	180	0	180	3.8%	.3%	.0%	.9%
Omaton	3.5	11,666	11,666	0	3.7%	18.7%	27.6%	.0%
Valid	3.5	305	0	305	3.7%	.5%	.0%	1.5%
Autodesk	3.4	2,832	934	1,897	3.5%	4.5%	2.2%	9.4%
Daisy Systems	3.3	188	0	188	3.5%	.3%	.0%	.9%
Microsim	3.1	1,860	0	1,860	3.2%	3.0%	.0%	9.2%
Wacom	2.9	440	0	440	3.0%	.7%	.0%	2.2%
Automated Images	2.5	250	0	250	2.6%	.4%	.0%	1.2%
Aucotec	2.5	540	0	540	2.6%	.9%	.0%	2.7%
Spectrum Software	1.5	3,000	3,000	0	1.6%	4.8%	7.1%	.0%
Rotring euroCAD	1.5	80	0	80	1.6%	.1%	.0%	.4%
Prime Computer	1.0	204	0	204	1.1%	.3%	.0%	1.0%
Cascade Graphics	1.0	519	0	519	1.0%	.8%	.0%	2.6%
Visionics	.8	510	0	510	.9%	.8%	.0%	2.5%
Phase Three Logic	.7	2,000	2,000	0	.7%	3.2%	4.7%	.0%
Logotec	.6	75	0	75	.7%	.1%	.0%	.4%
RHV Software Systems	.6	200	0	200	.6%	.3%	.0%	1.0%
Fujitsu	.5	128	0	128	.5%	.2%	.0%	.6%
BV Engineering	.4	4,000	4,000	0	.4%	6.4%	9.5%	.0%
Intercad	.4	215	0	215	.4%	.3%	.0%	1.1%
Foresight Resources	.4	1,756	1,756	0	.4%	2.8%	4.2%	.0%
Kanematsu Semiconductor	.3	58	0	58	.3%	.1%	.0%	.3%
CAD Software	.3	141	0	141	.3%	.2%	.0%	.7%
Generic Software	.3	2,692	2,692	0	.3%	4.3%	6.4%	.0%

(Continued)

# Market Share

TABLE NUMBER: 12 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
EDA Systems	.2	3	0	3	.3%	.0%	.0%	.0%
Vamp	.2	817	817	0	.2%	1.3%	1.9%	.0%
Accel Technologies	.2	500	0	500	.2%	.8%	.0%	2.5%
American Small Business Comp.	.2	1,116	1,116	0	.2%	1.8%	2.6%	.0%
International Microelectronic	.1	20	0	20	.1%	.0%	.0%	.1%
Robocom	.1	156	0	156	.1%	.2%	.0%	.8%
Innovative Data Design	.1	717	717	0	.1%	1.1%	1.7%	.0%
Intergraph	.1	58	0	58	.1%	.1%	.0%	.3%
Sycotronic AG	.1	3	0	3	.1%	.0%	.0%	.0%
Other Companies	3.5	571	0	571	3.7%	.9%	.0%	2.8%
All Companies	94.6	62,379	42,212	20,167	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 13  
 TITLE: 1988 Market Share  
 APPLICATION: IC Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Autodesk	6.7	.0	6.7	0	48.8%	.0%	64.1%	.0%
Fujitsu	1.6	1.0	.4	74	11.8%	32.1%	3.6%	20.5%
Wacom	1.5	.6	.8	70	10.9%	18.5%	8.0%	19.5%
Prime Computer	.8	.0	.8	0	5.8%	.0%	7.6%	.0%
Integrated Silicon Systems	.8	.3	.5	17	5.5%	9.7%	4.5%	4.8%
European Silicon Structures	.7	.0	.7	0	5.0%	.0%	6.5%	.0%
Rikei	.6	.2	.3	0	4.0%	5.8%	3.2%	.0%
Hewlett-Packard	.5	.5	.0	101	3.6%	16.2%	.0%	28.3%
Intergraph	.1	.0	.1	0	.9%	.0%	1.1%	.0%
Cascade Graphics	.1	.0	.1	0	.8%	.0%	.9%	.0%
Control Data	.0	.0	.0	2	.2%	.6%	.1%	.4%
Other Companies	4.0	1.6	2.5	182	28.8%	51.0%	23.6%	50.7%
All Companies	13.7	3.1	10.4	358	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	9.3	1.3	8.2	214	68.1%	42.9%	78.4%	59.9%
All Asian-Based Companies	3.7	1.7	1.6	144	26.7%	56.5%	14.8%	40.1%
All European-Based Companies	.7	.0	.7	0	5.2%	.6%	6.7%	.0%
All Hardware Companies	.8	1.0	.0	196	5.8%	32.5%	.0%	54.6%
All Turnkey & SW Companies	12.9	2.1	10.4	162	94.2%	67.5%	100.0%	45.4%

Source: Dataquest  
 May 1989

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# Market Share

TABLE NUMBER: 14  
 TITLE: 1988 Software Market Share  
 APPLICATION: IC Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	6.7	5,655	1,866	3,789	64.1%	77.2%	100.0%	69.4%
Wacom	.8	130	0	130	8.0%	1.8%	.0%	2.4%
Prime Computer	.8	1,185	0	1,185	7.6%	16.2%	.0%	21.7%
European Silicon Structures	.7	32	0	32	6.5%	.4%	.0%	.6%
Integrated Silicon Systems	.5	35	0	35	4.5%	.5%	.0%	.6%
Fujitsu	.4	99	0	99	3.6%	1.4%	.0%	1.8%
Rikei	.3	50	0	50	3.2%	.7%	.0%	.9%
Intergraph	.1	71	0	71	1.1%	1.0%	.0%	1.3%
Cascade Graphics	.1	49	0	49	.9%	.7%	.0%	.9%
Other Companies	.0	19	0	19	.5%	.3%	.0%	.3%
All Companies	10.4	7,327	1,866	5,461	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 15  
 TITLE: 1988 Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total Revenue			Units Shipped	Market Share			
	Revenue	Hardware Revenue	Software Revenue		Revenue	Hardware Revenue	Software Revenue	
Compaq	25.0	25.0	.0	4,800	16.0%	31.0%	.0%	30.8%
Racal-Redac	18.6	.0	18.6	0	11.9%	.0%	25.3%	.0%
CADAM	15.7	.0	14.0	0	10.1%	.0%	19.1%	.0%
NEC	13.0	13.0	.0	1,397	8.4%	16.2%	.0%	9.0%
Autodesk	10.0	.0	10.0	0	6.4%	.0%	13.7%	.0%
Apple Computer	7.5	6.6	.0	1,750	4.8%	8.2%	.0%	11.2%
Daisy Systems	6.4	1.6	3.7	82	4.1%	2.0%	5.1%	.5%
Hewlett-Packard	5.1	5.1	.0	1,012	3.2%	6.3%	.0%	6.5%
Macom	4.3	1.6	2.4	324	2.7%	2.0%	3.3%	2.1%
Prime Computer	3.8	.5	3.0	28	2.4%	.6%	4.1%	.2%
IBM	3.6	3.4	.1	559	2.3%	4.2%	.2%	3.6%
Aptos	3.1	.0	3.1	0	2.0%	.0%	4.2%	.0%
CAD Software	2.9	.0	2.6	0	1.9%	.0%	3.5%	.0%
Ziegler Instruments GmbH	2.8	.0	2.7	0	1.8%	.0%	3.6%	.0%
Intercad	2.1	1.1	.6	108	1.3%	1.3%	.8%	.7%
Visionics	2.0	.0	2.0	0	1.3%	.0%	2.7%	.0%
Hitachi	1.9	1.2	.6	35	1.2%	1.4%	.8%	.2%
Accel Technologies	1.8	.0	1.8	0	1.2%	.0%	2.5%	.0%
The Great Western Co.	1.3	.0	1.3	0	.8%	.0%	1.8%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.8%	.0%	1.6%	.0%
CAD-UL	1.0	.3	.7	27	.6%	.4%	.9%	.2%
Cadisy	1.0	.0	1.0	0	.6%	.0%	1.4%	.0%
Sycotronic AG	.9	.0	.7	0	.6%	.0%	1.0%	.0%
Intergraph	.8	.0	.8	0	.5%	.0%	1.0%	.0%
Douglas Electronics	.7	.0	.4	0	.4%	.0%	.6%	.0%
Olivetti	.6	.3	.2	131	.4%	.4%	.3%	.8%
Vamp	.5	.0	.5	0	.3%	.0%	.7%	.0%
Andor	.3	.1	.3	4	.2%	.1%	.3%	.0%
Kanematsu Semiconductor	.3	.0	.3	0	.2%	.0%	.4%	.0%
Generic Software	.3	.0	.3	0	.2%	.0%	.4%	.0%
Everex	.3	.3	.0	135	.2%	.3%	.0%	.9%
Secma	.2	.1	.0	3	.1%	.1%	.0%	.0%

(Continued)



# Market Share

TABLE NUMBER: 15 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Foresight Resources	.1	.0	.1	0	.1%	.0%	.2%	.0%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.1%	.0%
Robocom	.1	.0	.1	0	.0%	.0%	.1%	.0%
Control Data	.1	.1	.0	2	.0%	.1%	.0%	.0%
Calma	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	43.7	23.9	22.2	5,807	28.1%	29.7%	30.3%	37.2%
All Companies	155.9	80.6	73.2	15,603	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	109.8	62.9	46.2	13,511	70.4%	78.1%	63.1%	86.6%
All Asian-Based Companies	19.9	15.9	3.5	1,811	12.7%	19.7%	4.8%	11.6%
All European-Based Companies	26.2	1.8	23.5	281	16.8%	2.2%	32.1%	1.8%
All Hardware Companies	70.0	73.2	.0	14,726	44.9%	90.8%	.0%	94.4%
All Turnkey & SW Companies	85.9	7.4	73.2	877	55.1%	9.2%	100.0%	5.6%

Source: Dataquest  
 May 1989

# Market Share

TABLE NUMBER: 16  
 TITLE: 1988 Software Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Racal-Redac	18.6	4,747	0	4,747	25.0%	12.7%	.0%	16.7%
CADAM	14.7	2,290	0	2,290	19.9%	6.1%	.0%	8.0%
Autodesk	10.0	8,469	2,795	5,674	13.5%	22.6%	31.1%	19.9%
Daisy Systems	4.0	131	0	131	5.3%	.3%	.0%	.5%
Aptos	3.1	900	99	801	4.2%	2.4%	1.1%	2.8%
Prime Computer	3.0	1,627	0	1,627	4.1%	4.3%	.0%	5.7%
Ziegler Instruments GmbH	2.7	200	0	200	3.6%	.5%	.0%	.7%
CAD Software	2.6	1,259	0	1,259	3.5%	3.4%	.0%	4.4%
Wacom	2.4	370	0	370	3.2%	1.0%	.0%	1.3%
Visionics	2.0	1,190	0	1,190	2.6%	3.2%	.0%	4.2%
Accel Technologies	1.8	4,500	0	4,500	2.4%	12.0%	.0%	15.8%
The Great Softwestern Co.	1.3	942	0	942	1.8%	2.5%	.0%	3.3%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	1.6%	6.1%	.0%	8.1%
Cadisys	1.0	400	0	400	1.3%	1.1%	.0%	1.4%
Intergraph	.8	492	0	492	1.0%	1.3%	.0%	1.7%
Sycotronic AG	.7	36	0	36	1.0%	.1%	.0%	.1%
CAD-UL	.7	53	0	53	.9%	.1%	.0%	.2%
InterCAD	.6	343	0	343	.8%	.9%	.0%	1.2%
Hitachi	.6	59	0	59	.8%	.2%	.0%	.2%
Vamp	.5	1,983	1,983	0	.7%	5.3%	22.1%	.0%
Douglas Electronics	.4	750	0	750	.6%	2.0%	.0%	2.6%
Generic Software	.3	2,692	2,692	0	.4%	7.2%	29.9%	.0%
Kanematsu Semiconductor	.3	52	0	52	.4%	.1%	.0%	.2%
Andor	.3	85	0	85	.3%	.2%	.0%	.3%
Olivetti	.2	31	0	31	.3%	.1%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 16 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Foresight Resources	.1	702	702	0	.2%	1.9%	7.8%	.0%
IBM	.1	32	0	32	.2%	.1%	.0%	.1%
Innovative Data Design	.1	717	717	0	.1%	1.9%	8.0%	.0%
Robocom	.1	84	0	84	.1%	.2%	.0%	.3%
Secmai	.0	4	0	4	.0%	.0%	.0%	.0%
Other Companies	.0	0	1	(1)	.0%	.0%	.0%	.0%
All Companies	74.1	37,443	8,990	28,453	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 17  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Compaq	175.9	175.9	.0	33,763	21.3%	31.6%	.0%	24.3%
Apple Computer	112.4	98.9	.0	26,229	13.6%	17.8%	.0%	18.8%
Autodesk	69.6	.0	69.6	0	8.4%	.0%	28.6%	.0%
IBM	45.2	45.1	.1	7,516	5.5%	8.1%	.0%	5.4%
Hewlett-Packard	25.0	25.0	.0	5,238	3.0%	4.5%	.0%	3.8%
Zenith	23.6	23.6	.0	8,000	2.9%	4.2%	.0%	5.7%
Prime Computer	15.6	1.4	13.2	88	1.9%	.3%	5.4%	.1%
Daisy Systems	12.8	3.8	6.1	265	1.6%	.7%	2.5%	.2%
Everex	11.5	11.5	.0	5,737	1.4%	2.1%	.0%	4.1%
CADAM	9.0	.0	8.1	0	1.1%	.0%	3.3%	.0%
Intergraph	8.9	.0	8.3	0	1.1%	.0%	3.4%	.0%
CADKEY	8.1	.0	8.1	0	1.0%	.0%	3.3%	.0%
Generic Software	6.8	.0	6.8	0	.8%	.0%	2.8%	.0%
View Logic	5.5	.0	4.8	0	.7%	.0%	2.0%	.0%
Xilinx	5.3	.0	4.8	0	.6%	.0%	2.0%	.0%
Altera	5.0	.0	4.3	0	.6%	.0%	1.8%	.0%
EESOF	4.6	.2	3.9	5	.6%	.0%	1.6%	.0%
ESRI	4.2	.0	4.1	0	.5%	.0%	1.7%	.0%
Computer Aided Planning	4.0	.0	3.2	0	.5%	.0%	1.3%	.0%
Aries Technology	4.0	1.5	2.0	84	.5%	.3%	.8%	.1%
Futurenet	3.8	.0	3.3	0	.5%	.0%	1.3%	.0%
Racal-Redac	3.7	.0	3.7	0	.4%	.0%	1.5%	.0%
ETAK	3.6	.5	2.9	0	.4%	.1%	1.2%	.0%
Teradyne	3.4	.0	2.7	0	.4%	.0%	1.1%	.0%
Orcad	3.0	.0	2.9	0	.4%	.0%	1.2%	.0%
ISICAD	2.8	.0	2.8	0	.3%	.0%	1.2%	.0%
Valid	2.8	1.2	1.1	43	.3%	.2%	.5%	.0%
Visionics	2.8	.0	2.8	0	.3%	.0%	1.2%	.0%
American Small Business Comp.	2.7	.0	2.7	0	.3%	.0%	1.1%	.0%
Foresight Resources	2.6	.0	2.6	0	.3%	.0%	1.1%	.0%
Manufacturing Consultants	2.6	.0	2.2	0	.3%	.0%	.9%	.0%
Omaton	2.6	.0	2.6	0	.3%	.0%	1.1%	.0%
Automated Images	2.5	.0	2.5	0	.3%	.0%	1.0%	.0%

(Continued)

# Market Share

TABLE NUMBER:

17

TITLE: 1988 Market Share

APPLICATION:

All Applications

PLATFORM:

Personal Computer

REGION:

North America

UNITS:

Millions of Dollars/Actual Units

Company	Total Hardware		Software		Wkstns Shipped	Market Share		Wkstns Shipped
	Revenue	Revenue	Revenue	Revenue		Total Hardware Revenue	Software Revenue	
Sigma Design	2.5	.0	2.2	0	.3%	.0%	.9%	.0%
Aptos	2.5	.0	2.5	0	.3%	.0%	1.0%	.0%
Microsim	2.4	.0	2.4	0	.3%	.0%	1.0%	.0%
Cascade Graphics	2.3	.0	1.8	0	.3%	.0%	.7%	.0%
Innovative Data Design	2.3	.0	2.3	0	.3%	.0%	.9%	.0%
D.C.A. Engineering	2.1	.0	2.1	0	.3%	.0%	.9%	.0%
Mepinfo	2.1	.0	2.1	0	.3%	.0%	.9%	.0%
Accel Technologies	2.0	.0	2.0	0	.2%	.0%	.8%	.0%
CAD Software	2.0	.0	1.7	0	.2%	.0%	.7%	.0%
Algor Interactive Systems	1.9	.0	1.9	0	.2%	.0%	.8%	.0%
Endeco Systems	1.9	.0	1.7	0	.2%	.0%	.7%	.0%
Mega CADD	1.9	.0	1.9	0	.2%	.0%	.8%	.0%
Micrografx	1.8	.0	1.8	0	.2%	.0%	.7%	.0%
Micro Engineering Solutions	1.8	.5	1.1	154	.2%	.1%	.4%	.1%
Terr-Mar	1.7	.8	.8	45	.2%	.1%	.3%	.0%
Bentley	1.6	.0	1.6	0	.2%	.0%	.7%	.0%
Swanson Analysis	1.5	.0	1.5	0	.2%	.0%	.6%	.0%
Ashton-Tate	1.5	.0	1.4	0	.2%	.0%	.6%	.0%
Evolution Computing	1.5	.0	1.5	0	.2%	.0%	.6%	.0%
LandCadd	1.4	.0	1.3	0	.2%	.0%	.5%	.0%
Control Data	1.4	.9	.4	62	.2%	.2%	.1%	.0%
ERDAS	1.3	.7	.7	36	.2%	.1%	.3%	.0%
The Great Softwestern Co.	1.3	.0	1.3	0	.2%	.0%	.5%	.0%
Rebocom	1.2	.0	1.2	0	.2%	.0%	.5%	.0%
MacNeal-Schwendler	1.2	.0	1.2	0	.1%	.0%	.5%	.0%
Spectrum Software	1.2	.0	1.2	0	.1%	.0%	.5%	.0%
Strategic Locations Planning	1.2	.0	1.2	0	.1%	.0%	.5%	.0%
Accugraph	1.2	.4	.7	40	.1%	.1%	.3%	.0%
Geographic Data Technologies	1.2	.0	1.1	0	.1%	.0%	.4%	.0%
Micro CAD/CAM Systems	1.1	.0	1.1	0	.1%	.0%	.5%	.0%
A.I. Systems	1.1	.0	1.1	0	.1%	.0%	.4%	.0%
CIVILSOFT	1.1	.0	1.0	0	.1%	.0%	.4%	.0%
C.H. Guernsey	1.0	.0	1.0	0	.1%	.0%	.4%	.0%

(Continued)

# Market Share

TABLE NUMBER: 17  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CadisyS	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
Challenger Software	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
Bishop Graphics CAD Systems	1.0	.0	1.0	0	.1%	.0%	.4%	.0%
Engineering Software	.9	.0	.8	0	.1%	.0%	.3%	.0%
Dennis Klein & Associates	.9	.0	.8	0	.1%	.0%	.3%	.0%
Comshoppe	.8	.0	.8	0	.1%	.0%	.3%	.0%
GRAPHSOFT	.8	.0	.8	0	.1%	.0%	.3%	.0%
Mutoh Industries	.8	.5	.2	79	.1%	.1%	.1%	.1%
Zycor	.8	.0	.7	0	.1%	.0%	.3%	.0%
Ikos Systems	.7	.8	.0	11	.1%	.1%	.0%	.0%
MATC CAD	.7	.2	.5	5	.1%	.0%	.2%	.0%
Vamp	.7	.0	.7	0	.1%	.0%	.3%	.0%
IGC Technology	.5	.0	.5	0	.1%	.0%	.2%	.0%
Douglas Electronics	.5	.0	.3	0	.1%	.0%	.1%	.0%
Integrated Silicon Systems	.5	.2	.3	11	.1%	.0%	.1%	.0%
Elite Software Development	.5	.1	.3	0	.1%	.0%	.1%	.0%
CRTC	.4	.0	.4	0	.1%	.0%	.2%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.2%	.0%
Ithaca Software	.4	.0	.4	0	.0%	.0%	.2%	.0%
Calma	.4	.0	.3	0	.0%	.0%	.1%	.0%
Dynaware	.4	.0	.4	0	.0%	.0%	.1%	.0%
Phase Three Logic	.3	.0	.3	0	.0%	.0%	.1%	.0%
CLM/Systems	.3	.0	.3	0	.0%	.0%	.1%	.0%
DFI	.3	.1	.2	11	.0%	.0%	.1%	.0%
EDA Systems	.3	.0	.2	0	.0%	.0%	.1%	.0%
EDSA Micro	.2	.0	.2	0	.0%	.0%	.1%	.0%
Bechtel Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Geomath	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.1	.0	.1	4	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 17 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	300.4	179.8	114.5	57,881	36.4%	32.3%	47.1%	41.6%
All Companies	826.4	556.1	243.0	139,164	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	820.6	555.7	237.9	139,086	99.3%	99.9%	97.9%	99.9%
All Asian-Based Companies	.8	.5	.2	79	.1%	.1%	.1%	.1%
All European-Based Companies	4.9	.0	4.9	0	.6%	.0%	2.0%	.0%
All Hardware Companies	555.5	542.0	.0	138,162	67.2%	97.5%	.0%	99.3%
All Turnkey & SW Companies	270.9	14.1	243.0	1,002	32.8%	2.5%	100.0%	.7%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 18  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Market Share			
	Software Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	69.6	58,804	19,405	39,398
Prime Computer	13.2	10,828	0	10,828
Intergraph	8.3	5,394	0	5,394
CADKEY	8.1	5,805	0	5,805
CADAM	8.1	1,662	0	1,662
Generic Software	6.8	63,215	63,215	0
Daisy Systems	5.7	295	0	295
Xilinx	4.8	930	0	930
View Logic	4.8	1,864	0	1,864
Altera	4.3	830	0	830
ESRI	4.1	961	0	961
EESOF	3.9	396	0	396
Racal-Redac	3.7	937	0	937
Futurenet	3.3	1,083	0	1,083
Computer Aided Planning	3.2	400	0	400
Orcad	2.9	8,092	8,092	0
ETAK	2.9	580	0	580
ISICAD	2.8	2,779	0	2,779
Visionics	2.8	1,700	0	1,700
Teradyne	2.7	135	0	135
American Small Business Comp.	2.7	17,596	17,596	0
Foresight Resources	2.6	12,892	12,892	0
Omaton	2.6	8,509	8,509	0
Automated Images	2.5	250	0	250
Aptos	2.5	711	78	633
Microsim	2.4	1,466	0	1,466
Innovative Data Design	2.3	16,135	16,135	0
Sigma Design	2.2	1,428	0	1,428
Manufacturing Consultants	2.2	1,115	0	1,115
D.C.A. Engineering	2.1	1,406	0	1,406
Mepinfo	2.1	1,800	0	1,800
Aries Technology	2.0	152	0	152
Valid	2.0	172	0	172

(Continued)



# Market Share

TABLE NUMBER: 18  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Accel Technologies	2.0	5,000	0	5,000	.8%	1.5%	.0%	4.0%
Algor Interactive Systems	1.9	2,000	0	2,000	.8%	.6%	.0%	1.6%
Mega CADD	1.9	2,087	0	2,087	.8%	.6%	.0%	1.7%
Cascade Graphics	1.8	978	0	978	.7%	.3%	.0%	.8%
Micrografx	1.8	8,018	8,018	0	.7%	2.4%	3.8%	.0%
CAD Software	1.7	839	0	839	.7%	.3%	.0%	.7%
Endeco Systems	1.7	475	0	475	.7%	.1%	.0%	.4%
Bentley	1.6	1,070	0	1,070	.7%	.3%	.0%	.9%
Swanson Analysis	1.5	756	0	756	.6%	.2%	.0%	.6%
Evolution Computing	1.5	30,266	29,660	605	.6%	9.0%	14.0%	.5%
Ashton-Tate	1.4	3,600	3,600	0	.6%	1.1%	1.7%	.0%
LandCadd	1.3	1,162	0	1,162	.5%	.3%	.0%	.9%
The Great Softwestern Co.	1.3	942	0	942	.5%	.3%	.0%	.8%
Robocom	1.2	1,486	0	1,486	.5%	.4%	.0%	1.2%
MacNeal-Schwendler	1.2	586	0	586	.5%	.2%	.0%	.5%
Spectrum Software	1.2	2,384	2,384	0	.5%	.7%	1.1%	.0%
Strategic Locations Planning	1.2	2,667	0	2,667	.5%	.8%	.0%	2.2%
Micro CAD/CAM Systems	1.1	2,247	0	2,247	.5%	.7%	.0%	1.8%
A.I. Systems	1.1	1,982	0	1,982	.4%	.6%	.0%	1.6%
Geographic Data Technologies	1.1	220	0	220	.4%	.1%	.0%	.2%
Micro Engineering Solutions	1.1	108	0	108	.4%	.0%	.0%	.1%
Cadisys	1.0	400	0	400	.4%	.1%	.0%	.3%
Challenger Software	1.0	4,000	4,000	0	.4%	1.2%	1.9%	.0%
CIVILSOFT	1.0	7,185	0	7,185	.4%	2.1%	.0%	5.8%
Bishop Graphics CAD Systems	1.0	1,821	0	1,821	.4%	.5%	.0%	1.5%
C.H. Guernsey	1.0	333	0	333	.4%	.1%	.0%	.3%
Dennis Klein & Associates	.8	274	0	274	.3%	.1%	.0%	.2%
Terr-Mar	.8	40	0	40	.3%	.0%	.0%	.0%
Engineering Software	.8	1,800	1,800	0	.3%	.5%	.9%	.0%
Comshoppe	.8	2,500	2,500	0	.3%	.7%	1.2%	.0%
GRAPHSOFT	.8	2,857	2,857	0	.3%	.9%	1.4%	.0%
Zycor	.7	94	0	94	.3%	.0%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 18 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
ERDAS	.7	28	0	28	.3%	.0%	.0%	.0%
Accugraph	.7	429	0	429	.3%	.1%	.0%	.3%
Vamp	.7	2,567	2,567	0	.3%	.8%	1.2%	.0%
NATC CAD	.5	764	764	0	.2%	.2%	.4%	.0%
IGC Technology	.5	800	0	800	.2%	.2%	.0%	.6%
CRTC	.4	504	0	504	.2%	.2%	.0%	.4%
BV Engineering	.4	4,000	4,000	0	.2%	1.2%	1.9%	.0%
Ithaca Software	.4	980	980	0	.2%	.3%	.5%	.0%
Control Data	.4	75	0	75	.1%	.0%	.0%	.1%
Dynaware	.4	771	0	771	.1%	.2%	.0%	.6%
Elite Software Development	.3	1,181	1,181	0	.1%	.4%	.6%	.0%
Phase Three Logic	.3	912	912	0	.1%	.3%	.4%	.0%
Integrated Silicon Systems	.3	22	0	22	.1%	.0%	.0%	.0%
CLM/Systems	.3	25	0	25	.1%	.0%	.0%	.0%
Douglas Electronics	.3	530	0	530	.1%	.2%	.0%	.4%
GEOVISION Inc.	.2	383	0	383	.1%	.1%	.0%	.3%
Mutoh Industries - No OEM	.2	25	0	25	.1%	.0%	.0%	.0%
EDA Systems	.2	3	0	3	.1%	.0%	.0%	.0%
EDSA Micro	.2	40	0	40	.1%	.0%	.0%	.0%
Bechtel Software	.2	23	0	23	.1%	.0%	.0%	.0%
DFI	.2	115	0	115	.1%	.0%	.0%	.1%
Geomath	.1	10	0	10	.0%	.0%	.0%	.0%
IBM	.1	14	0	14	.0%	.0%	.0%	.0%
Other Companies	.8	661	248	413	.3%	.2%	.1%	.3%
All Companies	244.9	335,386	211,394	123,992	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 19  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	70.9	68.2	2.1	11,040	15.6%	23.6%	1.4%	18.0%
Compaq	61.5	61.5	.0	11,798	13.5%	21.2%	.0%	19.2%
Autodesk	33.9	.0	33.9	0	7.5%	.0%	22.1%	.0%
Apple Computer	23.7	20.9	.0	5,527	5.2%	7.2%	.0%	9.0%
Hewlett-Packard	20.0	20.0	.0	3,810	4.4%	6.9%	.0%	6.2%
Racal-Redac	18.9	.0	18.9	0	4.1%	.0%	12.3%	.0%
Prime Computer	16.6	2.5	12.6	143	3.7%	.9%	8.2%	.2%
Olivetti	15.6	6.4	6.0	2,850	3.4%	2.2%	3.9%	4.6%
Ziegler Instruments GmbH	14.1	.0	13.3	0	3.1%	.0%	8.7%	.0%
Logotec	8.5	5.2	2.5	50	1.9%	1.8%	1.6%	.1%
Rotring euroCAD	8.0	3.5	3.7	140	1.8%	1.2%	2.4%	.2%
Intercad	6.5	3.4	1.8	336	1.4%	1.2%	1.2%	.5%
CADAM	5.9	.0	5.3	0	1.3%	.0%	3.4%	.0%
RHV Software Systems	5.5	.0	5.5	0	1.2%	.0%	3.6%	.0%
Aucotec	5.4	2.0	2.5	495	1.2%	.7%	1.6%	.8%
Engineering Computer Services	5.3	2.3	1.7	158	1.2%	.8%	1.1%	.3%
Intergraph	4.1	.0	3.8	0	.9%	.0%	2.5%	.0%
Xilinx	3.2	.0	2.9	0	.7%	.0%	1.9%	.0%
ETAK	2.9	.4	2.3	0	.6%	.1%	1.5%	.0%
Robocom	2.9	.0	2.9	0	.6%	.0%	1.9%	.0%
Superdraft	2.9	.2	2.6	0	.6%	.1%	1.7%	.0%
Cadtronic	2.8	1.8	.8	36	.6%	.6%	.5%	.1%
Philips International	2.5	.0	2.1	0	.5%	.0%	1.4%	.0%
Westward	2.3	1.7	.3	833	.5%	.6%	.2%	1.4%
ISICAD	2.1	.0	2.1	0	.5%	.0%	1.4%	.0%
Everex	2.0	2.0	.0	1,013	.4%	.7%	.0%	1.6%
EESOF	1.8	.1	1.5	2	.4%	.0%	1.0%	.0%
CADKEY	1.8	.0	1.8	0	.4%	.0%	1.1%	.0%
Valid	1.7	.9	.5	24	.4%	.3%	.3%	.0%
Sycotronic AG	1.4	.0	1.2	0	.3%	.0%	.8%	.0%
Cimatron	1.3	.9	.4	34	.3%	.3%	.2%	.1%
Daisy Systems	1.3	.2	1.3	0	.3%	.1%	.8%	.0%
Futurenet	1.3	.0	1.1	0	.3%	.0%	.7%	.0%

(Continued)

# Market Share

TABLE NUMBER: 19  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Total Revenue			Mksts Shipped	Market Share		
	Revenue	Hardware Revenue	Software Revenue		Revenue	Hardware Revenue	Software Revenue
Orcad	1.3	.0	1.2	0	.3%	.0%	.8%
Micrografix	1.2	.0	1.2	0	.3%	.0%	.8%
Vision 3D	1.2	1.2	.0	15	.3%	.4%	.0%
CAD-UL	1.0	.3	.7	27	.2%	.1%	.5%
CAD Lab	1.0	.0	.8	0	.2%	.0%	.5%
CAD Software	.9	.0	.8	0	.2%	.0%	.5%
Teradyne	.9	.0	.7	0	.2%	.0%	.5%
Norsk Data	.9	.1	.2	36	.2%	.0%	.1%
ESRI	.8	.0	.8	0	.2%	.0%	.5%
Calma	.8	.0	.7	0	.2%	.0%	.5%
Sigma Design	.8	.0	.7	0	.2%	.0%	.4%
View Logic	.7	.0	.6	0	.2%	.0%	.4%
European Silicon Structures	.7	.0	.7	0	.1%	.0%	.4%
Aptos	.5	.0	.5	0	.1%	.0%	.3%
Manufacturing Consultants	.5	.0	.5	0	.1%	.0%	.3%
Foresight Resources	.5	.0	.5	0	.1%	.0%	.3%
Artes Technology	.5	.2	.3	10	.1%	.1%	.2%
Albert Nestler	.5	.3	.1	32	.1%	.1%	.1%
Omation	.5	.0	.5	0	.1%	.0%	.3%
Altera	.4	.0	.4	0	.1%	.0%	.2%
Micro CAD/CAM Systems	.4	.0	.4	0	.1%	.0%	.2%
American Small Business Comp.	.3	.0	.3	0	.1%	.0%	.2%
Shanson Analytcs	.3	.0	.3	0	.1%	.0%	.2%
Microsim	.3	.0	.3	0	.1%	.0%	.2%
Zycor	.3	.0	.3	0	.1%	.0%	.2%
Evolution Computing	.3	.0	.3	0	.1%	.0%	.2%
Mega CAD	.3	.0	.3	0	.1%	.0%	.2%
Bishop Graphics CAD Systems	.2	.0	.2	0	.0%	.0%	.1%
Phase Three Logic	.2	.0	.2	0	.0%	.0%	.1%
Secmai	.2	.1	.0	3	.0%	.0%	.0%
Accugraph	.2	.1	.1	6	.0%	.0%	.1%
International Microelectronic	.2	.0	.1	0	.0%	.0%	.1%
MacNeal-Schwendler	.2	.0	.2	0	.0%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 19  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Generic Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Strategic Locations Planning	.2	.0	.2	0	.0%	.0%	.1%	.0%
Douglas Electronics	.1	.0	.1	0	.0%	.0%	.1%	.0%
Elite Software Development	.1	.0	.1	0	.0%	.0%	.1%	.0%
Innovative Data Design	.1	.0	.1	0	.0%	.0%	.1%	.0%
A.I. Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
CIVILSOFT	.1	.0	.1	0	.0%	.0%	.1%	.0%
Engineering Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Ikos Systems	.1	.1	.0	2	.0%	.0%	.0%	.0%
D.C.A. Engineering	.1	.0	.1	0	.0%	.0%	.1%	.0%
Spectrum Software	.1	.0	.1	0	.0%	.0%	.1%	.0%
Endeco Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Vamp	.1	.0	.1	0	.0%	.0%	.0%	.0%
CRTC	.1	.0	.1	0	.0%	.0%	.0%	.0%
EDA Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
GRAPHSOFT	.0	.0	.0	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.0	.0	.0	1	.0%	.0%	.0%	.0%
Ithaca Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Bechtel Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cascade Graphics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Micro Engineering Solutions	.0	.0	.0	2	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 19 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	165.7	105.2	59.6	26,117	36.4%	36.4%	38.9%	42.5%
All Companies	454.7	289.2	153.3	61,484	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	348.3	261.9	85.5	56,474	76.6%	90.6%	55.8%	91.9%
All Asian-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All European-Based Companies	106.4	27.3	67.8	5,010	23.4%	9.4%	44.2%	8.1%
All Hardware Companies	239.2	244.1	.0	55,132	52.6%	84.4%	.0%	89.7%
All Turnkey & SW Companies	215.4	45.1	153.3	6,352	47.4%	15.6%	100.0%	10.3%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 20  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	33.9	28,637	9,430	19,187	22.0%	30.1%	22.1%	36.6%
Racal-Redac	18.9	4,823	0	4,823	12.3%	5.1%	.0%	9.2%
Ziegler Instruments GmbH	13.3	1,000	0	1,000	8.7%	1.0%	.0%	1.9%
Prime Computer	12.6	3,455	0	3,455	8.2%	3.6%	.0%	6.6%
Olivetti	6.0	841	0	841	3.9%	.9%	.0%	1.6%
CADAM	5.6	903	0	903	3.7%	.9%	.0%	1.7%
RHV Software Systems	5.5	1,800	0	1,800	3.6%	1.9%	.0%	3.4%
Intergraph	3.8	2,487	0	2,487	2.5%	2.6%	.0%	4.7%
Rotring euroCAD	3.7	200	0	200	2.4%	.2%	.0%	.4%
Xilinx	2.9	571	0	571	1.9%	.6%	.0%	1.1%
Robocom	2.9	3,439	0	3,439	1.9%	3.6%	.0%	6.6%
Superdraft	2.6	8,944	8,944	0	1.7%	9.4%	20.9%	.0%
Logotec	2.5	300	0	300	1.6%	.3%	.0%	.6%
Aucotec	2.5	540	0	540	1.6%	.6%	.0%	1.0%
ETAK	2.3	463	0	463	1.5%	.5%	.0%	.9%
Philips International	2.1	140	0	140	1.4%	.1%	.0%	.3%
IBM	2.1	484	0	484	1.4%	.5%	.0%	.9%
ISICAD	2.1	2,054	0	2,054	1.3%	2.2%	.0%	3.9%
InterCAD	1.8	1,070	0	1,070	1.2%	1.1%	.0%	2.0%
CADKEY	1.8	1,248	0	1,248	1.1%	1.3%	.0%	2.4%
Engineering Computer Services	1.7	157	0	157	1.1%	.2%	.0%	.3%
EESOF	1.5	153	0	153	1.0%	.2%	.0%	.3%
Orcad	1.2	3,385	3,385	0	.8%	3.6%	7.9%	.0%
Micrografx	1.2	5,315	5,315	0	.8%	5.6%	12.4%	.0%
Sycotronic AG	1.2	58	0	58	.8%	.1%	.0%	.1%
Daisy Systems	1.1	11	0	11	.7%	.0%	.0%	.0%
Futurenet	1.1	360	0	360	.7%	.4%	.0%	.7%
Valid	.9	83	0	83	.6%	.1%	.0%	.2%
CAD Lab	.8	800	0	800	.5%	.8%	.0%	1.5%
CAD Software	.8	390	0	390	.5%	.4%	.0%	.7%
Cadtronic	.8	145	0	145	.5%	.2%	.0%	.3%
ESRI	.8	180	0	180	.5%	.2%	.0%	.3%
Teradyne	.7	36	0	36	.5%	.0%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 20  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
CAD-UL	.7	53	0	53	.4%	.1%	.0%	.1%
European Silicon Structures	.7	32	0	32	.4%	.0%	.0%	.1%
Sigma Design	.7	438	0	438	.4%	.5%	.0%	.8%
View Logic	.6	235	0	235	.4%	.2%	.0%	.4%
Aptos	.5	154	17	137	.3%	.2%	.0%	.3%
Foresight Resources	.5	2,608	2,608	0	.3%	2.7%	6.1%	.0%
Manufacturing Consultants	.5	233	0	233	.3%	.2%	.0%	.4%
Omatron	.5	1,529	1,529	0	.3%	1.6%	3.6%	.0%
Altera	.4	71	0	71	.2%	.1%	.0%	.1%
Cimatron	.4	50	0	50	.2%	.1%	.0%	.1%
Micro CAD/CAM Systems	.4	696	0	696	.2%	.7%	.0%	1.3%
American Small Business Comp.	.3	2,167	2,167	0	.2%	2.3%	5.1%	.0%
Swanson Analysis	.3	157	0	157	.2%	.2%	.0%	.3%
Microsim	.3	188	0	188	.2%	.2%	.0%	.4%
Evolution Computing	.3	5,484	5,375	110	.2%	5.8%	12.6%	.2%
Zycor	.3	36	0	36	.2%	.0%	.0%	.1%
Mega CADD	.3	293	0	293	.2%	.3%	.0%	.6%
Aries Technology	.3	19	0	19	.2%	.0%	.0%	.0%
Bishop Graphics CAD Systems	.2	383	0	383	.1%	.4%	.0%	.7%
Norsk Data	.2	50	0	50	.1%	.1%	.0%	.1%
Phase Three Logic	.2	500	500	0	.1%	.5%	1.2%	.0%
MacNeal-Schwendler	.2	78	0	78	.1%	.1%	.0%	.1%
Generic Software	.2	1,392	1,392	0	.1%	1.5%	3.3%	.0%
Strategic Locations Planning	.2	333	0	333	.1%	.3%	.0%	.6%
International Microelectronic	.1	20	0	20	.1%	.0%	.0%	.0%
Innovative Data Design	.1	932	932	0	.1%	1.0%	2.2%	.0%
A.I. Systems	.1	218	0	218	.1%	.2%	.0%	.4%
Albert Nestler	.1	25	0	25	.1%	.0%	.0%	.0%
Accugraph	.1	71	0	71	.1%	.1%	.0%	.1%
CIVILSOFT	.1	741	0	741	.1%	.8%	.0%	1.4%
D.C.A. Engineering	.1	61	0	61	.1%	.1%	.0%	.1%
Elite Software Development	.1	343	343	0	.1%	.4%	.8%	.0%

(Continued)



# Market Share

TABLE NUMBER: 20 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Software Revenue	Software Units	Units < \$500	Units > \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
Engineering Software	.1	200	200	0	.1%	.2%	.5%	.0%
Douglas Electronics	.1	146	0	146	.1%	.2%	.0%	.3%
Spectrum Software	.1	159	159	0	.1%	.2%	.4%	.0%
Vamp	.1	233	233	0	.0%	.2%	.5%	.0%
CRTC	.1	60	0	60	.0%	.1%	.0%	.1%
Endeco Systems	.1	14	0	14	.0%	.0%	.0%	.0%
GRAPHSOFT	.0	143	143	0	.0%	.1%	.3%	.0%
Vision 3D	.0	15	0	15	.0%	.0%	.0%	.0%
EDA Systems	.0	0	0	0	.0%	.0%	.0%	.0%
Integrated Silicon Systems	.0	2	0	2	.0%	.0%	.0%	.0%
Ithaca Software	.0	74	74	0	.0%	.1%	.2%	.0%
Bechtel Software	.0	3	0	3	.0%	.0%	.0%	.0%
Cascade Graphics	.0	11	0	11	.0%	.0%	.0%	.0%
Secmai	.0	4	0	4	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	3	0	3	.0%	.0%	.0%	.0%
GEOVISION Inc.	.0	17	0	17	.0%	.0%	.0%	.0%
Other Companies	.9	93	(2)	95	.6%	.1%	.0%	.2%
All Companies	153.7	95,243	42,764	52,479	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 21  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
NEC	93.0	93.0	.0	9,978	19.6%	26.5%	.0%	27.5%
Mutoh Industries	55.1	33.6	19.8	1,185	11.6%	9.6%	14.9%	3.3%
IBM	46.5	43.2	2.8	7,108	9.8%	12.3%	2.1%	19.6%
Fujitsu	44.5	27.5	10.6	2,031	9.4%	7.8%	7.9%	5.6%
Hitachi	38.5	23.1	11.6	700	8.1%	6.6%	8.7%	1.9%
Nakuto	26.2	13.1	10.4	298	5.5%	3.7%	7.8%	.8%
Compaq	12.7	12.7	.0	2,438	2.7%	3.6%	.0%	6.7%
Apple Computer	11.7	10.3	.0	2,723	2.5%	2.9%	.0%	7.5%
Wacom	11.6	4.4	6.5	752	2.4%	1.3%	4.9%	2.1%
Hitachi Seiko	10.5	4.9	5.6	177	2.2%	1.4%	4.2%	.5%
Andor	8.4	1.7	6.3	90	1.8%	.5%	4.7%	.2%
Mitsubishi Electric	7.9	.0	3.9	20	1.7%	.0%	2.9%	.1%
Autodesk	7.4	.0	7.4	0	1.6%	.0%	5.5%	.0%
Toshiba	7.2	.0	.0	307	1.5%	.0%	.0%	.8%
Futurenet	7.0	.0	6.0	0	1.5%	.0%	4.5%	.0%
Seiko Instruments	6.3	2.8	2.8	350	1.3%	.8%	2.1%	1.0%
CPU	5.4	1.4	3.8	300	1.1%	.4%	2.8%	.8%
Design Automation	5.4	.0	5.4	0	1.1%	.0%	4.0%	.0%
Hewlett-Packard	5.0	5.0	.0	952	1.1%	1.4%	.0%	2.6%
Yamashita Electronic	4.6	1.9	2.3	100	1.0%	.5%	1.7%	.3%
Sumisho Electronics	3.4	1.0	2.0	65	.7%	.3%	1.5%	.2%
Sumisho Electronics	3.4	1.0	2.1	65	.7%	.3%	1.5%	.2%
Technovision	3.2	.0	3.2	0	.7%	.0%	2.4%	.0%
Prime Computer	3.2	.4	2.5	24	.7%	.1%	1.9%	.1%
Marubeni Hytech	3.0	.0	2.7	0	.6%	.0%	2.0%	.0%
Xilinx	2.3	.0	2.0	0	.5%	.0%	1.5%	.0%
CADAM	1.6	.0	1.4	0	.3%	.0%	1.0%	.0%
View Logic	1.5	.0	1.3	0	.3%	.0%	1.0%	.0%
Graphtec Engineering	1.5	.8	.6	0	.3%	.2%	.5%	.0%
Mitsui Engineering	1.5	1.4	.0	24	.3%	.4%	.0%	.1%
Valid	1.0	.4	.4	15	.2%	.1%	.3%	.0%
Strategic Locations Planning	.8	.0	.8	0	.2%	.0%	.6%	.0%
EESOF	.7	.0	.6	1	.1%	.0%	.5%	.0%

(Continued)

# Market Share

TABLE NUMBER: 21  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Market Share				Market Share			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Kanematsu Semiconductor	.7	.0	.6	0	.1%	.0%	.4%	.0%
Intergraph	.6	.0	.6	0	.1%	.0%	.4%	.0%
Altera	.6	.0	.6	0	.1%	.0%	.4%	.0%
Orcad	.6	.0	.6	0	.1%	.0%	.4%	.0%
Rikei	.6	.2	.3	0	.1%	.1%	.2%	.0%
Aries Technology	.5	.2	.3	10	.1%	.1%	.2%	.0%
Omation	.5	.0	.5	0	.1%	.0%	.4%	.0%
CADKEY	.4	.0	.4	0	.1%	.0%	.3%	.0%
Sigma Design	.4	.0	.3	0	.1%	.0%	.3%	.0%
ETAK	.4	.1	.3	0	.1%	.0%	.2%	.0%
MacNeal-Schwendler	.3	.0	.3	0	.1%	.0%	.3%	.0%
Microsim	.3	.0	.3	0	.1%	.0%	.3%	.0%
American Small Business Comp.	.3	.0	.3	0	.1%	.0%	.2%	.0%
ISICAD	.3	.0	.3	0	.1%	.0%	.2%	.0%
Swanson Analysis	.2	.0	.2	0	.1%	.0%	.2%	.0%
Integrated Silicon Systems	.2	.1	.1	5	.0%	.0%	.1%	.0%
Manufacturing Consultants	.2	.0	.2	0	.0%	.0%	.1%	.0%
Phase Three Logic	.2	.0	.2	0	.0%	.0%	.1%	.0%
ESRI	.2	.0	.2	0	.0%	.0%	.1%	.0%
Ikos Systems	.2	.2	.0	3	.0%	.1%	.0%	.0%
Control Data	.2	.1	.0	9	.0%	.0%	.0%	.0%
Teradyne	.2	.0	.1	0	.0%	.0%	.1%	.0%
Generic Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Spectrum Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Calma	.1	.0	.1	0	.0%	.0%	.1%	.0%
Aptos	.1	.0	.1	0	.0%	.0%	.1%	.0%
Daisy Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
CAD Software	.1	.0	.1	0	.0%	.0%	.0%	.0%
Douglas Electronics	.1	.0	.0	0	.0%	.0%	.0%	.0%
Dynaware	.1	.0	.1	0	.0%	.0%	.0%	.0%
Bishop Graphics CAD Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
D.C.A. Engineering	.1	.0	.1	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 21 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Endeco Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
CRTC	.0	.0	.0	0	.0%	.0%	.0%	.0%
Elite Software Development	.0	.0	.0	0	.0%	.0%	.0%	.0%
Innovative Data Design	.0	.0	.0	0	.0%	.0%	.0%	.0%
Ithaca Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Micro CAD/CAM Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cascade Graphics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Micro Engineering Solutions	.0	.0	.0	2	.0%	.0%	.0%	.0%
CIVILSOFT	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	92.7	83.7	49.7	7,916	19.5%	23.8%	37.3%	21.8%
All Companies	474.6	351.3	133.5	36,295	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	149.7	145.6	43.4	19,793	31.5%	41.4%	32.5%	54.5%
All Asian-Based Companies	324.9	205.7	90.1	16,502	68.5%	58.6%	67.5%	45.5%
All European-Based Companies	.0	.0	.0	0	.0%	.0%	.0%	.0%
All Hardware Companies	179.2	221.6	.0	28,493	37.7%	63.1%	.0%	78.5%
All Turnkey & SW Companies	295.5	129.7	133.5	7,803	62.3%	36.9%	100.0%	21.5%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 22  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Software				Market Share			
	Revenue	Units	Units < \$500	Units > \$500	Revenue	Units	Units < \$500	Units > \$500
Mutoh Industries - No OEM	19.8	2,265	0	2,265	14.8%	5.6%	.0%	7.3%
Hitachi	11.6	1,171	0	1,171	8.6%	2.9%	.0%	3.8%
Fujitsu	10.6	2,760	0	2,760	7.9%	6.8%	.0%	8.9%
Hakuto	10.4	582	0	582	7.8%	1.4%	.0%	1.9%
Autodesk	7.4	6,246	2,061	4,185	5.5%	15.4%	21.3%	13.5%
Wacom	6.5	1,000	0	1,000	4.8%	2.5%	.0%	3.2%
Andor	6.3	2,130	0	2,130	4.7%	5.2%	.0%	6.9%
Futurenet	6.0	1,990	0	1,990	4.5%	4.9%	.0%	6.4%
Hitachi Seiko	5.6	210	0	210	4.2%	.5%	.0%	.7%
Design Automation	5.4	4,000	0	4,000	4.0%	9.8%	.0%	12.9%
Mitsubishi Electric	3.9	332	0	332	2.9%	.8%	.0%	1.1%
CPU	3.8	1,200	0	1,200	2.8%	2.9%	.0%	3.9%
Technovision	3.2	460	0	460	2.4%	1.1%	.0%	1.5%
Seiko I&E - Turnkey	2.8	52	0	52	2.1%	.1%	.0%	.2%
IBM	2.8	647	0	647	2.1%	1.6%	.0%	2.1%
Prime Computer	2.5	1,215	0	1,215	1.9%	3.0%	.0%	3.9%
Toshiba - No OEM	2.3	307	0	307	1.7%	.8%	.0%	1.0%
Yamashita Electronic	2.3	200	0	200	1.7%	.5%	.0%	.6%
Sumisho Electronics	2.0	256	0	256	1.5%	.6%	.0%	.8%
Xilinx	2.0	399	0	399	1.5%	1.0%	.0%	1.3%
CADAM	1.8	406	0	406	1.3%	1.0%	.0%	1.3%
View Logic	1.3	526	0	526	1.0%	1.3%	.0%	1.7%
Strategic Locations Planning	.8	1,667	0	1,667	.6%	4.1%	.0%	5.4%
EESDF	.6	61	0	61	.5%	.2%	.0%	.2%
Graphtec Engineering	.6	40	0	40	.5%	.1%	.0%	.1%
Intergraph	.6	382	0	382	.4%	.9%	.0%	1.2%
Kanematsu Semiconductor	.6	110	0	110	.4%	.3%	.0%	.4%
Valid	.6	48	0	48	.4%	.1%	.0%	.2%
Orcad	.5	1,486	1,486	0	.4%	3.7%	15.3%	.0%
Altera	.5	100	0	100	.4%	.2%	.0%	.3%
Omaton	.5	1,629	1,629	0	.4%	4.0%	16.8%	.0%
CADKEY	.4	307	0	307	.3%	.8%	.0%	1.0%
MacNeal-Schwendler	.3	166	0	166	.3%	.4%	.0%	.5%

(Continued)

# Market Share

TABLE NUMBER: 22  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Software				Market Share			
	Revenue	Units	Units < \$500	Units > \$500	Revenue	Units	Units < \$500	Units > \$500
Microsim	.3	206	0	206	.3%	.5%	.0%	.7%
Sigma Design	.3	219	0	219	.3%	.5%	.0%	.7%
Rikei	.3	50	0	50	.2%	.1%	.0%	.2%
American Small Business Comp.	.3	1,904	1,904	0	.2%	4.7%	19.6%	.0%
ETAK	.3	58	0	58	.2%	.1%	.0%	.2%
ISICAD	.3	288	0	288	.2%	.7%	.0%	.9%
Daisy Systems	.3	3	0	3	.2%	.0%	.0%	.0%
Aries Technology	.3	19	0	19	.2%	.0%	.0%	.1%
Swanson Analysis	.2	118	0	118	.2%	.3%	.0%	.4%
ESRI	.2	47	0	47	.1%	.1%	.0%	.2%
Manufacturing Consultants	.2	101	0	101	.1%	.2%	.0%	.3%
Phase Three Logic	.2	588	588	0	.1%	1.4%	6.1%	.0%
Generic Software	.2	1,392	1,392	0	.1%	3.4%	14.4%	.0%
Spectrum Software	.2	298	298	0	.1%	.7%	3.1%	.0%
Integrated Silicon Systems	.1	10	0	10	.1%	.0%	.0%	.0%
Teradyne	.1	7	0	7	.1%	.0%	.0%	.0%
Aptos	.1	35	4	31	.1%	.1%	.0%	.1%
CAD Software	.1	29	0	29	.0%	.1%	.0%	.1%
Dynaware	.1	129	0	129	.0%	.3%	.0%	.4%
Bishop Graphics CAD Systems	.1	96	0	96	.0%	.2%	.0%	.3%
D.C.A. Engineering	.1	34	0	34	.0%	.1%	.0%	.1%
Control Data	.0	8	0	8	.0%	.0%	.0%	.0%
Douglas Electronics	.0	73	0	73	.0%	.2%	.0%	.2%
Endeco Systems	.0	11	0	11	.0%	.0%	.0%	.0%
CRTC	.0	36	0	36	.0%	.1%	.0%	.1%
Innovative Data Design	.0	215	215	0	.0%	.5%	2.2%	.0%
Ithaca Software	.0	74	74	0	.0%	.2%	.8%	.0%

(Continued)

# Market Share

TABLE NUMBER: 22 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company					..... Market Share .....			
	Software Revenue	Software Units	Units < \$500	Units > \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
*****	*****	*****	*****	*****	*****	*****	*****	*****
Micro CAD/CAM Systems	.0	60	0	60	.0%	.1%	.0%	.2%
Cascade Graphics	.0	11	0	11	.0%	.0%	.0%	.0%
CIVILSOFT	.0	74	0	74	.0%	.2%	.0%	.2%
Dennis Klein & Associates	.0	3	0	3	.0%	.0%	.0%	.0%
Elite Software Development	.0	38	38	0	.0%	.1%	.4%	.0%
Other Companies	2.9	98	1	97	2.2%	.2%	.0%	.3%
All Companies	133.8	40,681	9,690	30,991	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
May 1989

# Market Share

TABLE NUMBER: 23  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	8.1	7.8	.2	1,302	31.3%	32.2%	3.1%	31.2%
Apple Computer	2.2	2.0	.0	522	8.7%	8.1%	.0%	12.5%
Olivetti	1.0	.5	.4	143	4.0%	1.8%	6.7%	3.4%
Mutoh Industries	.9	.5	.2	91	3.3%	2.1%	3.7%	2.2%
Futurenet	.6	.0	.5	0	2.5%	.0%	8.4%	.0%
Intergraph	.6	.0	.6	0	2.5%	.0%	9.2%	.0%
Autodesk	.6	.0	.6	0	2.3%	.0%	9.3%	.0%
Daisy Systems	.6	.3	.2	0	2.2%	1.1%	2.3%	.0%
Prime Computer	.5	.1	.4	3	1.9%	.2%	6.5%	.1%
CADAM	.5	.0	.5	0	1.8%	.0%	6.5%	.0%
ETAK	.4	.1	.3	0	1.4%	.2%	4.5%	.0%
CAD Software	.3	.0	.3	0	1.2%	.0%	4.5%	.0%
Micro CAD/CAM Systems	.3	.0	.3	0	1.0%	.0%	3.9%	.0%
Mapinfo	.2	.0	.2	0	.9%	.0%	3.6%	.0%
Orcad	.2	.0	.2	0	.8%	.0%	3.1%	.0%
Control Data	.2	.1	.0	9	.7%	.6%	.6%	.2%
ERDAS	.2	.1	.1	5	.7%	.4%	1.4%	.1%
Sigma Design	.2	.0	.2	0	.7%	.0%	2.6%	.0%
Strategic Locations Planning	.2	.0	.2	0	.6%	.0%	2.3%	.0%
Zycor	.1	.0	.1	0	.5%	.0%	1.7%	.0%
Innovative Data Design	.1	.0	.1	0	.4%	.0%	1.6%	.0%
ISICAD	.1	.0	.1	0	.3%	.0%	1.2%	.0%
Spectrum Software	.1	.0	.1	0	.3%	.0%	1.2%	.0%
Racal-Redac	.1	.0	.0	0	.2%	.0%	.0%	.0%
D.C.A. Engineering	.1	.0	.1	0	.2%	.0%	.8%	.0%
ESRI	.1	.0	.1	0	.2%	.0%	.8%	.0%
Ithaca Software	.1	.0	.1	0	.2%	.0%	.8%	.0%
Valid	.1	.0	.0	1	.2%	.1%	.3%	.0%
MacNeal-Schwendler	.0	.0	.0	0	.2%	.0%	.6%	.0%
Swanson Analysis	.0	.0	.0	0	.2%	.0%	.6%	.0%
Teradyne	.0	.0	.0	0	.2%	.0%	.6%	.0%
Elite Software Development	.0	.0	.0	0	.1%	.0%	.2%	.0%

(Continued)



# Market Share

TABLE NUMBER: 23 (Continued)  
 TITLE: 1988 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Douglas Electronics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	9.5	13.1	2.5	2,109	37.0%	53.8%	38.8%	50.5%
All Companies	25.7	24.4	6.4	4,178	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	22.7	23.0	5.3	3,802	88.4%	94.2%	82.9%	91.0%
All Asian-Based Companies	.9	.5	.2	91	3.3%	2.1%	3.7%	2.2%
All European-Based Companies	2.1	.9	.9	285	8.3%	3.7%	13.4%	6.8%
All Hardware Companies	15.9	22.0	.0	3,733	61.8%	90.2%	.0%	89.3%
All Turnkey & SW Companies	9.8	2.4	6.4	445	38.2%	9.8%	100.0%	10.7%

Source: Dataquest  
May 1989.

# Market Share

TABLE NUMBER: 24  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: ROW  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Software Revenue	Software Units	Units < \$500	Units > \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
*****	*****	*****	*****	*****	*****	*****	*****	*****
Autodesk	.6	507	167	340	10.0%	10.6%	9.5%	11.2%
Intergraph	.6	382	0	382	9.8%	8.0%	.0%	12.6%
Futurenet	.5	180	0	180	9.0%	3.8%	.0%	5.9%
CADAM	.4	65	0	65	7.3%	1.4%	.0%	2.2%
Olivetti	.4	60	0	60	7.2%	1.3%	.0%	2.0%
Prime Computer	.4	383	0	383	7.0%	8.0%	.0%	12.6%
CAD Software	.3	141	0	141	4.8%	3.0%	.0%	4.7%
ETAK	.3	58	0	58	4.8%	1.2%	.0%	1.9%
Micro CAD/CAM Systems	.3	497	0	497	4.2%	10.4%	.0%	16.4%
Mutoh Industries - No OEM	.2	27	0	27	4.0%	.6%	.0%	.9%
Mapinfo	.2	200	0	200	3.8%	4.2%	.0%	6.6%
IBM	.2	46	0	46	3.3%	1.0%	.0%	1.5%
Orcad	.2	550	550	0	3.3%	11.5%	31.4%	.0%
Sigma Design	.2	109	0	109	2.8%	2.3%	.0%	3.6%
Daisy Systems	.2	10	0	10	2.5%	.2%	.0%	.3%
Strategic Locations Planning	.2	333	0	333	2.5%	7.0%	.0%	11.0%
Zycor	.1	15	0	15	1.8%	.3%	.0%	.5%
Innovative Data Design	.1	717	717	0	1.7%	15.0%	40.9%	.0%
ERDAS	.1	4	0	4	1.5%	.1%	.0%	.1%
ISICAD	.1	79	0	79	1.3%	1.7%	.0%	2.6%
Spectrum Software	.1	159	159	0	1.3%	3.3%	9.1%	.0%
D.C.A. Engineering	.1	34	0	34	.8%	.7%	.0%	1.1%
ESRI	.1	12	0	12	.8%	.2%	.0%	.4%
Ithaca Software	.1	123	123	0	.8%	2.6%	7.0%	.0%

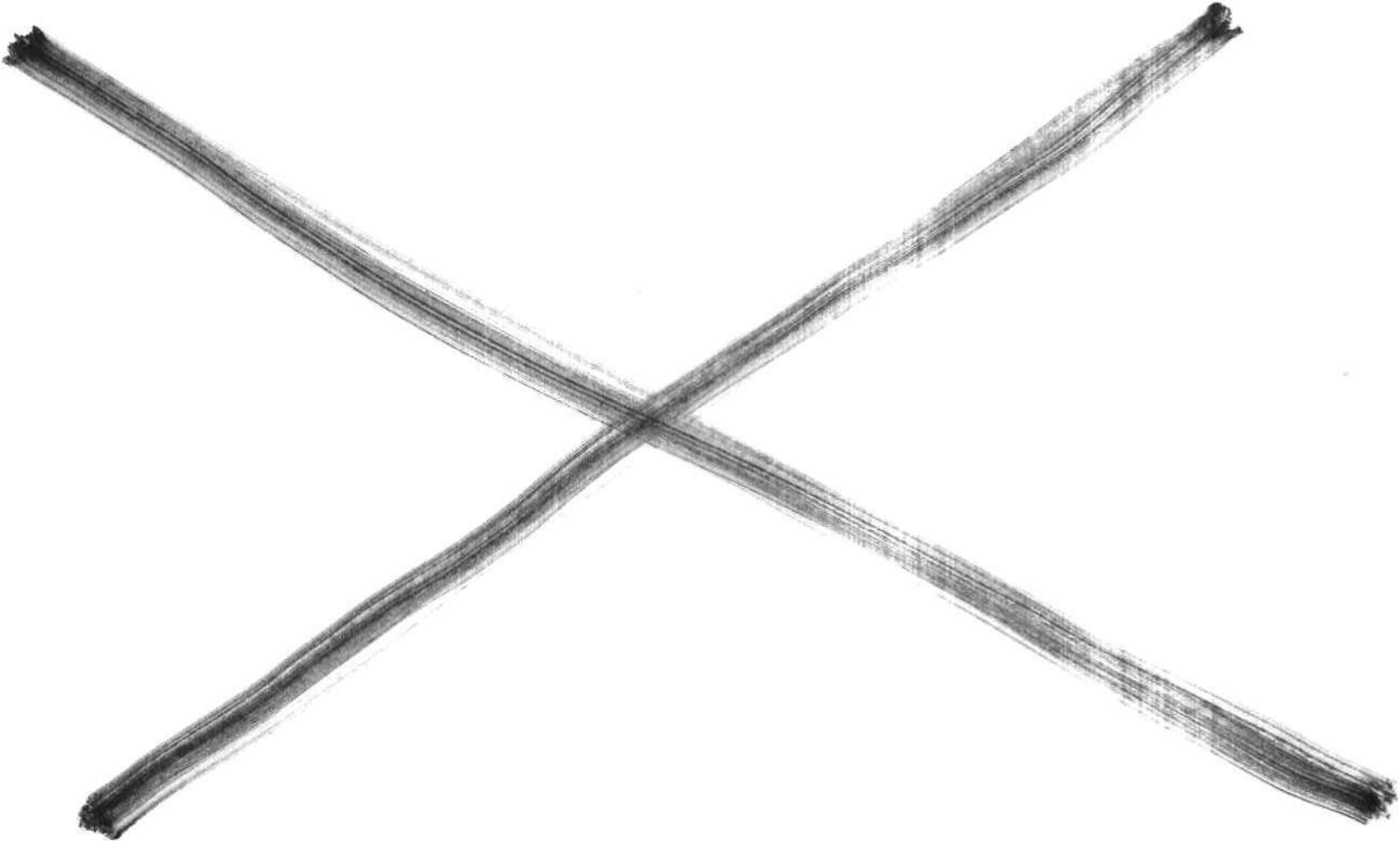
(Continued)

# Market Share

TABLE NUMBER: 24 (Continued)  
 TITLE: 1988 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: ROW  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Control Data	.0	8	0	8	.7%	.2%	.0%	.3%
MacNeal-Schwendler	.0	20	0	20	.7%	.4%	.0%	.6%
Swenson Analysis	.0	20	0	20	.7%	.4%	.0%	.6%
Teradyne	.0	2	0	2	.7%	.0%	.0%	.1%
Valid	.0	2	0	2	.3%	.0%	.0%	.1%
Other Companies	.0	0	(0)	0	.0%	.0%	.0%	.0%
All Companies	6.0	4,783	1,754	3,029	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 May 1989



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# PERSONAL CAD DEALER DIRECTORY

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The following list of CAD dealers were verified by telephone interviews in August 1989.

## **17 SOFTWARE STREET INC.**

d/b/a Computer Emporium, 453 Route 211, E., Middletown, NY 10940  
Phone: 914 343-4880 Fax: N/A  
Contacts: Jim Burpoe, Sales Manager  
CAD Software Sold: Claris CAD, Versacad  
Computers Sold: Mac  
CAD Revenue: Less than \$1 Million

## **800 SOFTWARE**

918 Parker Street, Berkeley, CA 94710  
Phone: 415 644-3611 Fax: 415 644-8226  
Contacts: Ira Wyse, Vice President  
CAD Software Sold: Generic Software  
Computers Sold: N/A  
CAD Revenue: N/A

## **A.C.E. CONSULTING FIRM**

3610 West 6th Street, Los Angeles, CA 90020  
Phone: 213 383-2425 Fax: N/A  
Contacts: Mr. Mohammad Nour, President; Mrs. Oresa Cuthbertson, Vice President  
CAD Software Sold: AutoCAD  
Computers Sold: Apollo, Compaq, HP, IBM, Mac, Sun, DOS Clone  
CAD Revenue: Less than \$1 Million

## **A.I. SYSTEMS**

2450 East 7000 South, Salt Lake City, UT 84121  
Phone: 801 942-8949 Fax: N/A  
Contacts: Mr. Ken Coburn, President  
CAD Software Sold: Autodesk, Sigma Design  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

## **A.S. THOMAS, INC.**

355 Providence Highway, Westwood, MA 02090  
Phone: 617 329-9200 Fax: N/A  
Contacts: Mrs. E.M. Thomas, Vice President; Dr. A.S. Thomas, President  
CAD Software Sold: Nuform systems  
Computers Sold: Digital  
CAD Revenue: \$1 to \$3 Million

**A/E MICRO SYSTEMS**

P.O Box 41217, Cincinnati, OH 45241  
Phone: 513 772-6700 Fax: N/A  
Contacts: Mr. Mark Feitlinger, President  
CAD Software Sold: Autocad  
Computers Sold: Compaq, HP, IBM, Mac, Sun, DOS Clone, Intel  
CAD Revenue: More than \$3 Million

**A/K COMPUTERS**

738 Cumberland St., Lebanon, PA 17042  
Phone: 717 274-5005 Fax: N/A  
Contacts: Mr. Don Auken, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ABCOR INC.**

P.O. Box 890247, Houston, TX 77289-0247  
Phone: 713 486-9251 Fax: N/A  
Contacts: Mr. Gerald Bourque, Owner  
CAD Software Sold: OrCAD, 4-CEEN, Sedco  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ACCESS GRAPHICS TECHNOLOGY INC.**

1426 Pearl Street, Boulder, CO 80302  
Phone: 303 938-9333 Fax: N/A  
Contacts: James C. Hudson, President  
CAD Software Sold: N/A  
Computers Sold: Peripherals, Digital  
CAD Revenue: N/A

**ACCESS GRAPHICS TECHNOLOGY INC.**

41A Gordon Road, Piscataway, NJ 08854  
Phone: 201 985-2200 Fax: 201-985-1930  
Contacts: Mr. James Hudson, President; Mr. Eric Korb, V.P., Workstation Business Unit  
CAD Software Sold: AutoCAD, Arris, CADkey, Personal Designer  
Computers Sold: DOS Clone, Digital, Mitsubishi  
CAD Revenue: More than \$3 Million

**ACCUDATA INC.**

9555 James Avenue South, Suite 225, Bloomington, MN 55431  
Phone: 612 881-0623 Fax: N/A  
Contacts: Mr. Thomas G. Carlson, President  
CAD Software Sold: AutoCAD  
Computers Sold: Zenith  
CAD Revenue: \$1 to \$3 Million

**ACRATECH, INC.**

1200 Hwy 146, S. Suite 150, La Porte, TX 77571  
Phone: 713-470-1322 Fax: N/A  
Contacts: Mr. Gene Horn, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**ADC COMPUTER SERVICES, INC.**

2101 Burlington, North Kansas City, MO 64116  
Phone: 816 221-1100 Fax: 816 221-0614  
Contacts: Mr. Mike Jennings, CAD Consultant; Mr. Jim Claypool, Vice President  
CAD Software Sold: Autocad, Third party development  
Computers Sold: Compaq, IBM, DOS Clone, Acer  
CAD Revenue: Less than \$1 Million

**ADVANCE COMPUTER SYSTEMS**

665 Grape Avenue, Sunnyvale, CA  
Phone: 408 732-6200 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ADVANCED COMPUTER PRODUCTS INC.**

1310 "B" E. Edinger Avenue, Santa Ana, CA 92705  
Phone: 714 558-8813 Fax: N/A  
Contacts: Mr. David Freeman, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ADVANCED DIGITAL GROUP**

12062 Valley View Street, Suite 111, Garden Grove, CA 92645  
Phone: 714 897-0319 Fax: 714-898-7731  
Contacts: Mr. Dennis Jeffers, President  
CAD Software Sold: OrCAD  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ADVANCED INFORMATION SYSTEMS, INC.**

4665 44th Street S.E., Airport Technical Center, Grand Rapids, MI 49508  
Phone: 616 957-7900 Fax: N/A  
Contacts: Mr. John A. Osterhart, President  
CAD Software Sold: Autodesk, Time Arts  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ADVANCED MICRO CONSULTANTS, INC.**

2107 N. First Street, Suite 480, San Jose, CA 95131  
Phone: 408 436-7711 Fax: N/A  
Contacts: Mr. Douglas Herfurth, CEO  
CAD Software Sold: Cadvance, Anvil, P-CAD, SmartCAM  
Computers Sold: N/A  
CAD Revenue: N/A

**ADVANCED TECHNOLOGY DEVELOPMENT CO.**

22702 Crosshill Avenue, Torrance, CA 90505  
Phone: 213 316-6862 Fax: N/A  
Contacts: Mr. Dave Head, Co-Owner; Mr. Bob Washington, Co-Owner  
CAD Software Sold: AutoCAD, Complete Autodesk line  
Computers Sold: DOS Clone, Zenith, AST, ALR  
CAD Revenue: Less than \$1 Million

**ADVANCED TECHNOLOGY DISTRIBUTION**

524 Busse Highway, Suite D, Park Ridge, IL 60068  
Phone: 312 692-7325 Fax: N/A  
Contacts: Mr. Tom Math, President  
CAD Software Sold: Autodesk, American Small Bus Cmptr, Cornerstone  
Computers Sold: Compaq, DOS Clone, Everex, AST  
CAD Revenue: \$1 to \$3 Million

**ADVANCED TECHNOLOGY INC.**

2708 Phillips Drive, Jonesboro, AR 72401  
Phone: 501 932-8511 Fax: 501-935-9560  
Contacts: Mr. Troy Phillips, President; Mr. J. C. Nix, Vice President, Marketing  
CAD Software Sold: Cadkey, MasterCAM  
Computers Sold: DOS Clone, 386  
CAD Revenue: \$1 to \$3 Million

**ADVANCED TECHNOLOGY OF JONESBORO**

2708 Phillips Dr., Jonesboro, AR 72401  
Phone: 501-932-8511 Fax: 501-935-9560  
Contacts: Mr. Troy Phillips, President; Mr. Chris George, V.P. Marketing/Sales  
CAD Software Sold: Cadkey, Computervision  
Computers Sold: DOS Clone, Everex, DTK  
CAD Revenue: Less than \$1 Million

**AIDEX CORP.**

1802 N. Division, Morris, IL 60450  
Phone: 815-942-4299 Fax: 815-942-3248  
Contacts: Mr. Gary Rockis, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A



**ALDEN COMPUTER SYSTEMS CORP.**

1 Salem Green, Suite 420, Salem, MA 01970  
Phone: 508 744-1314 Fax: N/A  
Contacts: Mr. Robert Whitten, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ALPHA COMPUTERS INC.**

11635 SW Beaverton-Hillsdale Hwy., Beaverton, OR 97005  
Phone: 503 644-9722 Fax: N/A  
Contacts: N/A  
CAD Software Sold: VersaCAD  
Computers Sold: Compaq, Mac  
CAD Revenue: Less than \$1 Million

**ALPHA COMPUTERS INC.**

15110 S.W. Bangy Road, Lake Oswego, OR 97035  
Phone: 503 620-7000 Fax: N/A  
Contacts: Mr. Thomas Chow N/A  
CAD Software Sold: Versacad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ALTEK CORP.**

12210 Plum Orchard Drive, Silver Spring, MD 209047802  
Phone: 301 572-2555 Fax: 301-572-2510  
Contacts: Mr. Al Cameron, President; Mr. Tom Rainone, Chief Operating Officer  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**AMCAD**

1325 Whitlock #314, Carrollton, TX 75006  
Phone: 214 323-0700 Fax: 214 323-9004  
Contacts: Mr. Wade Whitmer, President; Ms. Cherie Jo Barns, Vice President, Marketing  
CAD Software Sold: Drafix, MaxiCAD, Fast, DesignCAD, Concurrent plot  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**AMERICAN COMPUTER TECHNOLOGY**

4825 North First Street, Arlington, VA 22203  
Phone: 703 525-0111 Fax: N/A  
Contacts: N/A  
CAD Software Sold: ARRIS, Pro-Engineer, Pro Cadam, AutoCAD  
Computers Sold: Compaq, Sun  
CAD Revenue: \$1 to \$3 Million

**AMERICAN MICROCAD, INC.**

510 Kings Street, Suite 505, Alexandria, VA 22314  
Phone: 301 353-1100 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ANTECH, INC.**

788 Myrtle Street, Roswell, GA 30075  
Phone: 404 993-7270 Fax: N/A  
Contacts: Mr. Ashok K. Nagrani, President  
CAD Software Sold: AutoCAD  
Computers Sold: NEC  
CAD Revenue: Less than \$1 Million

**APPA BUSINESS COMPUTERS**

5864 Interface Drive, Ann Arbor, MI 48103  
Phone: 313 769-2727 Fax: 313-769-4727  
Contacts: Mr. Arno Poerner, President  
CAD Software Sold: Autodesk, Intergraph  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**APPLIED MANAGEMENT CORP.**

636 Logan, Helena, MT 59601  
Phone: 406 442-6665 Fax: N/A  
Contacts: Mr. Richard Subry, President; Mr. Robert Romney, Marketing Director  
CAD Software Sold: Autodesk line  
Computers Sold: Compaq, HP, IBM  
CAD Revenue: Less than \$1 Million

**APPLIED SOFTWARE TECHNOLOGY, INC.**

1908 Cliff Valley Way N.E., Atlanta, GA 30329  
Phone: 404 633-8660 Fax: N/A  
Contacts: Mr. Richard Burroughs, President; Mr. Raymond Metzger, Vice President  
CAD Software Sold: AutoCAD, ARRIS, AutoSolid, Computervision, Intergraph  
Computers Sold: Apollo, Compaq, IBM, Sun, DOS Clone, Everex, NEC  
CAD Revenue: More than \$3 Million

**APPLIED TECHNICAL SUPPORT, INC.**

320 South Boston Building, Lower Level, Tulsa, OK 74103  
Phone: 918 438-5311 Fax: N/A  
Contacts: Mr. Greg Lorson, President  
CAD Software Sold: AutoCAD  
Computers Sold: HP, DOS Clone, AST  
CAD Revenue: \$1 to \$3 Million

**APPLIED TECHNOLOGY ADVANCES**

Div of the Center for Manufacturing Tech., 10200 Anderson Way, Cincinnati, OH 45242  
Phone: 513 984-7272 Fax: N/A  
Contacts: Mr. Ian Clough, Applications Specialist; Mr. Neal P. Jeffries, Executive Director  
CAD Software Sold: AutoCAD, CADAM, Computervision  
Computers Sold: DOS Clone, IBM clones  
CAD Revenue:

**AQUARIAN AGE COMPUTER CENTER**

301 Balboa Street, San Francisco, CA 94118  
Phone: 415 386-3980 Fax: N/A  
Contacts: Mr. Richard Teich, Technical Manager  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ARDEN SYSTEMS, INC.**

12335 Santa Monica Blvd., Los Angeles, CA 90025  
Phone: 213 479-6707 Fax: N/A  
Contacts: N/A  
CAD Software Sold: AutoCAD  
Computers Sold: DOS Clone, Step systems - Everex  
CAD Revenue:

**ASSOCIATED MARKET RESEARCH**

3755 Capital of Texas Highway S., Suite 380, Austin, TX 78704  
Phone: 512 328-5181 Fax: N/A  
Contacts: Mr. George Head, President; Ms. Jan Head, Vice President  
CAD Software Sold: AutoCAD, CADEX 10  
Computers Sold: Compaq, IBM, Mac, Mitsubishi, NEC, NCR  
CAD Revenue: Less than \$1 Million

**ATKINSON INDUSTRIES, INC.**

100 Lincoln Avenue, Orwigsburg, PA 17961  
Phone: 717 366-2114 Fax: N/A  
Contacts: Mr. Tom Atkinson, Vice President; Mr. Gary R. Atkinson, President  
CAD Software Sold: AutoCAD  
Computers Sold: Compaq, IBM, DOS Clone  
CAD Revenue: Less than \$1 Million

**AUTOMATED DATA SERVICES INC.**

2280 Aloma Avenue, Winterpark, FL 32792  
Phone: 407 628-9828 Fax: N/A  
Contacts: Mr. Pete Girard, Vice President; Mr. Jerry Girard, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**AUTOMATED INFORMATION MANAGEMENT**

11 Greenway Plaza #P102, Houston, TX 77046

Phone: 713 961-4551 Fax: N/A

Contacts: Mr. Terry Edgerton, President; Mr. John Edgerton, Vice President

CAD Software Sold: Autosolid, Autoshade, AutoCAD, AutoSketch, Whole Autodesk line

Computers Sold: Sun

CAD Revenue: More than \$3 Million

**AUTOMATED SYSTEMS DESIGN GROUP, INC**

2001 Omega Road, Suite 203, San Ramon, CA 94583

Phone: 415 838-3140 Fax: 415-838-1061

Contacts: Mr. Raymond Howard, Vice President

CAD Software Sold: AutoCAD, VersaCAD

Computers Sold: Compaq, IBM, Mac, DOS Clone, Everex

CAD Revenue: \$1 to \$3 Million

**AUTOMATION IMAGE**

2081 Hutton Drive, Suite 311, Carrollton, TX 75006

Phone: 214 247-8816 Fax: N/A

Contacts: Mr. Palmer Keith, Vice President, Operations: Ms. Indira Singla, Vice President, Marketing

CAD Software Sold: Autodesk, Personal CAD Systems

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**AUTOMATION INTEGRATORS**

30100 Telegraph Road, Suite 478, Birmingham, MI 48010

Phone: 313 644-8870 Fax: 313 644-9153

Contacts: Mr. Timothy O'Connor, President

CAD Software Sold: Prime- Personal Designer, AutoCAD

Computers Sold: Compaq, IBM, DOS Clone, DKI, Innovative Sys.

CAD Revenue: Less than \$1 Million

**AUTOMATION INTELLIGENCE INC.**

1200 West Colonial Drive, Orlando, FL 328047194

Phone: 407 843-7030 Fax: 407-843-7030

Contacts: Mr. Theodroe F. Fluchrad, President; Mr. Thomas J. Weber, Vice President, Marketing

CAD Software Sold: Intellipost, Expedite 3D

Computers Sold: Apollo, Compaq, HP, IBM, Sun

CAD Revenue: More than \$3 Million

**AUTOMATION RESOURCES CORP.**

1519 N. Dale Mabry, Suite 105, Lutz, FL 33549

Phone: 813 949-9334 Fax: 813-949-9335

Contacts: Mr. Sam Wingate, President

CAD Software Sold: Autodesk, Amer. Small Business Cmpt

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**AVCOM**

119 University Avenue, Palo Alto, CA 94301  
Phone: 415 326-8686 Fax: 415 326-2420  
Contacts: Mr. Brad Bishop, Vice President; Mr. Sam Gibbs, President  
CAD Software Sold: Autocad  
Computers Sold: Sun, DOS Clone, 386  
CAD Revenue: More than \$3 Million

**AXIS TECHNOLOGIES**

940 Perinton, Hills Office Park, Fairport, NY 14450  
Phone: 716 223-4330 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Anvil 1000, Anvil 5000, Anvil 5000 pc, Intergraph Microstation, Autocad  
Computers Sold: Compaq, DOS Clone, AST, Tech  
CAD Revenue: N/A

**BABBAGES**

10741 King William Drive, Dallas, TX 75220  
Phone: 214 401-9000 Fax: 214 401-9002  
Contacts: Jill DeTar, Buyer; Brad Garrison, Training  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**BARNETT BUSINESS PRODUCTS, INC.**

7600 Jericho Turnpike, Woodbury, NY 11797  
Phone: 516 921-0273 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**BARRY WALDMAN ART STUDIOS**

500 East 77th Street, New York, NY 10021  
Phone: 212 734-7513 Fax: N/A  
Contacts: Mr. Barry Waldman, CEO  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**BASIC COMPUTER**

2010 Miamisburg-Centerville Road, Dayton, OH 45459  
Phone: 513 439-1331 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**BASIC COMPUTER CORPORATION**

1585 Frederick Blvd., Akron, OH 44320

Phone: 216 873-1000 Fax: 216-836-4338

Contacts: Mr. Jim Graber, Director of Support Services; Mr. Carl D'Abato, Senior CAD Engineer

CAD Software Sold: AutoCAD, IBMCAD

Computers Sold: Compaq, IBM, Mac, DOS Clone

CAD Revenue: \$1 to \$3 Million

**BECHTEL COMPUTER COMPANY**

474 Niagra Falls Blvd., Buffalo, NY 14223

Phone: 716 833-6815 Fax: N/A

Contacts: Mr. Harry Styliades, President

CAD Software Sold: Generic Cad, Fujitsu, Personal CAD, VersaCAD

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**BETA COR ENGINEERING, LTD.**

P. O. Box 5398, Station E, Edmonton, AL, CD T5P4C9

Phone: 403-482-1561 Fax: N/A

Contacts: Mr. Morgan Barnes, President

CAD Software Sold: AutoCAD

Computers Sold: DOS Clone, Everex, Eltech, Vtech

CAD Revenue: Less than \$1 Million

**BETA LAMBDA INC.**

449 Highway #33, RD 2, Manalapan, NJ 07726

Phone: 201 446-1100 Fax: N/A

Contacts: Mr. Ernie Liu, President

CAD Software Sold: Orcad

Computers Sold: N/A

CAD Revenue: N/A

**BIRMINGHAM COMPUTER CONSULTING**

1700 Vanderbilt Rd., Birmingham, AL 35234

Phone: 205-322-8514 Fax: N/A

Contacts: Mr. Dan Sapp, President

CAD Software Sold: Autodesk, Cadkey

Computers Sold: N/A

CAD Revenue: N/A

**BLUE CHIP COMPUTER SYSTEM**

9701 West Pico Blvd., Los Angeles, CA 90035

Phone: 213 553-3393 Fax: 213-553-0123

Contacts: Mr. Ronald C. Herman, President

CAD Software Sold: Autodesk, CADAM, Versacad

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**BOLDER DESIGNS**

P.O. Box 15780, Philadelphia, PA 19103  
Phone: 215 988-9622 Fax: 215-988-9762  
Contacts: Mr. John Rutkowski, Managing Partner  
CAD Software Sold: AutoCAD  
Computers Sold: Everex, ALR, Fortran  
CAD Revenue: \$1 to \$3 Million

**BOSTON CADD**

Schrafft Center, 529 Main Street, Boston, MA 02129  
Phone: 617 242-5202 Fax: N/A  
Contacts: Mr. Tony Giannetto, President  
CAD Software Sold: Autodesk, CADAM  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**BROMLEY ENGINEERING, INC.**

883 A Cambridge Street, Cambridge, MA 02141  
Phone: 617 661-3144 Fax: N/A  
Contacts: Ms. Maria Bromley, Vice President; Mr. Peter Bromley, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**BUSINESSLAND**

348 Waverly Road, Holland, MI 49423  
Phone: 616 396-5006 Fax: N/A  
Contacts: Mr. Raymond E. Munson  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**BYTE AND WORD SYSTEMS, INC.**

89 Haddon Avenue, Haddonfield, NJ 08033  
Phone: 609 795-4315 Fax: N/A  
Contacts: Ruth Repici; Rosalyn Davis, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**C.C.S. SYSTEMS**

190 S Warner Rd., Wayne, PA 19087  
Phone: 215 971-9252 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**CABER SYSTEMS INC.**

5150 N. Federal Highway, Ft. Lauderdale, FL 33308  
Phone: 305 491-8600 Fax: N/A  
Contacts: Ms. Paula Grande, Manager  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**CAD CRAFT**

323 Boston Post Road, Old Saybrook, CT 06475  
Phone: 203 388-6657 Fax: N/A  
Contacts: Mr. Chris Wick, President; Mr. Jonathan Solomon, Vice President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**CAD SOLUTIONS INC.**

2841 Junction Avenue, Suite 200, San Jose, CA 95134  
Phone: 408 943-1610 Fax: 408-943-0709  
Contacts: Mr. Stephen Steele, Chairman; Mr. Richard Nedbal, President  
CAD Software Sold: AutoCAD, P-CAD, Racal-Redac, CADstar, Versacad  
Computers Sold: Compaq, IBM, DOS Clone, Our own brand  
CAD Revenue: More than \$3 Million

**CAD SOUTHWEST/DATA IMAGE**

2747 W. Southern #3, Tempe, AZ 85282  
Phone: 602 438-9060 Fax: N/A  
Contacts: N/A  
CAD Software Sold: AutoCAD, ARRIS, Computervision  
Computers Sold: Compaq, IBM, Sun, AST, WYSE  
CAD Revenue: Less than \$1 Million

**CAD SYSTEMS INC.**

9040 Roswell Road, Suite 462, Atlanta, GA 30350  
Phone: 404 641-8239 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**CAD SYSTEMS UNLIMITED, INC.**

Techmart Suite 443, 5201 Great America, Santa Clara, CA 95050  
Phone: 408 562-5762 Fax: 408-562-5745  
Contacts: Mr. Robert Pantangco, President; Mr. Froi Lomotan, R&D Manager  
CAD Software Sold: AutoCAD  
Computers Sold: 386  
CAD Revenue: Less than \$1 Million



**CAD TRAIN, INC.**

5987 Peacock Ridge Road. #213, Rancho Palos Verdes, CA 90274  
Phone: 213 212-6701 Fax: N/A  
Contacts: Mr. Eric Schmidt, CEO  
CAD Software Sold: CAD Train  
Computers Sold: N/A  
CAD Revenue: Less than \$1 Million

**CAD/CAM INC.**

2844 E. River Road, Dayton, OH 45439  
Phone: 513 293-3381 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Aries, Autodesk, CADAM  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**CAD/CAM RESOURCES**

17A Sterling Road, Billerica, MA 01862  
Phone: 508 667-8008 Fax: N/A  
Contacts: Mr. Joseph White, President; Mr. John Fox, V.P., Marketing/Sales  
CAD Software Sold: N/A  
Computers Sold: HP  
CAD Revenue: N/A

**CAD/CAM TECHNOLOGIES**

111 Third Ave. S., Minneapolis, MN 55401  
Phone: 612 339-5870 Fax: N/A  
Contacts: Mr. Paul J. Druckman, President  
CAD Software Sold: IBM CAD  
Computers Sold: N/A  
CAD Revenue: N/A

**CAD/CAM TECHNOLOGIES, INC.**

140 Second Avenue, Waltham, MA 02254  
Phone: 617 895-1500 Fax: N/A  
Contacts: Mr. James Carney, President  
CAD Software Sold: Autodesk, Computervision, Intergraph, Parametrics  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**CADALYST RESOURCES**

601 Locust Street, 10th Floor, Des Moines, IA 50309  
Phone: 515 245-3733 Fax: N/A  
Contacts: Mr. Joe Stevens, Vice President; Mr. Jack Linge, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**CADCORP, Inc.**

250 Consumers Road, Suite 104, Willowdale, ONT M2J4V6 CANADA  
Phone: 416 492-5982 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**CADD CENTER**

2003 Cypress Creek, Suite 102A, Ft. Lauderdale, FL 33309  
Phone: 305 772-7300 Fax: 305-491-8570  
Contacts: Mr. Tim Strickland, Vice President of Sales; Mr. Ruben Neiman, President  
CAD Software Sold: Autodesk, Intergraph, Versacad  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**CADD CENTRE**

P.O. Box 4543, Lynchburg, VA 24502  
Phone: 804 239-8193 Fax: N/A  
Contacts: Mr. Jack L. Thompson, CEO  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**CADD DEVELOPMENT CORPORATION**

1718 South Orange Avenue, Orlando, FL 32806  
Phone: 407 648-9148 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**CADD PRODUCTIVITY CENTER**

1502 Greenway Cross, Madison, WI 53713  
Phone: 608 273-1500 Fax: N/A  
Contacts: Mr. Gregg Plummer, Partner; Mr. Dan Hughes, Partner  
CAD Software Sold: AutoCAD, Autosolid, Autosshade, VersaCAD, AEC Architectural Template  
Computers Sold: Compaq, IBM, Mac  
CAD Revenue: Less than \$1 Million

**CADD SERVICES INCORPORATED**

Pier 9, San Francisco, CA 94111  
Phone: 415 433-7023 Fax: N/A  
Contacts: Mr. Robert Moe, President  
CAD Software Sold: ARRIS, AutoCAD, DataCAD, Prime  
Computers Sold: Apollo, Compaq, HP, IBM, Mac, Sun  
CAD Revenue: N/A

**CADDTECH PRODUCTIVITY, INC.**

4713 Crossroads Park, Liverpool, NY 13088

Phone: 315-453-7116 Fax: 315-453-7209

Contacts: Mr. Atul Agrawal, Vice President, Marketing; Mr. Jagdish S. Agrawal, President

CAD Software Sold: AutoCAD, CADkey, MicroCADAM, Smartcam

Computers Sold: Compaq, HP, IBM, DOS Clone, Wyse, NEC, Everex, AST

CAD Revenue: \$1 to \$3 Million

**CADMASTER, INC.**

879 Waterman Ave., East Providence, RI 02914

Phone: 401-434-2970 Fax: N/A

Contacts: Mr. Paul Enos, President; Mr. Michael Enos, V.P. Marketing/Sales

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: N/A

**CADNET, INC.**

2420 Camino Ramon, Suite 202, San Ramon, CA 94583

Phone: 415-275-0990 Fax: 415-275-0997

Contacts: Mr. David Young, President; Mr. David Carroll, V.P., Sales

CAD Software Sold: Proprietary CAD product

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**CADPAC**

999 Plaza Droive, 400, Schaumburg, IL 60173

Phone: 312-330-4417 Fax: N/A

Contacts: Mr. Howard Weinberg, Account Executive

CAD Software Sold: Anvil 5000, Anvil 5000 pc, Anvil 1000, Intergraph Microstation, AutoCAD

Computers Sold: Apollo, HP, Sun, DOS Clone, Digital, Silicon Graphics

CAD Revenue: More than \$3 Million

**CADPAC**

655 Eden Park Drive, Suite 350, Cincinnati, OH 45202

Phone: 800-223-5465 Fax: N/A

Contacts: N/A

CAD Software Sold: Anvil 10000, Anvil 5000

Computers Sold: Apollo, Sun, AST, Tektronics

CAD Revenue: \$1 to \$3 Million

**CADSULTANTS**

10820 Sunset Office Drive, Suite 101, St. Louis, MO 63127

Phone: 314-965-1600 Fax: N/A

Contacts: Mr. Don Spiegel, President

CAD Software Sold: AutoCAD, VersaCAD, EasyCAD, FastCAD

Computers Sold: DOS Clone, Everex, Micronics

CAD Revenue: Less than \$1 Million

**CADSYS, INC.**

20875 Crossroads Cir'600, Waukesha, WI 53186

Phone: 414 785-9495 Fax: 414-785-1856

Contacts: Ms. Denise Chenevert, Vice President; Mr. Jeffry Miller, President

CAD Software Sold: AutoCAD, DCA, SmartCAM, Interleaf, Computervision

Computers Sold: Compaq, IBM, Mac, Sun, DOS Clone, Everex

CAD Revenue: More than \$3 Million

**CADTEL SYSTEMS, INC.**

1715 W Northern Ave. # 109, Phoenix, AZ 85021

Phone: 602 870-7799 Fax: 602-864-0837

Contacts: Mr. David Lankford, President

CAD Software Sold: REA Package, BSP Package, Power Package

Computers Sold: Compaq, IBM, Zenith 386

CAD Revenue: \$1 to \$3 Million

**CALSOFT**

353 Sacramento Street, Suite 340, San Francisco, CA 94111

Phone: 415 397-6901 Fax: N/A

Contacts: Mr. Tadashi Okuno, CAD Manager

CAD Software Sold: AutoCAD

Computers Sold: DOS Clone, IBM clones

CAD Revenue: Less than \$1 Million

**CAPISTRANO COMPUTERS**

31952 Del Obispo, Suite 240, San Juan Capistrano, CA 92675

Phone: 714-661-7250 Fax: 714-661-7657

Contacts: Mr. Dan Morrison, Owner; Ms. Janet Harber, Office Manager

CAD Software Sold: Anvil 1000 MD, Anvil 5000 PC, Point Control Smartcam

Computers Sold: Compaq, HP, DOS Clone, Everex, AST

CAD Revenue: \$1 to \$3 Million

**CBM COMPUTER CENTER**

1215 U George Washington, Memorial Highway, Tabb, VA 23602

Phone: 804 873-1580 Fax: N/A

Contacts: Mr. Steve Wilson

CAD Software Sold: Microcadam, DesignCAD, Modelmate

Computers Sold: IBM, Mac

CAD Revenue: N/A

**CEMAX, INC.**

1705 Wyatt Avenue, Santa Clara, CA 95054

Phone: 408 970-8411 Fax: N/A

Contacts: Terry Ross, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**CENTURY 23**

4101 Meadows Lane, Las Vegas, NV 89107

Phone: 702 870-1534 Fax: N/A

Contacts: N/A

CAD Software Sold: AutoCAD, MacBravo

Computers Sold: Mac, DOS Clone, Everex

CAD Revenue: Less than \$1 Million

**CHARLES HILL & ASSOCIATES**

/dba CADDcenters, 6330 E. 75th Street, Suite 146, Indianapolis, IN 46250

Phone: 317 849-9808 Fax: N/A

Contacts: Mr. Charles Hill, President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**CHEMPRO DATA SCIENCES CORP.**

507 Southampton Road, Westfield, MA 01085

Phone: 413 562-2353 Fax: N/A

Contacts: Mr. Robert St. Martin, Vice President; Mr. Norman St. Martin, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**COMPUADD**

12303-G Technology Blvd., Austin, TX 78727

Phone: 512 250-2635 Fax: 512 258-8996

Contacts: Charles Smreker, Buyer; Teresa Robertson, Training

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**COMPUSULTING ASSOCIATES, LTD.**

P. O. Box 418, Centerport, NY 11721

Phone: 516-261-0488 Fax: N/A

Contacts: Mr. Ron Friedman

CAD Software Sold: Cadkey

Computers Sold: N/A

CAD Revenue: N/A

**COMPUTER AIDED DESIGN SYSTEMS, INC.**

3 Amberwood Crescent, Nepean, ONT K2E 7L1 Canada

Phone: 613 225-0411 Fax: 613 225-4339

Contacts: Mr. G. W. Philliban, Vice President, Marketing; Mr. P. J. Philliban, Owner

CAD Software Sold: Autocad, SmartCAM

Computers Sold: DOS Clone, Everex, Intel Clones

CAD Revenue: \$1 to \$3 Million

**COMPUTER AIDED SOLUTIONS**

8592 Mayfield road, Chesterland, OH 44026

Phone: 216 729-8084 Fax: 216 729-2257

Contacts: Mr. Tony Oliverio, President; Mr. Mike Conley, Sales Manager

CAD Software Sold: P-CAD, AutoCAD, Intergraph, Microstation, VersaCAD

Computers Sold: Compaq, IBM, Sun

CAD Revenue: \$1 to \$3 Million

**COMPUTER ANALYTICS CORP.**

4088 Commercial Avenue, Northbrook, IL 60062

Phone: 312 498-0750 Fax: N/A

Contacts: Mr. Kenneth Kosnik, Vice President; Mr. Dale C. Jessen, President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**COMPUTER BAY OF RALEIGH, INC.**

4600 Marrott Drive, Suite 330, Raleigh, NC 27612

Phone: 919 783-6300 Fax: 919-783-6999

Contacts: Mr. Barrett Powell, President; Mr. Jim Compton, Vice President, National Sales

CAD Software Sold: Intergraph, CADAM, CADkey, ARRIS, IBMCAD

Computers Sold: Apollo, Compaq, HP, IBM, Mac, Silicon Graphics

CAD Revenue: \$1 to \$3 Million

**COMPUTER CHANNEL**

226 Sherwood Avenue, Farmingdale, NY 11735

Phone: 516 420-1470 Fax: 516 420-5503

Contacts: Dr. Chien Chao, President; Mr. Shaun Huang, Director of Marketing and Sales

CAD Software Sold: SDRC

Computers Sold: Digital

CAD Revenue: \$1 to \$3 Million

**COMPUTER CONNECTION**

5962 Brainerd Road, Suite 1, Chattanooga, TN 37421

Phone: 615 892-3253 Fax: N/A

Contacts: Mr. Steve W. Bunch, Vice President, Sales; Mr. Ronald F. Bunch, President

CAD Software Sold: Autodesk, Mega CADD

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**COMPUTER DYNAMICS, INC.**

607 Linnhaven Parkway, Virginia Beach, VA 23450

Phone: 804 490-1234 Fax: N/A

Contacts: Mr. Chris Crumley, Sr. Vice President, Marketing; Mr. John Fain, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: More than \$3 Million

**COMPUTER MODULES, INC.**

2348 C Walsh Avenue, Santa Clara, CA 95051  
Phone: 408 496-1881 Fax: 408-496-1886  
Contacts: Mr. Laszlo Zoltan, President  
CAD Software Sold: MicroCADAM  
Computers Sold: Sun, DOS Clone, Everex  
CAD Revenue: Less than \$1 Million

**COMPUTER NUMERICAL CONTROL CORP.**

225 Stedman Park, Lowell, MA 01851  
Phone: 508 937-0984 Fax: N/A  
Contacts: Mr. George C. Kakridas, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**COMPUTER PORT**

2 Technology Dr., E Setauket, NY 11733  
Phone: 516 751-8111 Fax: N/A  
Contacts: Ms. Jane McChrie, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**COMPUTER RESEARCH**

Cherrington Ctr Bldg 2, 1700 Beaver Grade, Pittsburgh, PA 15108  
Phone: 412 262-4430 Fax: N/A  
Contacts: Mr. James Schultz, President  
CAD Software Sold: Autodesk, Computervision, Sigma Design, Automatrix  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**COMPUTER RESOURCES**

101 39th Street North, Birmingham, AL 35222  
Phone: 205 591-8810 Fax: N/A  
Contacts: Mr. Billy Hinds, President  
CAD Software Sold: AutoCAD  
Computers Sold: Compaq, IBM, DOS Clone, AST, Wyse, Samsung  
CAD Revenue: Less than \$1 Million

**COMPUTER SCIENCES APPLICATIONS**

P.O. Box F, Arcadia, CA 91066  
Phone: 818 355-8888 Fax: N/A  
Contacts: Mr. Constantine Ananiades, President  
CAD Software Sold: PCAD, Orcad  
Computers Sold: DOS Clone, IBM Clones  
CAD Revenue: Less than \$1 Million

**COMPUTER SYSTEMS SPECIALISTS INC.**

P.O. Box 1007, 150 Route 9, Wappingers Falls, NY 12590  
Phone: 914 297-1223 Fax: N/A  
Contacts: Mr. Robert Knapp, Vice President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**COMPUTER SYSTEMS TECHNOLOGY, INC.**

226 Sherwood Avenue, East Farmingdale, NY 11735  
Phone: 516 420-1470 Fax: 516-420-5503  
Contacts: Mr. Shaun Huang, Vice President, Marketing; Dr. Chien F. Chao, President  
CAD Software Sold: SDRC  
Computers Sold: Digital  
CAD Revenue: \$1 to \$3 Million

**COMPUTER TECH**

4521 Campus Drive, Suite 298, Irvine, CA 92715  
Phone: 714 725-0444 Fax: N/A  
Contacts: Renee Havig, Vice President, Marketing; Mr. Paul Leveque, President  
CAD Software Sold: MGM Station, Unimod  
Computers Sold: Mac, DOS Clone, Compaq, IBM compatibles  
CAD Revenue: Less than \$1 Million

**COMPUTER TIME**

187 N. Church Street, Montgomery Bldg., Suite 106, Spartanburg, SC 29301  
Phone: 803 585-5004 Fax: N/A  
Contacts: Mr. Steve Fowler  
CAD Software Sold: AutoCAD  
Computers Sold: Apollo, HP, IBM, Sun  
CAD Revenue: N/A

**COMPUTER TOWN**

430 Winchester Street, Keene, NH 03431  
Phone: 603 357-1113 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**COMPUTER-AIDED TECHNOLOGIES, INC.**

605 Baronne Street, New Orleans, LA 70113  
Phone: 504 523-2233 Fax: N/A  
Contacts: Dr. Kenneth M. Goldstein, Executive Vice President; Ms. Linda F. Goldstein, President  
CAD Software Sold: AutoCAD, FastCAD, VersaCAD  
Computers Sold: Compaq, HP, IBM, Mac, DOS Clone, AT&T, Zenith  
CAD Revenue: \$1 to \$3 Million



**COMPUTERAID**

E. 10807 Montgomery #9, Spokane, WA 99206  
Phone: 509 922-0366 Fax: 509-922-1911  
Contacts: Mr. Jim Raschka, President  
CAD Software Sold: AutoCAD, Microstation  
Computers Sold: Everex Step  
CAD Revenue: Less than \$1 Million

**COMPUTERCRAFT**

1616 S. Voss, Suite 100, Houston, TX 77057  
Phone: 713 977-8419 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**COMPUTERIZED BUSINESS SYSTEMS, INC.**

2108 West Freeway, Fort Worth, TX 76102  
Phone: 817 332-1610 Fax: N/A  
Contacts: Mr. Leon Brachman, Vice President; Mr. Marshall Brachman, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**COMPUTERLAND**

2950 Peralta Oaks Court, Oakland, CA 94605  
Phone: 415 465-2000 Fax: N/A  
Contacts: Joel Weiss, Sr. Product Manager; Kris Thompson, Catalog Manager  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**COMPUTERLAND**

2255 John F. Kennedy, Dubuque, IA 52001  
Phone: 319 556-6515 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Generic CAD, Autosketch  
Computers Sold: Compaq, DOS Clone, 386.Mitsubishi, NEC  
CAD Revenue: Less than \$1 Million

**COMPUTERLAND**

510 West Cordova Road, Santa Fe, NM 87501  
Phone: 505 988-8800 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**COMPUTERLAND OF EAU CLAIRE**

1801 S. Hastings Way, Altoona, WI 54720

Phone: 715 835-8082 Fax: N/A

Contacts: Mr. Charles Christian, Sales Manager; Karen Schaefer, CAD Specialist

CAD Software Sold: AutoCAD, ALL Autodesk product lines, VersaCAD

Computers Sold: Compaq, HP, IBM, DOS Clone, AT&T

CAD Revenue: \$1 to \$3 Million

**COMPUTERLAND-INFOSYSTEMS**

19951 Mariner, Torrance, CA 90503

Phone: 213 214-4200 Fax: N/A

Contacts: Mr. Zeb Bhatti, Vice President; Mr. Greg Williams, Systems Analyst

CAD Software Sold: AutoCAD, VersaCAD, Powerdraw

Computers Sold: Compaq, HP, IBM, Mac, DOS Clone, AST

CAD Revenue: Less than \$1 Million

**COMPUTERS & CONCEPTS INC.**

3248 Orchard LK, Orchard Lake, MI 48033

Phone: 313 681-7722 Fax: N/A

Contacts: Mr. Taher F. Rasheed, President

CAD Software Sold: Autodesk, CADAM

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**COMPUTERS FOR DESIGN**

1430 Larimer Square, Denver, CO 80202

Phone: 303 629-7474 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**COMPUTOOL SYSTEMS & ENGINEERING**

5601 N. Powerline Road, Suite 201, Ft. Lauderdale, FL 33309

Phone: 305 771-4801 Fax: N/A

Contacts: Mr. Reggie Freedman, President; Ms. Robbie Ratafia, Vice President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**COMSTRAND INC.**

2852 Anthony Lane South, Minneapolis, MN 55418

Phone: 612 788-9234 Fax: N/A

Contacts: Mr. Bob Van Den Berg, President

CAD Software Sold: Orcad

Computers Sold: N/A

CAD Revenue: N/A

**COMTEC COMPUTER SERVICES CO., INC.**

1717 West 34th, Suite A, Houston, TX 77018

Phone: 713 680-3300 Fax: N/A

Contacts: Mr. Robert M. Muntatchy, President

CAD Software Sold: AutoCAD, Intergraph

Computers Sold: Compaq, IBM, DOS Clone

CAD Revenue: Less than \$1 Million

**CONCAD TECHNOLOGIES, INC.**

1233A Menomonie Street, Eau Claire, WI 54703

Phone: 715 835-8331 Fax: N/A

Contacts: Mr. Gerald Revelle, President

CAD Software Sold: AutoCAD

Computers Sold: NEC

CAD Revenue: \$1 to \$3 Million

**CONCURRENT CORPORATION**

1870 Madison Road, Cincinnati, OH 45206

Phone: 513 281-2000 Fax: N/A

Contacts: Mr. Thomas Widlar, President

CAD Software Sold: Generic Software

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**CONNECTING POINT**

7979 East Tufts Avenue, Suite 700, Denver, Co 80237

Phone: 303 779-6026 Fax: N/A

Contacts: Nick Kromenacker, Merchandise Manager; Janice Grissom, Marketing

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**COOPERATIVES COMPUTER CENTER**

5159 Woodlane Circle, Tallahassee, FL 32303

Phone: 904 562-0121 Fax: N/A

Contacts: Mr. Don J. Stockten, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**CORNERSTONES - WRIGHT, INC.**

10 Danforth St., Portland, ME 04101

Phone: 207-772-3900 Fax: N/A

Contacts: Mr. G. W. Eldridge, President

CAD Software Sold: Orcad

Computers Sold: N/A

CAD Revenue: N/A

**CORPORATE COMPUTER, INC.**

1530 Eastlake Avenue E, Suite 101, Seattle, WA 98102

Phone: 206 328-4463 Fax: 206-328-5074

Contacts: Mr. Fred H. Taucher, President; Mr. Walter S. Taucher, Treasurer

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**CORPORATE DEVELOPMENT ASSOCIATES**

641 East Butterfield, Suite 408, Lombard, IL 60148

Phone: 312 719-1600 Fax: N/A

Contacts: Ms. J. R. Reid, Vice President, Marketing; Ms. Phyllis Anderson, President

CAD Software Sold: AutoCAD, Autosolid

Computers Sold: Compaq, IBM, DOS Clone, Intel 302, Digital

CAD Revenue: \$1 to \$3 Million

**CORPORATE SOFTWARE**

410 University Avenue, #301, Westwood, MA 02090

Phone: 617 461-1010 Fax: 617 461-1745

Contacts: Bob Johnson

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**CR CAD**

560 W. First Street, Tustin, CA 92680

Phone: 714 544-7223 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**CREATIVE CONNECTIONS, INC.**

P. O. Box 1365, Duluth, GA 30136

Phone: 404-476-7028 Fax: N/A

Contacts: Mr. Ian Albritton

CAD Software Sold: PCAD, Versacad

Computers Sold: HP, DOS Clone, Everex

CAD Revenue: N/A

**CTR BUSINESS SYSTEMS, INC.**

825 Southwest 14th Avenue, Portland, OR 97205

Phone: 503 227-2414 Fax: 503-274-8008

Contacts: Mr. Edward Israel, President; Mr. Tom McKasson, CADD/CAM Manager

CAD Software Sold: Cadkey

Computers Sold: Compaq, DOS Clone, ALR, Silicon Graphics

CAD Revenue: \$1 to \$3 Million

**CUSTOM COMPUTER SPECIALISTS, INC.**

1775 Express Drive, Hauppauge, NY 11788  
Phone: 516-582-6012 Fax: 516-582-6012  
Contacts: Mr. Gregory Galdi, President; Mr. Mario Cavallaro, V.P. Marketing  
CAD Software Sold: Versacad  
Computers Sold: N/A  
CAD Revenue: N/A

**CW ELECTRONICS**

800 Lincoln Street, Denver, CO 80203  
Phone: 303 832-1111 Fax: N/A  
Contacts: Mr. Michael McLaughlin, CAD Applications  
CAD Software Sold: VersaCAD, Claris CAD/CAM  
Computers Sold: Compaq, Mac  
CAD Revenue: Less than \$1 Million

**CYBER RESEARCH**

5 Science Park Center, P.O. Box 9565, New Haven, CT 06536  
Phone: 203 786-5151 Fax: 203-786-5023  
Contacts: Mr. Robert Molloy, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**D. C. JAEGER CORPORATION**

135 N. Knowles Avenue, Winter Park, FL 32789  
Phone: 407 645-1500 Fax: 407-645-5904  
Contacts: Mr. Richard Junkins, Director of Technology; Ms. Barbara Scott, Program Manager  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**DARDICK**

10825 Midlothian Turnpike, Richmond, VA 23235  
Phone: 804 379-1122 Fax: 804-379-1125  
Contacts: Mr. Glen S. Dardick, President; Mr. Burl Wingold, Executive Vice President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**DAREX COMPUTER DISTRIBUTION LTD.**

158-12838 Clarke Place, Richmond, BC V6V2H6  
Phone: 604 270-3466 Fax: N/A  
Contacts: Jim Nelson; Darren Nelson  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**DATA AUTOMATION**

125 W. Mission Ave #202, Escondido, CA 92025

Phone: 619 743-3334 Fax: N/A

Contacts: Mr. Richard Hackworth, CEO; Mr. Fred Cleveland, Vice President, Marketing

CAD Software Sold: DGS 2000

Computers Sold: HP, DOS Clone, 386

CAD Revenue: Less than \$1 Million

**DATA HANDLING**

3105 San Pedro, N.E., Albuquerque, NM 87110

Phone: 505 884-0284 Fax: N/A

Contacts: Mr. Ray Rachowski, President; Ms. Carla Rachowski, Software

CAD Software Sold: Autodesk - various brands, MCS

Computers Sold: DOS Clone, ALR

CAD Revenue: N/A

**DATA IMAGE, INC.**

8704 Royal Lane, Irving, TX 75063

Phone: 214 929-4000 Fax: 214-929-0326

Contacts: Mr. Don Maly, Executive Vice President and GM; Mr. Allen Bowersox, Sales Manager

CAD Software Sold: Microstation, Prime CV, Autocad, Cadam, P-CAD

Computers Sold: Compaq, IBM, Sun, DOS Clone, AST

CAD Revenue: More than \$3 Million

**DATEC, INC.**

1141 Whitney Avenue, Gretna, LA 70053

Phone: 504 368-2097 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**DECI ASSOCIATES**

50 Elm Street, Huntington, NY 11743

Phone: 516 549-1511 Fax: N/A

Contacts: Mr. Donald E. Clark, President

CAD Software Sold: AutoCAD, Full Autodesk Lines, Companion products of Autocad, CADpartner

Computers Sold: DOS Clone, 386, Acer, Everex, AST

CAD Revenue: Less than \$1 Million

**DECISION VISION**

7054 Convoy Court, San Diego, CA 92111

Phone: 619 541-2000 Fax: N/A

Contacts: Mr. David Gmach, Owner

CAD Software Sold: AutoCAD, SmartCAM, NC Polaris, Autosolid, True Vision Products

Computers Sold: DOS Clone, NEC, AST, Everex, ALR

CAD Revenue: Less than \$1 Million

**DESIGNLAB**

10 East 9th Street, Lawrence, KS 66044  
Phone: 913 841-1510 Fax: 913 841-3097  
Contacts: Mr. Jon Bass, Vice President, Marketing; Mr. James Surber, President  
CAD Software Sold: Autocad, Cadvance, Datacad  
Computers Sold: Compaq, DOS Clone, Wyse, AST  
CAD Revenue: Less than \$1 Million

**DEVTRON, RUSSELL INC.**

301 North Bowery Avenue, Gladwin, MI 48624  
Phone: 517 426-6574 Fax: N/A  
Contacts: Mr. Edward J. Russell, President  
CAD Software Sold: Autodesk, CADAM  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**DEWBERRY COMPUTERS/CONNECTING POINT**

6767 Old Madison Pike, Suite 137, Huntsville, AL 35806  
Phone: 205 837-1085 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**DGA ASSOCIATES INC.**

155 West Street, Wilmington, MA 01887  
Phone: 617 935-3001 Fax: N/A  
Contacts: Mr. Don Glass, President  
CAD Software Sold: Orcad  
Computers Sold: N/A  
CAD Revenue: N/A

**DIGITAL OFFICE SYSTEMS INTL**

4152 Blue Heron Blvd West, #104, Riviera Beach, FL 33404  
Phone: 407 844-5666 Fax: N/A  
Contacts: Mr. Lloyd Chesney, President  
CAD Software Sold: Autodesk, LandCADD  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**DISCOVERY EDUCATIONAL SYSTEMS**

1860 Old Okeechobee Road #105, West Palm Beach, FL 33409  
Phone: 407 683-8410 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**DOS COMPUTER BAY**

400 W. Higgins Road, Park Ridge, IL 60068  
Phone: 312 825-6900 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**DTI TECHNOLOGIES INC.**

55 Constitution Drive, Bedford, NH 03102  
Phone: 603 472-5511 Fax: N/A  
Contacts: Mr. Dan Dolan, President  
CAD Software Sold: AutoCAD, AutoSolid, AutoSketch, AutoShade, 3rd party software  
Computers Sold: Compaq, IBM, NEC  
CAD Revenue: N/A

**DYNABYTE MICROAGE**

801 W. Main St., Charlottesville, VA 22901  
Phone: 804-296-7560 Fax: N/A  
Contacts: Mr. Blake Hurt, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**EAST COAST COMPUTER SYSTEMS INC.**

1 Sheila Drive, Building 6A, Tinton Falls, NJ 07724  
Phone: 201 747-6995 Fax: N/A  
Contacts: Ms. Marbeth Shay, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**EASTERN COMPUTER GRAPHICS**

6 Industrial Way West, Eatontown, NJ 07724  
Phone: 201 542-7733 Fax: N/A  
Contacts: Mr. Jeff Dalton, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**EASTMARK, INC.**

240 Smith, Lowell, MA 01851  
Phone: 508 453-9150 Fax: N/A  
Contacts: Mr. Marvin Berkowitz, President  
CAD Software Sold: AutoCAD  
Computers Sold: Unisys, Quadem  
CAD Revenue: N/A



**EBERHARD ENGINEERING**

27 Pine Ridge Drive, Smithtown, NY 11787  
Phone: 516 543-7777 Fax: N/A  
Contacts: Mr. Ronald Eberhard, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**EGGHEAD DISCOUNT SOFTWARE**

P.O. Box 7004, 22011 SE 51st Street, Issaquah, WA 98027-7004  
Phone: 206 391-0800 Fax: 206 391-6268  
Contacts: John Williams, Marketing  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**EKJ DESIGN AND DRAFTING, INC.**

2805 Tremainsville Road, Toledo, OH 43613  
Phone: 419 475-6225 Fax: N/A  
Contacts: Mr. Greg Johns, President; Mr. Gary Allen, Customer Service Director  
CAD Software Sold: AutoCAD, 3rd party programs  
Computers Sold: Apollo, DOS Clone, Everex, NEC  
CAD Revenue: Less than \$1 Million

**ELCAM, INC.**

275 Wyman St., Waltham, MA 02154  
Phone: 617-890-8424 Fax: 617-890-8497  
Contacts: Dr. Carlos Zorea, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**ELCOR ASSOCIATES INC.**

1800 Wyatt Drive #10, Santa Clara, CA 95054  
Phone: 408 980-8868 Fax: N/A  
Contacts: Mr. Bob Weeks, President  
CAD Software Sold: Orcad, Quad design, Logic Automation  
Computers Sold: Apollo, Compaq, HP, IBM, Mac, Sun, DOS Clone, Everex  
CAD Revenue: \$1 to \$3 Million

**ELECTRO-CADD**

1080 Holcomb Bridge Road, Roswell, GA 30076  
Phone: 404 552-8613 Fax: N/A  
Contacts: Mr. Glen Torrance, President, Sales & Marketing  
CAD Software Sold: Orcad, PSpice  
Computers Sold: HP, IBM, DOS Clone, AST  
CAD Revenue: Less than \$1 Million

**ELECTRONICS BOUTIQUE**

1345 Enterprise Drive, #747, West Chester, PA 19380  
Phone: 215 430-8100 Fax: 215 431-5881  
Contacts: Donna Dunlap  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ELEXOR ASSOCIATES**

P.O. Box 246, Morris Plains, NJ 07950  
Phone: 201 299-1615 Fax: N/A  
Contacts: Mr. Timothy Slifkin, Vice President, Marketing; Mr. Lee Glinski, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**EMERY DATAGRAPHIC**

6767 South Spruce Street No. 140, Englewood, CO 80112  
Phone: 303 773-0484 Fax: N/A  
Contacts: Mr. Henry A. Emery, CEO  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ENGINEERING DATA SYSTEMS CORP.**

Clock Tower West, Suite G, Dubuque, IA 52001  
Phone: 319-556-8392 Fax: N/A  
Contacts: Mr. John Biver, President; Mr. Scott Taylor, V.P. Marketing/Sales  
CAD Software Sold: AutoCAD, 3rd party Civil Engineering  
Computers Sold: Compaq, IBM, ALR, AST, Everex  
CAD Revenue: \$1 to \$3 Million

**ENGINEERING METHODS, INC.**

301 North 5th Street, Lafayette, IN 47901  
Phone: 317 742-0047 Fax: 317 742-0048  
Contacts: Dr. Charles J. Hunckler, President  
CAD Software Sold: Ansys, VSA, Aries  
Computers Sold: N/A  
CAD Revenue: N/A

**ENTRE COMPUTER CENTER**

3812 Rochester Road, Troy, MI 48083  
Phone: 313 528-3770 Fax: N/A  
Contacts: Mr. Frank L. Sabina, President  
CAD Software Sold: AutoCAD, Computervision Prime, SmartCAM, Personal designer machinist, MicroCADAM  
Computers Sold: Compaq, HP, IBM  
CAD Revenue: \$1 to \$3 Million

**ENTRE COMPUTER CENTER**

17950 Preston Road #75, Dallas, TX 75252  
Phone: 214 248-1200 Fax: N/A  
Contacts: Mr. Scott Shuppert, CAD Sales Manager  
CAD Software Sold: AutoCAD, DataCAD, MaxRoute, Pads  
Computers Sold: Compaq, IBM  
CAD Revenue: More than \$3 Million

**ENTRE COMPUTER CENTER**

1430 Spring Hill Road, McLean, VA 22102  
Phone: 703 556-0800 Fax: 703 749-3329  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ERA ELECTRONICS**

4500 El Camino Real, Los Altos, CA 94022  
Phone: 415 948-4500 Fax: N/A  
Contacts: N/A  
CAD Software Sold: McBravo, ME10D, ClarisCAD  
Computers Sold: HP, Mac, DOS Clone, AST  
CAD Revenue: Less than \$1 Million

**EVERGREEN SYSTEMS, INC.**

14216 NE 21st Street, Bellevue, WA 98007  
Phone: 206 455-0825 Fax: 206-869-2404  
Contacts: Mr. Mark Astengo, President  
CAD Software Sold: AutoCAD  
Computers Sold: DOS Clone, Everex  
CAD Revenue: N/A

**EXECUSOFT, INC.**

2875 Northwind Drive, Suite 218, East Lansing, MI 48823  
Phone: 517 332-3414 Fax: N/A  
Contacts: Mr. Jim Topper, President  
CAD Software Sold: AutoCAD, DCA, LandCAD  
Computers Sold: Compaq, Our own brand  
CAD Revenue: Less than \$1 Million

**FIGGIE INTERNATIONAL**

4420 Sherwin Road, Willoughby, OH 44094  
Phone: 216 946-9000 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**FINITE GRAPHICS**

5251 Verdugo Way, Suite L, Camarillo, CA 93010

Phone: 805 987-6033 Fax: N/A

Contacts: Mr. Darryl Erlandson, President; Mr. David Haynes, Sales Engineer

CAD Software Sold: AutoCAD, VersaCAD, CADKey, Computervision Personal Designer

Computers Sold: Compaq, Mac, DOS Clone, AST, Everex, ALR

CAD Revenue: \$1 to \$3 Million

**FOCUS COMPUTER COMMUNICATIONS**

4320 Viewridge Avenue, Suite D, San Diego, CA 92123

Phone: 619 277-0112 Fax: N/A

Contacts: Mr. Dennis Bertken, President

CAD Software Sold: AutoCAD, ARRIS

Computers Sold: Compaq, HP, Sun, DOS Clone, AST

CAD Revenue: More than \$3 Million

**FORTUNE MICRO SYSTEMS INC.**

23052 Lake Forest Drive, Laguna Hills, CA 92653

Phone: 714 583-1000 Fax: 714-583-7328

Contacts: Mr. Paul L. Bruce, President

CAD Software Sold: Versacad

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**FRANSWORTH COMPUTERS**

120 W. North Avenue, Villa Park, IL 60181

Phone: 312 941-3444 Fax: N/A

Contacts: Mr. Mark Phillips, CAD Sales Representative

CAD Software Sold: Cadkey

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**FRANTEK**

P.O. Box 89, Ogdensburg, NY 13669

Phone: 613 523-7272 Fax: 613 523-9129

Contacts: Lea Carswells

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**G & R DISTRIBUTING**

1495 Busch Parkway, Buffalo Grove, IL 60015

Phone: 312-537-8777 Fax: 312-520-7905

Contacts: Mr. William Rychel, President; Mr. Thomas Gust, V.P. Marketing/Sales

CAD Software Sold: Versacad

Computers Sold: N/A

CAD Revenue: N/A

**GENERAL COMPUTER CENTERS INC.**

R.D. #3, Box #7, Route 309, Tamaqua, PA 18252  
Phone: 717 668-1595 Fax: N/A  
Contacts: Mr. Ralf L. Bzura, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**GENZLINGER ASSOCIATES, INC.**

2 Northfield Plaza, Suite 212, 5700 Crooks Road, Troy, MI 48098  
Phone: 313 879-7070 Fax: N/A  
Contacts: Mr. Vance Genzlinger, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**GEOCAD, INC.**

P.O. Box 186, Laurel Road, Pound Ridge, NY 10576  
Phone: 914 764-4072 Fax: N/A  
Contacts: Mr. Rudolph Horowitz, President  
CAD Software Sold: GeoCAD, Geovue, Geost  
Computers Sold: DOS Clone  
CAD Revenue: N/A

**GEOMETRIC DATA FLOW, INC.**

337 N. Vineyard Avenue, Suite 206, Ontario, CA 917644453  
Phone: 714 984-1269 Fax: 714-391-6872  
Contacts: Mr. Randolph Paschal, Vice President, Marketing & Sales; Mr. Russell Mobley, President  
CAD Software Sold: Proprietary - Detail, Generic 3-D  
Computers Sold: Compaq, DOS Clone, ALR  
CAD Revenue: \$1 to \$3 Million

**GIMM CONSULTANTS**

211 Route 38, Maple Shade, NJ 08052  
Phone: 609 667-6900 Fax: 609-272-3777  
Contacts: Dr. Kenneth Gimm, President  
CAD Software Sold: Autodesk, Personal CAD Systems  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**GRADIENT TECHNOLOGIES**

550 Shelby Lane, Los Altos, CA 94022  
Phone: 415 949-5434 Fax: N/A  
Contacts: Dr. Joseph Binkowski, President  
CAD Software Sold: Cosmos  
Computers Sold: N/A  
CAD Revenue: N/A

**GRAPHICS & INFORMATION SYSTEMS**

300 N. 1st Avenue, Suite 440, Minneapolis, MN 55401  
Phone: 612 342-9200 Fax: N/A  
Contacts: Mr. P. Victor Grambsch, President  
CAD Software Sold: Autodesk, Isicad, Versacad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**HCS CORPORATION**

2525 S. Main Street, Suite 3, Salt Lake City, UT 84115  
Phone: 801 483-1000 Fax: N/A  
Contacts: Mr. W. L. Pulsipher, Vice President, Marketing: Mr. Memory Sheen, Operations Manager  
CAD Software Sold: Autodesk Family, 3rd party supporting products  
Computers Sold: Compaq, Mac, DOS Clone, Zenith, Everex, Nec  
CAD Revenue: \$1 to \$3 Million

**HEATH ZENITH COMPUTERS & ELECTRONICS**

6000 Petrero Avenue, El Cerrito, CA 94530  
Phone: 415 236-8870 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**HEATH ZENITH COMPUTERS & ELECTRONICS**

2309 S. Flower Street, Los Angeles, CA 90007  
Phone: 213 749-0261 Fax: N/A  
Contacts: Mr. Herb Van Hunnik  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**HEATH ZENITH COMPUTERS & ELECTRONICS**

505 8th Avenue North, Seattle, WA 98109  
Phone: 206 682-2172 Fax: N/A  
Contacts: Mr. Ken Chambers  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**HIGHLAND DIGITAL**

940 E. Meadow, Palo Alto, CA 94303  
Phone: 415-493-8550 Fax: 415-493-8550  
Contacts: Mr. Scott Holmgren, President: Mr. Michael Lash, Vice President  
CAD Software Sold: Terradyne, Prance GT, Oasis, Microtec  
Computers Sold: Sun, Digital, Mips  
CAD Revenue: More than \$3 Million

**HLA COMPUTERS**

5700-J Sunnyside Avenue, Beltsville, MD 20705  
Phone: 301 345-8170 Fax: N/A  
Contacts: Mr. Howard Lefkowitz, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**HM SYSTEMS, INC.**

18221-A Flower Hill Way, Gaithersburg, MD 20879  
Phone: 301 921-0711 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Microstation, Versacad, Microcadam, Algor Supersap, Smartcam  
Computers Sold: Compaq, Mac, DOS Clone, Acer, AST, Wyse, NEC  
CAD Revenue: N/A

**HOME & BUSINESS**

597 E. Calaveras Road, Milpitas, CA 95035  
Phone: 408 945-2985 Fax: N/A  
Contacts: Mr. Kevin Phillips, Partner  
CAD Software Sold: McBravo, Architron, ClarisCAD  
Computers Sold: Mac  
CAD Revenue: N/A

**HOME BUSINESS & NETWORK CMPTRS INC.**

711 East Main Street, Bridgewater, NJ 08807  
Phone: 201 469-8800 Fax: N/A  
Contacts: Mr. Tom Neston, President  
CAD Software Sold: Evolution Computing, Generic Software  
Computers Sold: N/A  
CAD Revenue: N/A

**HYLAND/RICE BUSINESS SYSTEMS**

112 River Street, Fitchburg, MA 01420  
Phone: 617 342-9707 Fax: N/A  
Contacts: Mr. Rodney Poland, Vice President. Sales: Mr. Parker Rice, President  
CAD Software Sold: Autodesk, Versacad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ICG**

4055 Clipper Court, Fremont, CA 94538  
Phone: 415 657-0200 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**ICT TECHNOLOGIES INC.**

200 Saginaw Drive, Redwood City, CA 94063

Phone: 415 361-1155 Fax: 415 361-1945

Contacts: Mr. Harman Cadis, President; Mr. Todd Bablinskas, Vice President Marketing

CAD Software Sold: ASG

Computers Sold: N/A

CAD Revenue: N/A

**IDEAS**

10741 Tucker Street, Beltsville, MD 20705

Phone: 301 937-3600 Fax: N/A

Contacts: Mr. Louis M. Brown, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: More than \$3 Million

**INACOMP COMPUTER CENTER**

11958 Monarch Street, Garden Grove, CA 92641

Phone: 714 898-2665 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**INACOMP COMPUTER CENTER**

1347 Florin Road, Suite 103, Sacramento, CA 95831

Phone: 916 427-8993 Fax: N/A

Contacts: N/A

CAD Software Sold: AutoCAD, Pegasus

Computers Sold: Compaq, IBM, Mac

CAD Revenue: \$1 to \$3 Million

**INACOMP COMPUTER CENTER**

8129 Mall Road, Florence, KY 41042

Phone: 606 283-2775 Fax: N/A

Contacts: Mr. Dave Hurt

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**INACOMP COMPUTER CENTER**

1824 West Maple Road, Troy, MI 48084

Phone: 313 649-0910 Fax: 313 649-3074

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A



**INACOMP COMPUTER CENTER**

225 East 6th Street, Cincinnati, OH 43623  
Phone: 513 421-5900 Fax: N/A  
Contacts: Ms. Debbie McKinney  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**INFINITE GRAPHICS**

4611 East Lake Street, Minneapolis, MN 55406  
Phone: 612 721-6283 Fax: 617-721-3802  
Contacts: Mr. Craig Johnson, Director of Sales; Mr. Jerry Polacek, Manager of Marketing  
CAD Software Sold: Computervision, Racal-Redac  
Computers Sold: N/A  
CAD Revenue: N/A

**INFOMAX COMPUTERS**

One Market Plaza, San Francisco, CA 94105  
Phone: 415 979-0404 Fax: N/A  
Contacts: Mr. Faye Oweis, CAD System Consultant  
CAD Software Sold: AutoCAD, VersaCAD  
Computers Sold: Compaq, IBM, Mac  
CAD Revenue: Less than \$1 Million

**INGRAM COMPUTERS INC.**

2128 Elmwood Avenue, Buffalo, NY 14207  
Phone: 716 874-1874 Fax: 716 874-4586  
Contacts: Doug Liberati  
CAD Software Sold: Generic CADD  
Computers Sold: N/A  
CAD Revenue: N/A

**INNOVA BUSINESS SYSTEMS**

2701 St. Louis Avenue, Signal Hills, CA 90806  
Phone: 213 427-6726 Fax: N/A  
Contacts: Mr. Mark Fowle, President  
CAD Software Sold: AutoCAD  
Computers Sold: DOS Clone, IBM Clones  
CAD Revenue: Less than \$1 Million

**INNOVATION COMPUTER**

1325 Juniper Street, Cleveland, WI 53015  
Phone: 414 693-3416 Fax: N/A  
Contacts: Mr. James R. Voigt, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INSYNC SYSTEMS, CORP.**

County Road 172, Alvin, TX 77511  
Phone: 713 331-2024 Fax: N/A  
Contacts: Mr. Romeo F. Goddard III, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTL TECHNOLOGY MARKETING, INC.**

177 Worchester Street, Suite 301, Wellesley, MA 02181  
Phone: 617 237-2089 Fax: N/A  
Contacts: Mr. Julius Dorfman, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**INTEGRATED COMPUTER GRAPHICS, INC.**

3060 Peachtree Rd., NW, Suite 800, Atlanta, GA 30305  
Phone: 404-233-6383 Fax: 404-262-9885  
Contacts: Mr. Alex Pertuz, President  
CAD Software Sold: N/A  
Computers Sold: HP, IBM, Sun  
CAD Revenue: N/A

**INTEGRATED COMPUTER SYSTEMS**

7120 Northwest 72nd Avenue, Miami, FL 33166  
Phone: 305 887-4777 Fax: N/A  
Contacts: Mr. Alan Bigio, Vice President; Mr. Moises Pancer, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTEGRATED GRAPHICS SYSTEMS, INC.**

625 Fair Oaks Avenue, Suite 340, S. PASADENA, CA 91030  
Phone: 818 799-4128 Fax: N/A  
Contacts: Mr. P. Douglas Josephson  
CAD Software Sold: Soft Master, Soft Master/Redline, Soft Master/PC, G-Copemaster  
Computers Sold: IBM, DOS Clone, IBM compatibles  
CAD Revenue: Less than \$1 Million

**INTEGRATED INFO. MGT. SYSTEMS INC.**

Rockland Professional Center, Suite 100, 1940 North 13th Street, Redding, PA 19604  
Phone: 215 921-9141 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTEGRATED SOLUTIONS**

8200 South Akron, Suite 120, Englewood, CO 80112  
Phone: 303 790-7030 Fax: N/A  
Contacts: Mr. Jack Espisido, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**INTEGRATED SUPPORT SERVICES**

100 Santa Fe Building, Suite 218, Norman, OK 73069  
Phone: 405 329-3267 Fax: N/A  
Contacts: Mr. Eric Johnston  
CAD Software Sold: American Small Business, CADAM, VersaCad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTEGRATED SYSTEMS & ENDEAVORS CORP**

1600 Wyatt Avenue #15, Santa Clara, CA 950541525  
Phone: 408 496-6746 Fax: 408-496-6847  
Contacts: Mr. David Smith, President; Mr. Edward Konvalin, CAD Services and Support Manager  
CAD Software Sold: Personal CAD  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTEGRATED TECHNOLOGY CORP.**

1228 N. Stadem Drive, Tempe, AZ 85281  
Phone: 602 968-3459 Fax: N/A  
Contacts: Mr. Rod Schwartz, Vice President; Mr. Gary Orman, President  
CAD Software Sold: Pads, Futurenet, Drafix  
Computers Sold: Generic computer  
CAD Revenue: Less than \$1 Million

**INTEGRITY COMPUTERS ELECTRONICS**

2245 Losantiville Road, Cincinnati, OH 45237  
Phone: 513 531-8324 Fax: 513-531-8372  
Contacts: Mr. Jim Rixey, President; Mr. Phillip G. Waller, Vice President, Marketing  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTELLIGENT IMAGES, INC.**

4920 Niagra Rd. #100, College Park, MD 20740  
Phone: 301 345-5544 Fax: N/A  
Contacts: Mr. Martin Fries; Ms. Kristie Nelson  
CAD Software Sold: Autodesk, Aries  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**INTERCAD**

3160 De La Cruz Blvd., Suite 100, Santa Clara, CA 95054  
Phone: 408 727-2929 Fax: N/A  
Contacts: Mr. Kenneth Kay, President; Mr. Steve Williams, General Manager  
CAD Software Sold: Autocad, Pro/Engineer, SmartCAM, Auto PCB  
Computers Sold: Sun  
CAD Revenue: More than \$3 Million

**INTERCAD GRAPHICS SYSTEMS**

116 Desense Highway, Annapolis, MD 21401  
Phone: 301 224-2926 Fax: N/A  
Contacts: Mr. Joe Gasper, Marketing Director; Mr. Thomas O. Mills, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**INTERFACE ELECTRONICS, INC.**

37500 Enterprise Court, Farmington Hills, MI 48331  
Phone: 313 553-9820 Fax: 313- 553-2013  
Contacts: Mr. Ketan Bakshi, Vice President, Marketing; Mr. Kirit Bakshi, President  
CAD Software Sold: Computervision, Valid Logic  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**ITAL BUSINESS COMPUTER SYSTEMS, LTD**

6425 Hollywood Blvd., Suite 300, Los Angeles, CA 90028  
Phone: 213 466-0552 Fax: N/A  
Contacts: Mr. Ken Richards, CEO; Mr. Douglas Richards, President  
CAD Software Sold: Autocad, Autosolid, NC Programmer, DCA  
Computers Sold: Compaq, IBM, Sun, DOS Clone, Clones, Everex  
CAD Revenue: \$1 to \$3 Million

**J.R. SYSTEMS WHOLESALERS**

1625 Eye St., N.W., Suite 725, Washington, DC 20006  
Phone: Fax: N/A  
Contacts: Mr. Douglas Lang, President; Mr. Mark Cohen, V.P., Marketing  
CAD Software Sold: Autodesk, Generic  
Computers Sold: N/A  
CAD Revenue: N/A

**J.Z.A. SYSTEMS SERVICES, INC.**

102 Greyfriar Drive, Pittsburgh, PA 15215  
Phone: 412 963-7780 Fax: N/A  
Contacts: Mr. Jim Zaenger, President  
CAD Software Sold: AutoCAD, AutoCogo, Enable, Autoword  
Computers Sold: HP, DOS Clone, Clones  
CAD Revenue: Less than \$1 Million

**JONATHAN'S COMPUTER CENTERS**

444 W. Route 70, Marlton, NJ 08053  
Phone: 609 983-0668 Fax: 609 983-6361  
Contacts: Mr. John H. Heitmann, General Manager  
CAD Software Sold: Autodesk, Versacad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**JONES ENGINEERING ASSOCIATES**

P.O. Box 26037, Charlotte, NC 28221  
Phone: 704 455-9616 Fax: 704-392-4741  
Contacts: Mr. Ben Beall, Project Director  
CAD Software Sold: AutoCAD, DCA Civil Engineering  
Computers Sold: Compaq, DOS Clone, AST,ALR  
CAD Revenue: \$1 to \$3 Million

**K & R CUSTOM SOFTWARE, INC.**

11048 Warwick Blvd., Suite 202, Newport News, VA 23601  
Phone: 804 595-5400 Fax: 804-595-4896  
Contacts: Mr. Thomas H. Rees, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**KANATEK MICRO**

3899 Ulmerton Rd., Clearwater, FL 33520  
Phone: 613 591-1555 Fax: N/A  
Contacts: Mr. Peter Karneef, President; T. Kell, V.P., Sales  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**KC/CAD**

P.O. Box 9206, Bakersfield, CA 93389  
Phone: 805 323-7228 Fax: N/A  
Contacts: Mr. Michael Largent, Vice President, Mktg & Sales; Mr. Gary Coats, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**KDS ENGINEERING**

2319 J Street, Sacramento, CA 95816  
Phone: 916 446-3310 Fax: N/A  
Contacts: Mr. David Berry, President  
CAD Software Sold: AutoCAD  
Computers Sold: Sun, DOS Clone, Everex  
CAD Revenue: \$1 to \$3 Million

**KEISER COMPUTERS**

1401 W. Cypress Creek Road, Ft. Lauderdale, FL 33309  
Phone: 305 771-3511 Fax: 305-771-4894  
Contacts: Mr. Jeffrey Keiser, President  
CAD Software Sold: Autodesk, VersaCad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**KELAR**

4000 Bridgeway, Sausalito, CA 94965  
Phone: 415 331-2171 Fax: 415-331-1944  
Contacts: Mr. Bruce Poropat, CAD Consultant  
CAD Software Sold: AutoCAD, AEC Architecture, AutoShade  
Computers Sold: Compaq, IBM, Mac, AST  
CAD Revenue: N/A

**KELAR CORP.**

5456 McConnell Avenue, Los Angeles, CA 90066  
Phone: 213 827-1200 Fax: 213-305-8091  
Contacts: Ms. Adriana K. Vernon, Vice President, Marketing; Mr. Kambiz Taleghani, President  
CAD Software Sold: Autodesk, CIVILSOFT, Computervision, Mega CADD, Timberline  
Computers Sold: N/A  
CAD Revenue: N/A

**KENFIL DISTRIBUTION**

16745 Saticoy Street, Van Nuys, CA 91406  
Phone: 818 785-1181 Fax: 818 780-5472  
Contacts: Marianne Carlson, Manager; Melissa Russell, Director of Purchasing  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**KETIV TECHNOLOGIES**

6645 NE 78th Court, C-2, Portland, OR 97218  
Phone: 503 252-3230 Fax: N/A  
Contacts: Mr. Robert Palioca, CEO, Chairman  
CAD Software Sold: Autodesk line, Sigma Design, Timberline, 3rd party software (Kativ), smartcam  
Computers Sold: Compaq, HP, Mac, Sun, DOS Clone, NEC, Everex  
CAD Revenue: More than \$3 Million

**KHAN PHILLIPS & ASSOCIATES, INC.**

1140 Lake Street, Suite 401, Oak Park, IL 60301  
Phone: 312 848-2233 Fax: 312-771-6058  
Contacts: Mr. Sam Khan, President  
CAD Software Sold: Autodesk full line, Personal Designer, MicroCADAM, Smartcam, Frame - Frame Technologies  
Computers Sold: Compaq, HP, IBM, Sun, DOS Clone, Everex, AST  
CAD Revenue: \$1 to \$3 Million

**LANGHAM/MATHIS**

941 Berryessa Road, Suite E, San Jose, CA 95113  
Phone: 408 453-0568 Fax: N/A  
Contacts: Mr. Steve Langham, President  
CAD Software Sold: Skok  
Computers Sold: N/A  
CAD Revenue: N/A

**LASSEN RESEARCH**

1000 Forward Road, Manton, CA 96059  
Phone: 916 474-3966 Fax: 916-474-1112  
Contacts: Mr. Robert W. Lee, General Partner; Ms. Karen Lee, General Partner  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**LECHMERE**

275 Wildwoods, Woburn, MA 01801  
Phone: 617 935-8320 Fax: 718 523-1082  
Contacts: Kim Gregalis  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**LEVEL ONE SYSTEMS, INC.**

198 North Main Street, Rutland, VT 05701  
Phone: 802 775-6512 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**LODESTAR**

347 Pendleton Way, Oakland, CA 94621  
Phone: 415 638-3585 Fax: 415-638-3978  
Contacts: Mr. Greg Eyrich, Vice President  
CAD Software Sold: Autocad  
Computers Sold: Apollo, Compaq, IBM, Mac, ALR  
CAD Revenue: More than \$3 Million

**LODESTAR SYSTEMS, INC.**

1420 N. Claremont Blvd. #102-A, Claremont, CA 91711  
Phone: 714 625-7961 Fax: 714-625-7968  
Contacts: Mr. Gerald Eyrich, President  
CAD Software Sold: AutoCAD  
Computers Sold: Compaq, IBM, Mac, DOS Clone, ALR  
CAD Revenue: \$1 to \$3 Million

**LOGIC DATA SYSTEMS INC.**

7055 Engle Road, Bldg. 6-604, Middleburg Heights, OH 44130  
Phone: 216 234-8008 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**LOGICAL RESOURCES, INC.**

74 14th Street N.W., Atlanta, GA 30309  
Phone: 404 892-3000 Fax: N/A  
Contacts: Dr. Herbert W. Eber, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**LOOKING GLASS MICROPRODUCTS**

4233 W. Eisenhower, Loveland, CO 80537  
Phone: 303 669-2681 Fax: N/A  
Contacts: Mr. Philip Kreiker, President  
CAD Software Sold: AutoCAD, AEC Architectural  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**LOVELAND COMPUTER CENTER**

Orchard's Center, 285 A, 29th Street, Loveland, CO 80538  
Phone: 303 667-9095 Fax: N/A  
Contacts: Ms. Sally A. Landes, President; Mr. William Whittrick, Sales Representative  
CAD Software Sold: LandCAD  
Computers Sold: AT&T, Zenith  
CAD Revenue: Less than \$1 Million

**M.I.B. CHOCK**

1048 24th Street, Santa Monica, CA 90403  
Phone: 213 828-4788 Fax: N/A  
Contacts: Ms. Margaret Chock, CEO  
CAD Software Sold: Picture Image Data Management Sys.  
Computers Sold: N/A  
CAD Revenue: Less than \$1 Million

**MAINE SURVEYORS/SOLUTIONS COMPUTER**

28 US Rt. 1, Yarmouth, ME 04096  
Phone: 207 846-5143 Fax: N/A  
Contacts: Mr. Gus McDonald, President  
CAD Software Sold: VersaCAD  
Computers Sold: N/A  
CAD Revenue: N/A



**MARFAM COMPUTER SOLUTIONS**

6351 Almaden Road, San Jose, CA 95120

Phone: 408 997-0140 Fax: N/A

Contacts: Ms. Sally Marler, President; Mr. John R. Marler, CEO

CAD Software Sold: AutoCAD, P-CAD, Turbo CAD, Generic CAD

Computers Sold: IBM, DOS Clone, NCR, AT&T, Kaypro, NEC

CAD Revenue: Less than \$1 Million

**MARTCO**

12952 W. Louisiana Avenue, Lakewood, CO 80228

Phone: 303 989-0848 Fax: N/A

Contacts: Mr. Marty Jones, Owner

CAD Software Sold: Foresight Resources

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**MATERIALS DEVELOPMENT CORP.**

21541 Nordhoff Street, Chatsworth, CA 91311

Phone: 818-700-8290 Fax: 818 700-8304

Contacts: Mr. Barton Gordon, President; Mr. M. Taylor, V.P. Marketing

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**MEASUREMENT MASTERS**

711 West 17th Street, Suite E11, Costa Mesa, CA 92627

Phone: 714-631-6950 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**MEDIA CYBERNETICS, INC.**

8484 Georgia Avenue, Silver Spring, MD 20910

Phone: 301 495-3305 Fax: N/A

Contacts: Ms. Lynn Cameron, Vice President, Marketing & Sales; Mr. William E. Strum, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**MEDIA SOFT INC.**

d/b/a MicroAge, 7512 Broadway Extension, Suite 308, Oklahoma City, OK 73116

Phone: 405 843-8739 Fax: N/A

Contacts: Mr. Robert H. Alfson

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**METRON GROUP**

1700 Alma, Suite 460, Plano, TX 75075  
Phone: 214 470-0406 Fax: N/A  
Contacts: Mr. David Machanick, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**METROPOLITAN CAD SYSTEMS, INC.**

P.O. Box 1406, 190 Lincoln Highway, Edison, NJ 08818  
Phone: 201 548-4040 Fax: 201-548-2743  
Contacts: Mr. Michael Basch  
CAD Software Sold: Autodesk, Cimatron  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**MGM SYSTEMS**

6155 Viewcrest Drive, Oakland, CA 94619  
Phone: 415 482-1804 Fax: N/A  
Contacts: Ms. Mary Metcalf, Senior Partner; Mr. Al Metcalf, President  
CAD Software Sold: Orcad  
Computers Sold: N/A  
CAD Revenue: N/A

**MICAD SYSTEMS, INC.**

128 East Texas Street, Grapevine, TX 76051  
Phone: 800 642-2336 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**MICRO CENTER**

1555 West Lane Avenue, Columbus, OH 43221  
Phone: 614 481-8041 Fax: 614 481-4439  
Contacts: Mark Mollenkopf  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**MICRO CITY COMPUTERS**

630 E. Ogden Avenue, Naperville, IL  
Phone: 312 420-8813 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**MICRO COMPUTER COMPANY, INC.**

101 Wheaton Plaza, Wheaton, MD 20902  
Phone: 301-942-5442 Fax: 301-942-6839  
Contacts: Mr. Jerry Paugh, Sales Manger; Mr. Steven Hulsey  
CAD Software Sold: AutoCAD, Autodesk all lines  
Computers Sold: DOS Clone, Everex, Novelle + others  
CAD Revenue: \$1 to \$3 Million

**MICRO COMPUTER SYSTEMS**

2615 184th Street, SW Suite 105, Lynnwood, WA 98037  
Phone: 206-778-7337 Fax: N/A  
Contacts: Mr. Gary Gill, President; Mr. Ron Van Winkle, Marketing Manager  
CAD Software Sold: N/A  
Computers Sold: Mac  
CAD Revenue: N/A

**MICRO COMPUTER TECHNIQUES**

807 Second Avenue South, Nashville, TN 37210  
Phone: 615-244-2808 Fax: N/A  
Contacts: Mr. Ken Hibbitt, Chairman  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**MICRO D**

2801 South Yale Street, Santa Ana, CA 92704-5850  
Phone: 714-540-4781 Fax: 714-540-1943  
Contacts: Rebecca Ortega, Marketing Manager  
CAD Software Sold: Generic CADD  
Computers Sold: N/A  
CAD Revenue: N/A

**MICRO ENGINEERING SOLUTIONS, INC.**

470 Murdock Avenue, Meriden, CT 06450  
Phone: 203-630-3630 Fax: N/A  
Contacts: Mr. Mitch Slater, President; Mr. Michael Schary, Vice President  
CAD Software Sold: AutoCAD, Cadkey  
Computers Sold: IBM, DOS Clone, Everex  
CAD Revenue: More than \$3 Million

**MICRO GRAPHICS, INC.**

2120A W. Braker Lane, Austin, TX 78758  
Phone: 512-834-0673 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Versacad  
Computers Sold: Mac, DOS Clone, clones  
CAD Revenue: \$1 to \$3 Million

**MICRO SOLUTIONS**

160-E Oxmoor Road, Birmingham, AL 35209  
Phone: 205 945-8097 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**MICRO SPECIALISTS**

3202 18th Street, Rockford, IL 61109  
Phone: 815 399-0326 Fax: N/A  
Contacts: Mr. Marvin Permenter, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**MICRO STAR, INC.**

14437 Catalina Street, San Leandro, CA 94577  
Phone: 415-483-6400 Fax: N/A  
Contacts: Mr. Jerzy Kulesza, President  
CAD Software Sold: AutoCAD  
Computers Sold: Intel  
CAD Revenue: Less than \$1 Million

**MICROAGE**

2020 Santa Monica Blvd., Suite 100, Santa Monica, CA 90404  
Phone: 213 458-1652 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**MICROAGE COMPUTER STORES INC.**

3611 Youree Drive, Shreveport, LA 71105  
Phone: 318 865-3563 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**MICROAGE COMPUTERS**

9602 N. May Avenue, Oklahoma City, OK 73120  
Phone: 405 752-0802 Fax: N/A  
Contacts: Mr. Bruce Parker, Manager  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**MICRODEC COMPUTER CENTER**

3065 Nutley Street, Fairfax, VA 22031

Phone: 703 280-1600 Fax: 703-573-2184

Contacts: Ms. Janet S. Comfort, President; Mr. Edward H. Comfort, Manager, Operations

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**MICROPLUS SYSTEMS TECHNOLOGY**

1020 E. El Camino Real, Sunnyvale, CA 94087

Phone: 408 737-2525 Fax: N/A

Contacts: Mr. Bui Han, President

CAD Software Sold: AutoCAD, P-CAD

Computers Sold: DOS Clone, 386, AST

CAD Revenue: \$1 to \$3 Million

**MICROSOURCE CAD/CAM, INC.**

400 W. Cummings Park, Woburn, MA 01801

Phone: 617 935-3320 Fax: N/A

Contacts: Mr. Charles Skeelee, President

CAD Software Sold: Aries, Autodesk, Computervision, MCS, Personal CAD Systems

Computers Sold: N/A

CAD Revenue: More than \$3 Million

**MICROSOUTH**

1009 Sun Valley Drive, Roswell, GA 30076

Phone: 404 993-6245 Fax: 404-641-7168

Contacts: Mr. Tom Woolsey, President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: More than \$3 Million

**MICROWARE COMPUTING**

17971 Skypark Circle, Irvine, CA 92714

Phone: 714 250-0511 Fax: N/A

Contacts: Mr. Donald Geller, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**MID STATES CAD SUPPLY, INC.**

4401 Lyman Drive, Suite C, Hilliard, OH 43026

Phone: 614-876-1002 Fax: N/A

Contacts: Mr. David Dikeman, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**MID-AMERICA INFORMATION SYSTEM, INC**

2603 22nd Street, Suite 23, Oak Brook, IL 60521  
Phone: 312 574-3633 Fax: N/A  
Contacts: Mr. Peter Youngwith, President  
CAD Software Sold: Autodesk, MCS  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**MID-WEST CAD SERVICES**

620 S.E. 291 Highway, Lee's Summit, MO 64063  
Phone: 816 525-5767 Fax: N/A  
Contacts: Mr. Roger Roberts, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**MIDWEST BUSINESS SYSTEMS**

24660 Lahser Road, Southfield, MI 48034  
Phone: 313 358-0890 Fax: 313-358-2361  
Contacts: Mr. Andy Prescott, Vice President, CAD/CAM Division  
CAD Software Sold: Autodesk line, CADAM, Computervision, Aries, Smartcam  
Computers Sold: Compaq, HP, Sun, DOS Clone, AST  
CAD Revenue: More than \$3 Million

**MINCAD SYSTEMS**

P.O. Box 6227, Minneapolis, MN 55406  
Phone: 612 722-1120 Fax: 612-722-2958  
Contacts: Mr. Paul Morley, Division Manager  
CAD Software Sold: Autodesk, Computervision  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**MONTEREY COMPUTER CONSULTING**

149 Bonifacio Place, Monterey, CA 93940  
Phone: 408 646-1146 Fax: N/A  
Contacts: Mr. Jerry C. McConnell, President, Owner  
CAD Software Sold: AutoCAD, PCAD, MicroCADAM, Generic CAD  
Computers Sold: Compaq, HP, IBM, DOS Clone  
CAD Revenue: \$1 to \$3 Million

**NATIONAL BUSINESS DATA SYSTEMS**

1509 Energy Park Drive, St. Paul, MN 55108  
Phone: 612 647-0143 Fax: N/A  
Contacts: Mr. Ron Fishback, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**NATIONAL NUMERICAL CONTROL APPLICNS.**

4053 Maple Rd, Amherst, NY 14226  
Phone: 716-837-6070 Fax: 716-837-8199  
Contacts: Mr. Dennis Wrazen, President  
CAD Software Sold: Autodesk, Cadkey  
Computers Sold: N/A  
CAD Revenue: N/A

**NATIONAL TECH TEAM INC.**

22000 Garrison Avenue, Dearborn, MI 48124  
Phone: 313 277-2277 Fax: 313-277-6409  
Contacts: Mr. William Coyro, Chairman; Mr. Thomas Judd, Director of Technical Graphics  
CAD Software Sold: Autodesk, CADAM, Cimlinc  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**NET PROFIT**

2230 Sunrise Blvd., Rancho Cardova, CA 95670  
Phone: 916 638-0588 Fax: N/A  
Contacts: Mr. Jerry Jewell, Corporate Sales Manager; Mr. Frederick Rauch, Government and Corporate Sales  
CAD Software Sold: Dynaperspective, MiniCAD, ClarisCAD  
Computers Sold: Compaq, Mac  
CAD Revenue: N/A

**NEW FOCUS INFORMATION SYSTEMS, INC.**

970 Mt. Kemble Avenue, Morristown, NJ 07960  
Phone: 201 953-0315 Fax: N/A  
Contacts: Mr. Donald E. Ellis, President  
CAD Software Sold: N/A  
Computers Sold: Compaq, IBM, DOS Clone, ACER  
CAD Revenue: Less than \$1 Million

**NEWMAN COMPUTER EXCHANGE**

P.O. Box 8610, 1250 North Main, Ann Arbor, MI 48104  
Phone: 313 994-3200 Fax: 313 994-9166  
Contacts: Ms. JoAnne Alexander, Product Specialist  
CAD Software Sold: Intergraph, Computervision  
Computers Sold: HP, Digital  
CAD Revenue: \$1 to \$3 Million

**NIELSEN ASSOCIATES INC.**

One Circle West, Stamford, CT 06902  
Phone: 203 978-0400 Fax: 203-978-0111  
Contacts: Mr. James Oliver, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**NOGUSKA INDUSTRIES**

735-741 N. Countyline, Fostoria, OH 44830

Phone: 419 435-0404 Fax: 419-435-1844

Contacts: Mr. Norman Gibat, Vice President, Direct Marketing; Ms. Kathleen Howard, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**NUMERAX, INC.**

3924 Linden Avenue, Long Beach, CA 90807

Phone: 213 426-6339 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**NUMERICAL CONTROL COMPUTER SCIENCES**

17321 Murphy Ave., Irvine, CA 92714

Phone: 714-474-7444 Fax: 714-474-0421

Contacts: Mr. Donald Schultz, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**NUMERIDEX, INC.**

241 Holbrook Dr., Wheeling, IL 60090

Phone: 312-541-8840 Fax: 312-541-8392

Contacts: Mr. William Gapp, President; Mr. Ed Down, Marketing/Sales Director

CAD Software Sold: Cadam, Cadkey, MCS

Computers Sold: N/A

CAD Revenue: More than \$3 Million

**O/E SYSTEMS**

3290 West Big Beaver Road, Suite 116, Troy, MI 48084

Phone: 313 643-7220 Fax: 313-643-7882

Contacts: Mr. Tom Sieja, CADAM Market Manager

CAD Software Sold: CADAM

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**OMICRON ELECTRONICS**

11240 East 9 Mile Road, Warren, MI 48089

Phone: 313 757-8192 Fax: N/A

Contacts: Mr. Michael Tattan, President

CAD Software Sold: Autodesk, Bishop Graphics, Robo Systems, Versacad

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million



**OMNI COMPUTER STORE**

4702-J Johnson Street, Lafayette, LA 70506  
Phone: 318 981-9124 Fax: N/A  
Contacts: Ms. Frances Garrard  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ONLINE COMPUTERS PLUS INC.**

6789 N. Blackstone, Fresno, CA 93710  
Phone: 209 432-4324 Fax: N/A  
Contacts: Mr. Merrill C. Oberg, Owner  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**OPTIMIZED DESIGN SERVICES, INC.**

10475 Perry Highway, Town Center Bldg., Suite 301, Wexford, PA 15090  
Phone: 412 935-0670 Fax: 412-935-8277  
Contacts: Mr. R. Scott Theissen, President; Mr. Gerald J. Hattrup, Vice President  
CAD Software Sold: MicroCADAM, Professional CADAM  
Computers Sold: IBM  
CAD Revenue: Less than \$1 Million

**PACIFIC DATAWARE**

15840 S.W. Upper Boones Ferry Road, Lake Oswego, OR 97035  
Phone: 503 620-9858 Fax: 503-684-3519  
Contacts: Mr. Richard Grossman, Vice President, Sales & Marketing  
CAD Software Sold: Versacad  
Computers Sold: ACER  
CAD Revenue: \$1 to \$3 Million

**PACKAGED COMMUNICATIONS TECHNOLOGY**

24B Andover Dr., West Hartford, CT 06110  
Phone: 203-247-8911 Fax: N/A  
Contacts: Mr. Don Nigro, Chairman; Mr. Tony Gaudet, V.O. Marketing/Sales  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**PANTHER TECHNOLOGIES**

Pineridge Business Park, 8347 Melrose Drive, Lenexa, KS 66214  
Phone: 913 599-0101 Fax: 913 599-0933  
Contacts: Mr. Andy Justesen, Sales Manager; Mr. Joe Panther, President  
CAD Software Sold: AutoCAD, CADAM - MicroCADAM  
Computers Sold: Sun, Everex, Acer  
CAD Revenue: \$1 to \$3 Million

**PERSONAL COMPUTER RESOURCES INC.**

2100 Washington Street, Hanover, MA 02339

Phone: 617 871-5396 Fax: N/A

Contacts: Mr. George Hamrah, President; Mr. Lee Adler, Vice President and Sales Manager

CAD Software Sold: Versacad

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**PERSONAL COMPUTER SERVICES INC.**

104 East 23rd Street, New York, NY 10010

Phone: 212 475-8977 Fax: N/A

Contacts: Mr. Alan Waxenburg, Vice President

CAD Software Sold: Versacad, Minicad, ClarisCAD

Computers Sold: IBM, Mac, DOS Clone, Clones

CAD Revenue: \$1 to \$3 Million

**PERSONAL WORKSTATIONS, INC.**

1201 Western Avenue, Suite 204, Seattle, WA 98101

Phone: 206 682-4803 Fax: 206-682-1314

Contacts: Mr. Davis Straub, Owner

CAD Software Sold: Anvil 5000, Computervision Personal Designer, Autocad

Computers Sold: Compaq

CAD Revenue: \$1 to \$3 Million

**PIEDMONT CAD/CAM, INC.**

814 Tyvola Road, Suite 126, Charlotte, NC 28217

Phone: 704 523-2400 Fax: 704-523-7764

Contacts: Mr. Spec Hall, President; Mr. Mitch Lemons, Vice President

CAD Software Sold: CADAM, Cimlinc, MCS, Personal CAD Systems, Sigma Design

Computers Sold: N/A

CAD Revenue: More than \$3 Million

**PMX, INC.**

33129 Schoolcraft, Livonia, MI 48150

Phone: 313 422-3740 Fax: 313 422-2770

Contacts: Mr. Jerry Peterson N/A

CAD Software Sold: Concept, XLNC

Computers Sold: None

CAD Revenue: More than \$3 Million

**POELMAN'S DESIGN**

901 Campisi Way, Suite 360, Campbell, CA 95008

Phone: 408-377-3585 Fax: 408-377-3687

Contacts: Mr. Mike Poelman, President

CAD Software Sold: Cadkey

Computers Sold: N/A

CAD Revenue: N/A

**PRACTICAL MICRO DESIGN, INC.**

105 Clermont Ave, Alexandria, VA 223044837  
Phone: 703 823-2531 Fax: N/A  
Contacts: Mr. Stephen C. Stallings, President  
CAD Software Sold: Autodesk, VersaCAD  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**PREMIER DESIGN SYSTEMS, INC.**

1107 Kenilworth, Suite 100, Towson, MD 21204  
Phone: 301 494-8444 Fax: N/A  
Contacts: Mr. Matt Richards, Vice President; Mr. Brice P. Schaeffer, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**PRISM BUSINESS COMPUTER SYSTEMS**

228 Main Street, Pawtucket, RI 02860  
Phone: 401 725-6555 Fax: N/A  
Contacts: Mr. Babak Taleghani, President  
CAD Software Sold: Autodesk, Versacad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**PROBLEM SOLVERS**

12725 Dupont Avenue South, Burnsville, MN 55337  
Phone: 612 894-6230 Fax: N/A  
Contacts: Ms. Colleen Carothers, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**PROFESSIONAL CONTROL CORPORATION**

6601 Shingle Creek Parkway, Suite 300, Minneapolis, MN 55430  
Phone: 612 566-0799 Fax: N/A  
Contacts: Mr. Kim Anderson, Vice President, Sales; Mr. Edgar Jay Anderson, President  
CAD Software Sold: AutoCAD, Anvil 5000, Proengineer, SmartCAM  
Computers Sold: Compaq, HP, IBM, Sun, DOS Clone, NEC, Everex  
CAD Revenue: Less than \$1 Million

**PROFESSIONAL CONTROL CORPORATION**

P.O. Box 130, Germantown, WI 53022  
Phone: 414 251-3000 Fax: 414 251-7334  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**QBIC**

7380 Sandlake Road, Suite 135, Orlando, FL 32819  
Phone: 407 352-3643 Fax: N/A  
Contacts: Mr. Bob Niles, CAD Sales Manager  
CAD Software Sold: Intergraph Microstation, Autocad, Personal Designer  
Computers Sold: N/A  
CAD Revenue: Less than \$1 Million

**QUANNON COMPUTER PRODUCTS**

6400 Flying Cloud Drive, Suite 107, Eden Prairie, MN 55344  
Phone: 612-944-5616 Fax: N/A  
Contacts: Mr. John McLeod, President; Mr. Jim Zink, Marketing Manager  
CAD Software Sold: Autodesk, Cadkey, Iconnix, Isicad  
Computers Sold: N/A  
CAD Revenue: N/A

**QUANNON COMPUTER PRODUCTS, INC.**

6400 Flying Cloud Drive, Suite 107, Eden Prairie, MN 55344  
Phone: 612 944-5616 Fax: N/A  
Contacts: Mr. John S. McLeod, President  
CAD Software Sold: Autodesk, Cadkey, Synthesis  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**RADIO SHACK**

A division of Tandy Corporation, 1500 One Tandy Center, Fort worth, TX 76102  
Phone: 817 390-3155 Fax: 817 390-3688  
Contacts: Chris Imler, Express Order Buyer; Ann Kennemer, Marketing Franchise  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**RAINBOW COMPUTERS**

797 E. Big Beaver, Troy, MI 48083  
Phone: 313 528-3535 Fax: 313 528-3760  
Contacts: Ms. Kate Gabriel, Vice President; Mr. Jerry Gabriel, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**REMEX/TCBC**

6095 28th Street, S.E., Grand Rapids, MI 49506  
Phone: 616 942-9800 Fax: N/A  
Contacts: Mr. Michael Noordyke, Vice President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**RESEARCH ENGINEERS, INC.**

303 Pavillion of Greentree, Marlton, NJ 08053  
Phone: 609-983-5050 Fax: N/A  
Contacts: Mr. Amrit Das, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**RETAIL COMPUTER CENTER INC.**

29934 Southfield Road, Southfield, MI 48076  
Phone: 313 443-0350 Fax: 313 443-1620  
Contacts: Mr. George Tasca, Store Manager; Mr. Fida H. Bohra, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**ROBEC DISTRIBUTORS, INC.**

425 Privet Road, Horsham, PA 19044  
Phone: 215 675-9300 Fax: N/A  
Contacts: Mr. Robert H. Beckett, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: More than \$3 Million

**ROBERT MCNEEL & ASSOCIATES**

1310 Ward Street, Suite 200, Seattle, WA 98109  
Phone: 206 628-2172 Fax: N/A  
Contacts: Mr. Robert McNeel  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**ROGERS PRODUCTS COMPANY, INC.**

438 E Katella, Suite G, Orange, CA 92667  
Phone: 714 771-0514 Fax: N/A  
Contacts: Mr. James E. Rogers, President  
CAD Software Sold: AutoCAD  
Computers Sold: Compaq, HP, DOS Clone, AST, CSS  
CAD Revenue: Less than \$1 Million

**ROSAL SYSTEMS, LTD.**

13220 St. Albert Trail, Suite 301, Edmonton, AL, CD T5L4W1 Canada  
Phone: 403-451-6163 Fax: 403-452-8191  
Contacts: Mr. Ronald Salmon, President  
CAD Software Sold: Autodesk, Mega CADD  
Computers Sold: N/A  
CAD Revenue: N.A

**RRG ENGINEERING**

975 Jefferson Road, Rochester, NY 14623

Phone: 716 424-7492 Fax: 716-424-7372

Contacts: Mr. Kenneth P. VanAlstine, Systems Consultant; Mr. Robert A. Giese, President

CAD Software Sold: AutoCAD, IBM CIEDS, Generic CADD, Iconnex

Computers Sold: Compaq, IBM, Sun, DOS Clone, AST, ATT

CAD Revenue: More than \$3 Million

**SARCOM**

dba Inacomp Computer Centers, 510-D E. Wilson Bridge, Worthington, OH 43085

Phone: 614 431-2228 Fax: 614-431-0659

Contacts: Mr. Randy Wilcox, President

CAD Software Sold: Autodesk, Sigma Design, VersaCad

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**SAUER COMPUTER SYSTEMS, INC.**

1750 S. Brentwood Avenue, St. Louis, MO 63144

Phone: 314 962-0382 Fax: N/A

Contacts: Mr. Robert Sauer, President; Mr. Roger W. Gruen, Vice President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**SAVVY - A DIVISION OF COMPUTER ATTIC**

394 University, Palo Alto, CA 94301

Phone: 415 321-6262 Fax: 415-322-0639

Contacts: Mr. Dave Gravlin, President

CAD Software Sold: AutoCAD, VersaCAD, Architrion, McBravo Schlumberger

Computers Sold: Compaq, Mac, Sun, DOS Clone, AST

CAD Revenue: N/A

**SCAN-GRAPHICS, INC.**

700 Abbott Drive, Broomall, PA 19008

Phone: 215 328-1040 Fax: 215 543-6257

Contacts: Mr. Larry Krueger, Vice President, Sales & Marketing; Mr. Andrew Trolio, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**SCIENTIFIC DEVICES EAST, INC.**

1415 Queen Anne Rd., Teaneck, NJ 07666

Phone: 201-837-1004 Fax: 201-857-0950

Contacts: Mr. Gary Wagner, Vice President

CAD Software Sold: Point Control, Versacad

Computers Sold: N/A

CAD Revenue: N/A

**SCORPION SYSTEMS INC.**

40 E Patrick St., Frederick, MD 217015628  
Phone: 301 663-0539 Fax: N/A  
Contacts: Ms. Karen Blood, President  
CAD Software Sold: Cadkey  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**SECAD**

4707 S.W. 72 Avenue, Miami, FL 33155  
Phone: 305 661-5092 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**SECTOR SYSTEMS CO.**

416 Ocean Avenue, Marblehead, MA 01945  
Phone: 617 639-2625 Fax: N/A  
Contacts: Mr. J. Lehto, President  
CAD Software Sold: Generic CAD  
Computers Sold: Unisys  
CAD Revenue: \$1 to \$3 Million

**SELTECH INC.**

1800 N W 169th Place, Bldg. A, Suite 100, Beaverton, OR 97006  
Phone: 503 645-6628 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Orcad  
Computers Sold: N/A  
CAD Revenue: N/A

**SIERRA RESOURCE**

3739 Meadow Wood Road, Carson City, NV 89701  
Phone: 702 885-8106 Fax: N/A  
Contacts: Mr. Don Asp, President  
CAD Software Sold: AutoCAD, Autoshade, AEC Architectural, AEC Mechanical, Complete Autodesk line  
Computers Sold: Compaq, IBM, DOS Clone, Everex  
CAD Revenue: Less than \$1 Million

**SIGMA DYNAMICS CORPORATION**

7935 E. Prentice Avenue, Suite 209, Englewood, CO 80111  
Phone: 303 850-5404 Fax: 303-850-0023  
Contacts: Mr. Bill Bollinger; Mr. Scot Susmann, Executive Vice President  
CAD Software Sold: Polaris, AutoCAD  
Computers Sold: IBM, DOS Clone  
CAD Revenue: \$1 to \$3 Million

**SILTRAN DIGITAL**

2250 Monterey Road, Atascadero, CA 93422  
Phone: 805 466-3209 Fax: N/A  
Contacts: Mr. M. F. Hordeski, CEO  
CAD Software Sold: Autodesk, VersaCad  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**SIMUTEK**

4897 E. Speedway, Tucson, AZ 85712  
Phone: 602 323-9391 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**SOFTLINK**

205 Newbury Str., Framington, MA 01701  
Phone: 617 876-5571 Fax: N/A  
Contacts: Mr. Timothy W. Armour, Vice President, Marketing & Sales; Mr. Allan D. Stejskal, President  
CAD Software Sold: DrawBase, AutoCAD  
Computers Sold: HP, DOS Clone, ACER  
CAD Revenue: \$1 to \$3 Million

**SOFTMART**

285 Great Valley Parkway, Malvern, PA 19355  
Phone: 215 363-1438 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**SOFTSEL COMPUTER PRODUCTS**

546 North Oak Street, Inglewood, CA 90312-6080  
Phone: 213 412-1700 Fax: 213 412-8263  
Contacts: N/A  
CAD Software Sold: Generic CADD  
Computers Sold: N/A  
CAD Revenue: N/A

**SOFTWARE CITY**

1415 Queen Anne Road, Teaneck, NJ 07666  
Phone: 201 833-8510 Fax: 201 833-8944  
Contacts: Maria A. Cirino  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A



**SOFTWARE ETC.**

7505 Metro Blvd., Minneapolis, MN 55435  
Phone: 612 893-7821 Fax: 612 893-7250  
Contacts: Bob McKenize  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**SOFTWARE GALLERIA AT WESTWOOD**

9894 Bissonnet Street, Suite 102, Houston, TX 77036  
Phone: 713-995-5500 Fax: N/A  
Contacts: Mr. Felix Alexis, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**SOFTWARE MANAGEMENT**

P.O. Box 767010, Roswell, GA 30076  
Phone: 404 998-8281 Fax: N/A  
Contacts: Mr. Robert Skor, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**SOUTHERN CAD/CAM INC.**

215 Center Park Drive, Suite 100, Knoxville, TN 37922  
Phone: 615 966-3956 Fax: N/A  
Contacts: Mr. Calvin Armistead, Product Manager  
CAD Software Sold: Autodesk, Cadkey, Computervision, MCS, Sigma Design  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**SPEC SYSTEMS CORP.**

1088 Bishop St., The Executive Centre, Suite 310, Honolulu, HI 96813  
Phone: 808-531-2511 Fax: N/A  
Contacts: Mr. Gregory Kosky, President; Ms. Margot Sharer, V.P., Marketing  
CAD Software Sold: Autodesk line except Autosolid, Sigma Design  
Computers Sold: Compaq, IBM, Sun, DOS Clone, Everex, ALR, Acer  
CAD Revenue: Less than \$1 Million

**SPECIALTY SYSTEMS OF THE SOUTH, INC**

7910 Wrenwood, Suite A, Baton Rouge, LA 70809  
Phone: 504 925-5521 Fax: N/A  
Contacts: Mr. George J. Harris, Jr., Owner, President  
CAD Software Sold: Autodesk, Isicad, Sigma Design  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**SPI - SOFT PAC INTERNATIONAL**

P.O. Box 28778, San Jose, CA 95159

Phone: 408 241-7710 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**STEPHEN & ASSOCIATES**

5205 Kearny Villa Way, Suite 104, San Diego, CA 92123

Phone: 619 571-5624 Fax: N/A

Contacts: Mr. Gerry Stephen, President; Mr. Mike Pirie, Mechanical Engineer

CAD Software Sold: AutoCAD, 3rd party that works with autocad

Computers Sold: Compaq, Acer, custom built items

CAD Revenue: Less than \$1 Million

**SULTAN COMPUTER SYSTEMS**

111 South Cayuga Street, Ithaca, NY 14850

Phone: 800-447-8582 Fax: N/A

Contacts: Mr. Jeff Danial, President

CAD Software Sold: Autodesk line, PCAD, Synthesis

Computers Sold: DOS Clone, Everex

CAD Revenue: \$1 to \$3 Million

**SUMMIT COMPUTER SYSTEMS**

270 Lafayette Street, New York, NY 10012

Phone: 212 334-8087 Fax: N/A

Contacts: Mr. Stephan K. Swaney, Partner; Mr. Finder, Partner

CAD Software Sold: Arris, AutoCAD, CAdvance

Computers Sold: IBM, Sun, DOS Clone, Everex, Silicon Graphics

CAD Revenue: \$1 to \$3 Million

**SUN COMPUTERS**

16241 Beach Blvd., Huntington Beach, CA 92647

Phone: 714 848-5574 Fax: N/A

Contacts: N/A

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**SUN-FLEX CO., INC.**

73 Digital Drive, Novato, CA 94949

Phone: 415 883-1221 Fax: N/A

Contacts: Mr. Tony Galt, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**SUNGRAF AUTOMATED SYSTEMS**

325 W. Ansin Blvd., Hallandale, FL 330093183

Phone: 305 458-5100 Fax: 305-454-2266

Contacts: Mr. Bob Flipse, Marketing Director; Mr. James Quinn, Vice President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**SUPPORT SYSTEMS**

514 Parquet Street, Sebastopol, CA 95472

Phone: 707 829-0569 Fax: N/A

Contacts: Mr. Clay Von Mueller, President

CAD Software Sold: ProCAD, Tango

Computers Sold: DOS Clone, Clones

CAD Revenue: Less than \$1 Million

**SWAN COMPUTERS**

14100 NE 20th, Bellevue, CA 98007

Phone: 206 747-3000 Fax: N/A

Contacts: Peter Wayne, Owner

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**SYNERGIS**

593 Skippack Pike, Suite 100, Blue Bell, PA 19422

Phone: 215 643-9050 Fax: N/A

Contacts: N/A

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: N/A

**SYSTEC CONSULTING GROUP**

1160 Eisenhower Place, Ann Arbor, MI 48108

Phone: 313 677-0150 Fax: N/A

Contacts: Mr. Keason Sanvordenker, President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: N/A

**SYSTEMS DESIGN**

45 Colvin Avenue, Albany, NY 12206

Phone: 518 438-8410 Fax: N/A

Contacts: Mr. Pierre Douyon, Partner

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**SYSTEMS SUPPORT, INC.**

436 12th Street, Dunbar, WV 25064  
Phone: 304 766-7762 Fax: N/A  
Contacts: Mr. Max Damaschko, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**TECHNICAL SERVICES GROUP/PCSI, INC.**

104 East 23rd St., New York, NY 10010  
Phone: 212-475-8977 Fax: 212-979-1612  
Contacts: Mr. Vic Caron, President  
CAD Software Sold: Autodesk, Mega Cadd, Versacad  
Computers Sold: N/A  
CAD Revenue: N/A

**TECHNICAL SOFTWARE, INC.**

4555 Emery Industrial Pkwy.#102, Cleveland, OH 44128  
Phone: 216 765-1133 Fax: N/A  
Contacts: Mr. Greg Malkin, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**TECHNIDATA, LTD.**

1087 Kentwood Avenue, Cupertino, CA 95014  
Phone: 408 255-1317 Fax: N/A  
Contacts: Mr. Michael Landis, President  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**TECHWARE COMPUTING CO.**

4912 Creekside Dr., Clearwater, FL 34620  
Phone: 813-573-3734 Fax: N/A  
Contacts: Mr. Bruce Robinson, V.P. Marketing  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**TELECAD**

7916 Capwell Drive, Oakland, CA 94621  
Phone: 415 633-2588 Fax: N/A  
Contacts: Mr. Richard Martini, President  
CAD Software Sold: MicroCADAM  
Computers Sold: HP, DOS Clone, AST, Wyse, our own  
CAD Revenue: N/A

**THE ALLIED GROUP, INC.**

701 Hebron Avenue, Glastonbury, CT 06033

Phone: 203-659-4235 Fax: 203-659-1402

Contacts: Mr. Irvin Miglietta, President; Mr. Tom Colleary, Sales and Marketing Manager

CAD Software Sold: Autodesk line, Arris Line, Interleaf

Computers Sold: Sun

CAD Revenue: \$1 to \$3 Million

**THE BEYDLER COMPANY/CADD**

9850 North 32nd Street, Suite One, Phoenix, AZ 85028

Phone: 602 482-9333 Fax: 602-992-2414

Contacts: Mr. John Beydler, President

CAD Software Sold: Autodesk, Computervision, Sigma Design

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**THE CAD ROOM INC.**

707 N. Washington, Wichita, KS 67214

Phone: 316 264-8148 Fax: N/A

Contacts: Mr. Jim Clough, President

CAD Software Sold: Aries, CADAM

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**THE FUTURE NOW**

814 S. Rangeline Road, Carmel, IN 46032

Phone: 317 846-5996 Fax: 317-844-4128

Contacts: Mr. Paul Jensen, Sales Representative

CAD Software Sold: AutoCAD

Computers Sold: Compaq, HP, IBM

CAD Revenue: Less than \$1 Million

**THE HIGH TECHNOLOGY STORE, USA**

1618 17th St. NW, Washington, DC 20009

Phone: 202 223-8211 Fax: 202-457-0168

Contacts: Mr. Douglas Lang, President

CAD Software Sold: AutoCAD, Generic CADD, Mega CAD, Versacad, DATA CAD

Computers Sold: Compaq, IBM, Everex, ALR

CAD Revenue: Less than \$1 Million

**THE MICROCOMPUTER CENTER INC.**

7668 Belair Road, Baltimore, MD 21236

Phone: 301 668-2600 Fax: N/A

Contacts: Mr. Jack D. Snell, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**THE SOFTWARE FIRM**

4341 Southwestedge, Suite 1101, Kalamazoo, MI 49008  
Phone: 616 381-4527 Fax: N/A  
Contacts: Mr. Frank Lucatelli, President  
CAD Software Sold: N/A  
Computers Sold: Everex, Michada  
CAD Revenue: \$1 to \$3 Million

**THE SOFTWARE GUILD**

3821 South Bristol, Santa Ana, CA 92704  
Phone: 714 641-0332 Fax: N/A  
Contacts: N/A  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**THRESHOLD TECHNOLOGY, INC.**

2860 E. Jackson Ave., Suite C, Anaheim, CA 92806  
Phone: 714-632-8777 Fax: N/A  
Contacts: Mr. Charles Fritsch, President; Mr. Doc Livingston, V.P. Marketing  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**TIME COMPUTER DISTRIBUTION**

4402 S. 800 E., Zionsville, IN 46077  
Phone: 317 769-6183 Fax: N/A  
Contacts: Mr. Bob Lueck, President, Owner  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**TINGEN TECHNICAL SALES**

304 A West Millbrook Road, Raleigh, NC 27609  
Phone: 919 870-6678 Fax: N/A  
Contacts: Ms. Judy Tingen, Office Manager  
CAD Software Sold: Orcad  
Computers Sold: N/A  
CAD Revenue: Less than \$1 Million

**TKF SYSTEMS**

5478 Harpers Farm Road, Suite A3, Columbia, MD 21044  
Phone: 301 730-3542 Fax: N/A  
Contacts: Mr. Ted Fryberger, President  
CAD Software Sold: Electronic Shape Library, Algor supersap package  
Computers Sold: DOS Clone  
CAD Revenue: N/A

**TODAYS COMPUTERS BUSINESS CENTER**

5530 O Street, Lincoln, NE 68510  
Phone: 402 466-8191 Fax: N/A  
Contacts: Mr. Elden Ehrlich, Sales Manager  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**TOTAL SUPPORT COMPUTER SYSTEMS**

3804 W. Alva Street, P.O. Box 15395, Tampa, FL 33614  
Phone: 813 876-5990 Fax: N/A  
Contacts: Mr. Gib Gerard, President  
CAD Software Sold: AutoCAD, A/E Microsystems, Civilsoft  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**TOTAL SYSTEMS INTEGRATION**

99 West 10th Ave., The Atrium Bldg., Suite 333, Eugene, OR 97403  
Phone: 503-345-7395 Fax: 503-343-6293  
Contacts: Mr. David Shipway, President; Mr. Joe Canale, V.P. Marketing/Sales  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: N/A

**TUSAR CORPORATION**

6016 E. Larkspur, Scottsdale, AZ 85254  
Phone: 602 998-3688 Fax: N/A  
Contacts: N/A  
CAD Software Sold: Orcad  
Computers Sold: N/A  
CAD Revenue: N/A

**VALCOM COMPUTER CENTER**

302 S 16 Street, Omaha, NE 68102  
Phone: 402 721-1102 Fax: N/A  
Contacts: Mr. Glenn Smith, CAD Specialist  
CAD Software Sold: Autodesk  
Computers Sold: N/A  
CAD Revenue: N/A

**VEGRZYN SARVER ASSOCIATES**

218 W. Laffayette Street, Ottawa, IL 61350  
Phone: 815 434-7225 Fax: N/A  
Contacts: Mr. Gene Sarver, Vice President  
CAD Software Sold: Civilsoft  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**VIRGINIA PANEL COMPANY**

1400 New Hope Road, Waynesboro, VA 22980

Phone: 703 949-8376 Fax: N/A

Contacts: Mr. Walter Hageman, Director of CAD/CAM Manufacturing

CAD Software Sold: Anvil, Computervision, Intergraph, Proengineer, Smartcam

Computers Sold: Compaq, IBM, Sun, DOS Clone, Everex, Intel

CAD Revenue: \$1 to \$3 Million

**W. C. KOEPF ASSOCIATES**

68 Olive Street, Chagrin Falls, OH 44022

Phone: 216 247-5129 Fax: N/A

Contacts: Mr. William Koepf

CAD Software Sold: Computervision

Computers Sold: N/A

CAD Revenue: N/A

**WALDEN SOFTWARE**

201 High Ridge Road, Stamford, CT 06904

Phone: 203 356-7834 Fax: 203 352-2398

Contacts: Tom Burich; Ed Thomas

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A

**WAREFORCE**

15705 Condon Ave. #D-3, Lawndale, CA 90260

Phone: 213 643-8170 Fax: N/A

Contacts: Ms. Kallie Starman, President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: N/A

**WASHINGTON COMPUTER SERVICES**

155 Avenue of the Americas, New York, NY 10013

Phone: 212 741-2320 Fax: 212-206-6759

Contacts: Mr. Jeffrey Goldberg, President

CAD Software Sold: Autodesk

Computers Sold: N/A

CAD Revenue: \$1 to \$3 Million

**WESTERN DATAGRAPHICS CORP.**

6 Faraday, Irvine, CA 92718

Phone: 714 768-3345 Fax: N/A

Contacts: Mr. Steven Jester, President

CAD Software Sold: N/A

Computers Sold: N/A

CAD Revenue: N/A



**WESTWOOD COMPUTERS**

155 Route 22 East, Springfield, NJ 07081  
Phone: 201 376-4242 Fax: N/A  
Contacts: Mr. Louis Tischler, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**WOLF COMPUTER**

105 N. Santa Cruz Avenue, Los Gatos, CA 95030  
Phone: 408 354-1210 Fax: N/A  
Contacts: Mr. Donald A. Wolf, President  
CAD Software Sold: AutoCAD, Versacad, Power Draw, ME10  
Computers Sold: HP, Mac, Tandem  
CAD Revenue: \$1 to \$3 Million

**WORDLINK, INC.**

24 East Green Street, Champaign, IL 61820  
Phone: 217 359-9378 Fax: N/A  
Contacts: Mr. Dennis Graham, President  
CAD Software Sold: N/A  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

**XCEL COMPUTER SYSTEMS**

1540 West 6th Street, Mishawaka, IN 46544  
Phone: 219 255-9608 Fax: N/A  
Contacts: Mr. John A. Brickley, Jr., President  
CAD Software Sold: Autodesk, Cimline  
Computers Sold: N/A  
CAD Revenue: \$1 to \$3 Million

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## Personal CAD Reseller Directory

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### **17 SOFTWARE STREET INC.**

d/b/a Computer Emporium, 453 Route 211, E., Middletown, NY 10940. Phone: 914-343-4880  
CONTACTS: Ms. Sally Shepherd

### **4-D GRAPHICS, INC.**

Revenue: \$1 to \$3 Million

1800 NE 44th #210, Renton, WA 980561695. Phone: 206-235-8181  
CONTACTS: Mr. Steven Ford, President; Mr. Norman Case, Vice President, R&D

### **A.C.E. CONSULTING FIRM**

Revenue: Less than \$1 Million

3400 W. 6th St., Suite 405A, Los Angeles, CA 90020. Phone: 213-383-2425  
CONTACTS: Mr. Mohammad Nour, President; Mrs. Oresa Cuthbertson, Vice President  
CAD Software sold: American Small Business, Autodesk, Foresight Resources

### **A.I. SYSTEMS**

Revenue: \$1 to \$3 Million

2450 East 7000 South, Salt Lake City, UT 84121. Phone: 801-942-8949  
CONTACTS: Mr. Ken Coburn, Executive Vice President; Mr. Steve Peterson, President  
CAD Software sold: Autodesk, Sigma Design

### **A.S. THOMAS, INC.**

Revenue: \$1 to \$3 Million

355 Providence Highway, Westwood, MA 02090. Phone: 617-329-9200  
CONTACTS: Mr. E.M. Thomas, President; Mr. A.S. Thomas, Vice President

### **A.S.J. SUPPORT SERVICES**

Revenue: \$1 to \$3 Million

3950 Dow Road, Melbourne, FL 32935. Phone: 305-242-2002  
CONTACTS: Mr. Dan A. Smith, Vice President; Mr. J.W. Banko, President

### **A/E MANAGEMENT SERVICES**

Revenue: Less than \$1 Million

4439 Natier Road, Plymouth, MI 48170. Phone: 313-455-0180  
CONTACTS: Ms. Nancy Watson, President

### **A/E MICRO SYSTEMS**

650 Northland Blvd., Suite 3C, Cincinnati, OH 45240. Phone: 513-825-8893  
CONTACTS: Mr. Mark Fettingler  
CAD Software sold: Autodesk

**A/K COMPUTERS** Revenue: Less than \$1 Million  
738 Cumberland St., Lebanon, PA 17042. Phone: 717-274-5005  
CONTACTS: Mr. Don Auker; Mr. Paul Yutzy

**AADEX** Revenue: Less than \$1 Million  
10051 Pasadena Avenue, Cupertino, CA 95014. Phone: 408-446-913

CAD Software sold: Point Line

**AARON MARCUS & ASSOCIATES**  
1196 Euclid Avenue, Berkeley, CA 94708. Phone: 415-527-6224  
CONTACTS: Mr. Aaron Marcus, CEO

**ABACUS**  
225 East 6th Street, Cincinnati, OH 43623. Phone: 513-421-5900  
CONTACTS: Ms. Debbie McKinney

**ABACUS COMPUTER STORE**  
8129 Mall Road, Florence, KY 41042. Phone: 606-282-2775  
CONTACTS: Mr. Dave Hurt

**ABACUS II COMPUTERS**  
2010 Miamisburg-Centerville Road, Dayton, OH 45459. Phone: 513-439-1331  
CONTACTS: Mr. Joseph Fischer

**ABCOR INC.**  
P.O. Box 890247, Houston, TX 77289. Phone: 713-486-9251  
CONTACTS: Mr. Gerald Bourque, Sales Representative  
CAD Software sold: Orcad

**ACCESS GRAPHICS TECHNOLOGY, INC.** Revenue: \$5+ Million  
41A Gordon Road, Piscataway, NJ 08854. Phone: 201-985-2200  
CONTACTS: Mr. Eric Korb, Vice President, Marketing  
CAD Software sold: Autodesk

**ACCUDATA INC.** Revenue: Less than \$1 Million  
9701 Penn Avenue S., Suite 108, Minneapolis, MN 55431. Phone: 612-881-0623  
CONTACTS: Mr. B. D. Carlson, Vice President; Mr. Thomas G. Carlson, President

**ADAPTIVE MICRO-WARE, INC.** Revenue: Less than \$1 Million  
5020 Executive Blvd., Fort Wayne, IN 46808. Phone: 219-483-8451  
CONTACTS: Mr. Timothy Digert, Vice President; Mr. Robert Kniskern, President

**ADC COMPUTER SERVICES, INC.** Revenue: \$1 to \$3 Million  
2101 Burlington, North Kansas City, MO 64116. Phone: 816-221-1100  
CONTACTS: Mr. Mike Jennings, Autocad Sales Manager; Mr. Jim Claypool, Vice President  
CAD Software sold: Autodesk, Sigma Design

**ADVANCE COMPUTER SYSTEMS**  
665 Grape Avenue, Sunnyvale, CA. Phone: 408-732-6200

**ADVANCED COMPUTER PRODUCTS INC.** Revenue: Less than \$1 Million  
1310 "B" E. Edinger Avenue, Santa Ana, CA 92705. Phone: 714-558-8813  
CONTACTS: Mr. David Freeman

**ADVANCED DIGITAL GROUP** Revenue: Less than \$1 Million  
12062 Valley View Street, Suite 111, Garden Grove, CA 92645. Phone: 714-897-0319  
CONTACTS: Mr. Dennis Jeffers, President  
CAD Software sold: Foresight Resources, Orcad

**ADVANCED INFORMATION SYSTEMS, INC.** Revenue: Less than \$1 Million  
4665 44th Street S.E., Airport Technical Center, Grand Rapids, MI 49508. Phone: 616-957-7900  
CONTACTS: Mr. David Potyraj, Vice President; Mr. John A. Osterhart, President  
CAD Software sold: Autodesk, Time Arts

**ADVANCED INSTRUMENTS** Revenue: Less than \$1 Million  
1609 N. 250 E., Greenfield, IN 46140. Phone: 317-353-3859  
CONTACTS: Mr. Norman N. Phelps, President

**ADVANCED MICRO CONSULTANTS, INC.**

2107 N. First Street, Suite 480, San Jose, CA 95131. Phone: 408-436-7711

CONTACTS: Mr. Douglas Herfurth, CEO

CAD Software sold: Cadvance, Anvil, P-CAD, SmartCAM

**ADVANCED SYSTEMS, INC.**

Revenue: Less than \$1 Million

14021 Old Hanover Road, Reisterstown, MD 21136. Phone: 301-252-1959

CONTACTS: Mr. Ron McCarty, President

**ADVANCED TECHNOLOGY DEVELOPMENT CO.**

Revenue: Less than \$1 Million

22702 Crosshill Avenue, Torrance, CA 90505. Phone: 213-316-6862

CONTACTS: Mr. Dave Head, Co-Owner; Mr. Bob Washington, Co-Owner

CAD Software sold: Autodesk, MacNeal-Schwendler

**ADVANCED TECHNOLOGY DISTRIBUTION**

Revenue: Less than \$1 Million

524 Busse Highway, Suite D, Park Ridge, IL 60068. Phone: 312-692-7325

CONTACTS: Mr. Tom Math

CAD Software sold: Autodesk, American Small Bus Cmptr

**ADVANCED TECHNOLOGY INC.**

Revenue: Less than \$1 Million

2708 Phillips Drive, Jonesboro, AR 72401. Phone: 501-932-8511

CONTACTS: Mr. Troy Phillips, President; Mr. J. C. Nix, Vice President, Marketing

CAD Software sold: Autodesk, Cadkey, Computervision, Versacad

**ALDEN COMPUTER SYSTEMS CORP.**

Revenue: Less than \$1 Million

1 Salem Green, Suite 420, Salem, MA 01970. Phone: 617-744-1314

CONTACTS: Mr. Robert Whitten, President

**ALL-CAD**

Revenue: Less than \$1 Million

6201 Copper NE, Albuquerque, NM. Phone: 505-265-7893

CONTACTS: Mr. John Cleveland, President

**ALPHA COMPUTERS INC.**

Revenue: Less than \$1 Million

4103 S.W. Mercantile Drive, Lake Oswego, OR 97035. Phone: 503-638-7208

CONTACTS: Mr. Thomas Chow, President

CAD Software sold: Versacad

**ALTEK CORP.** Revenue: \$3 to \$5 Million  
12210 Plum Orchard Drive, Silver Spring, MD 209047802. Phone: 301-572-2555  
CONTACTS: Mr. Al Cameron, President; Mr. Walter J. Doran, Director of Sales & Marketing

**AMCAD**  
1355 Whitlock #314, Carrollton, TX 75006. Phone: 214-323-0700

**AMERICAN BUSINESS EQUIPMENT, INC.** Revenue: Less than \$1 Million  
308 N. Hoover Avenue, New Holland, PA 17557. Phone: 717-354-4441  
CONTACTS: Mr. Richard B. Edmonds, President  
CAD Software sold: Autodesk

**AMERICAN INTELLIWARE CORP.** Revenue: Less than \$1 Million  
P.O. Box 6980, Torrance, CA 90504. Phone: 213-533-4040  
CONTACTS: Mr. Gene Joseph, CEO

**ANTECH, INC.** Revenue: Less than \$1 Million  
788 Myrtle Street, Roswell, GA 30075. Phone: 404-993-7270  
CONTACTS: Mr. Ashok K. Nagrani, President  
CAD Software sold: Autodesk

**APPA BUSINESS COMPUTERS** Revenue: \$3 to \$5 Million  
5864 Interface Drive, Ann Arbor, MI 48103. Phone: 313-769-2727  
CONTACTS: Mr. Arno Poerner, President  
CAD Software sold: Autodesk, Intergraph

**APPLIED CAD TECHNOLOGY**  
333 Kearny Street, Suite 700, San Francisco, CA 94108. Phone: 415-398-1121  
CONTACTS: Mr. Ed Levine

**APPLIED SOFTWARE TECHNOLOGY, INC.** Revenue: \$1 to \$3 Million  
1908 Cliff Valley Way N.E., Atlanta, GA 30329. Phone: 404-633-8660  
CONTACTS: Mr. Richard Burroughs, President; Mr. Raymond Metzger, Vice President  
CAD Software sold: Autodesk, Sigma Design

**APPLIED TECHNICAL SUPPORT, INC.** Revenue: \$3 to \$5 Million  
11740 E. 21st, Tulsa, OK 74129. Phone: 918-438-5311  
CONTACTS: Mr. Ted Schaffer, President; Ms. Charlotte Hoog  
CAD Software sold: Autodesk, Micro Control Systems, Personal CAD Systems, Versacad

**APPLIED TECHNOLOGY ADVANCES** Revenue: Less than \$1 Million  
Div. of Belcan Corp., 10200 Anderson Way, Cincinnati, OH 45242. Phone: 513-984-7272  
CONTACTS: Mr. Ian Clough, Applications Specialist  
CAD Software sold: Autodesk, CADAM, Computervision

**AQUARIAN AGE COMPUTER CENTER**  
301 Balboa Street, San Francisco, CA 94118. Phone: 415-386-3980  
CONTACTS: Mr. Richard Teich

**ARDEN SYSTEMS, INC.** Revenue: Less than \$1 Million  
12335 Santa Monica Blvd., Los Angeles, CA 90025. Phone: 213-479-6707  
  
CAD Software sold: Autodesk

**ARROW PRODUCTS, INC.**  
714 8th Avenue South, P.O. Box 25010, Nashville, TN 37219. Phone: 615-254-5550  
CONTACTS: Mr. Michael Pittenger  
CAD Software sold: Autodesk

**ASSOCIATED MARKET RESEARCH** Revenue: Less than \$1 Million  
3755 Capital of Texas Highway S., Suite 380, Austin, TX 78704. Phone: 512-445-6482  
CONTACTS: Mr. George Head, President  
CAD Software sold: Autodesk

**ATKINSON INDUSTRIES, INC.** Revenue: Less than \$1 Million  
100 Lincoln Avenue, Orwigsburg, PA 17961. Phone: 717-366-2114  
CONTACTS: Mr. Tom Atkinson, Vice President; Mr. Gary R. Atkinson, President

**AUTOMATE COMPUTER SOFTWARE** Revenue: Less than \$1 Million  
7475 Callaghan Road, Suite 201, San Antonio, TX 78229. Phone: 512-377-0461  
CONTACTS: Mr. Sadashiv B. Pai, President

**AUTOMATED DATA SERVICES INC.** Revenue: Less than \$1 Million  
190 Jennie Jewel Drive, Orlando, FL 32806. Phone: 305-859-2029  
CONTACTS: Mr. Pete Girard, Vice President; Mr. Jerry Girard, President

**AUTOMATED DRAFTING SYSTEMS** Revenue:  
207 W. Alameda Avenue #101, Burbank, CA 91502. Phone: 818-848-3600  
CONTACTS: Mr. Kevin Large  
CAD Software sold: Autodesk, MCS, Sigma Design

**AUTOMATED INFORMATION MANAGEMENT** Revenue: \$1 to \$3 Million  
1680 N. West Belt, Houston, TX 77043. Phone: 713-984-1430  
CONTACTS: Mr. Terry Edgerton, President; Mr. John Edgerton, Vice President  
CAD Software sold: Autodesk

**AUTOMATED SYSTEMS DESIGN GROUP, INC**  
2001 Omega Road, Suite 203, San Ramon, CA 94583. Phone: 800-344-3140  
CONTACTS: Mr. Raymond Howard, Vice President  
CAD Software sold: AutoCAD, VersaCAD, nc:CAM

**AUTOMATION GROUP, INC.** Revenue: Less than \$1 Million  
9501 W. Devon, Suite 203, Rosemont, IL 60018. Phone: 312-823-0555  
CONTACTS: Mr. Jerry Robertson, CEO

**AUTOMATION INTEGRATORS** Revenue: Less than \$1 Million  
30100 Telegraph Road, Suite 478, Birmingham, MI 48010. Phone: 313-644-8870  
CONTACTS: Mr. Timothy O'Connor, President  
CAD Software sold: Autodesk, Computervision

**AUTOMATION INTELLIGENCE INC.** Revenue: \$1 to \$3 Million  
1200 West Colonial Drive, Orlando, FL 328047194. Phone: 407-843-7030  
CONTACTS: Mr. Theodore F. Fluchrad, President; Mr. Thomas J. Weber, Vice President, Marketing

**AUTOMATION INTERNATIONAL** Revenue: \$1 to \$3 Million  
2081 Hutton Drive, Suite 311, Carrollton, TX 75006. Phone: 214-247-8816  
CONTACTS: Mr. Palmer Keith, Vice President, Operations; Ms. Indira Singla, Vice President, Marketing  
CAD Software sold: Autodesk, Personal CAD Systems



**AUTOMATION RESOURCES CORP.** Revenue: Less than \$1 Million  
1519 N. Dale Marby, Suite 105, Lutz, FL 33549. Phone: 813-949-9334  
CONTACTS: Mr. Gaylord V. Wingate III, President  
CAD Software sold: Autodesk, Amer. Small Business Cmpt

**AVCOM** Revenue: Less than \$1 Million  
437 Emerson Avenue, Palo Alto, CA 94301. Phone: 415-326-8686  
CONTACTS: Mr. Brad Bishop  
CAD Software sold: Autodesk

**AXIS, INC.** Revenue: Less than \$1 Million  
7825 Engineer Road, Suite 208, San Diego, CA 92111. Phone: 619-560-7737  
CONTACTS: Mr. Bruce Lightner, Vice President; Mr. Mark Prager, President

**BAHR TECHNOLOGIES, INC.** Revenue: Less than \$1 Million  
1842 Hoffman Street, Madison, WI 53704. Phone: 608-244-0500  
CONTACTS: Mr. Dennis E. Bahr, President

**BARLETT ASSOCIATES** Revenue: \$3 to \$5 Million  
3 West Main Street, Elmsford, NY 10523. Phone: 215-666-7100  
CONTACTS: Mr. Wayne Breisch, Vice President; Mr. Joseph A. Messemer, President

**BARNETT BUSINESS PRODUCTS, INC.** Revenue: Less than \$1 Million  
7600 Jericho Turnpike, Woodbury, NY 11797. Phone: 516-921-0273  
CAD Software sold: Autodesk

**BASIC COMPUTER CORPORATION** Revenue: \$1 to \$3 Million  
2919 W. Market, Akron, OH 44313. Phone: 216-836-3100  
CONTACTS: Mr. Frank Kovacs, General Manager CAD Systems; Mr. Carl Dabaho, Systems Support Engineer  
CAD Software sold: Autodesk, Intergraph, Versacad

**BECHTEL COMPUTER COMPANY** Revenue: Less than \$1 Million  
474 Niagra Falls Blvd., Buffalo, NY 14223. Phone: 716-833-6815  
CONTACTS: Mr. Harry Styliades, President  
CAD Software sold: Generic Cad, Fujitsu, Personal CAD, VersaCAD

**BETA LAMBDA INC.**

449 Highway #33, RD 2, Manalapan, NJ 07726. Phone: 201-446-1100

CONTACTS: Mr. Erine Liu, President

CAD Software sold: Orcad

**BFA SALES**

Revenue: \$3 to \$5 Million

1704 Moon NE, Albuquerque, NM 87112. Phone: 505-292-1212

CONTACTS: Mr. Steven P. Kadner, Vice President, Marketing; Mr. Jerome Beckes, President

CAD Software sold: General Parametrics

**BIRMINGHAM COMPUTER CONSULTING**

Revenue: Less than \$1 Million

1700 Vanderbilt Road, Birmingham, AL 35234. Phone: 205-956-4111

CONTACTS: Mr. Dan Sapp, President

CAD Software sold: Autodesk

**BLUE CHIP COMPUTER SYSTEM**

Revenue: Less than \$1 Million

9701 West Pico Blvd., Los Angeles, CA 90035. Phone: 213-553-3393

CONTACTS: Mr. Ronald C. Herman, President

CAD Software sold: Autodesk, CADAM, Versacad

**BOLDER DESIGNS**

Revenue: Less than \$1 Million

2350 Armory Street, Philadelphia, PA 19103. Phone: 215-988-9622

CONTACTS: Mr. John Rutkowski, Partner

CAD Software sold: Autodesk

**BOSTON CADD**

Revenue: \$1 to \$3 Million

Schrafft Center, 529 Main Street, Boston, MA 02129. Phone: 617-242-5202

CONTACTS: Mr. Tom Sinopoli, President; Mr. Tony Giannetto, Vice President, Rsh & Engineering

CAD Software sold: Autodesk, CADAM

**BROMLEY ENGINEERING, INC.**

Revenue: Less than \$1 Million

883 A Cambridge Street, Cambridge, MA 02141. Phone: 617-661-3144

CONTACTS: Ms. Maria Bromley, Vice President; Mr. Peter Bromley, President

**BUFFALO OFFICE SYSTEMS, INC.**

Revenue: Less than \$1 Million

1317 Harlem Road, Cheektowaga, NY 14206. Phone: 716-892-2204

CONTACTS: Mr. Ron Prazmark, President

**BUSINESS MANAGEMENT SYSTEMS**

Revenue: Less than \$1 Million

9526-A Lee Highway, Fairfax, VA 22031. Phone: 703-591-0911

CONTACTS: Mr. Doug Burne, Director, Marketing; Mr. Dennis Makurat, Partner

**BYTE AND WORD SYSTEMS, INC.**

Revenue: Less than \$1 Million

116 Haddon Avenue, Haddonfield, NJ 08033. Phone: 609-795-4315

CONTACTS: Mr. Dennis Davis, General Manager; Mr. Francis Davis, President

**C & D TECHNOLOGY, INC.**

378 S.W. 12th Avenue, Deerfield Beach, FL 33442. Phone: 305-428-8333

CONTACTS: Mr. Thomas Kennedy, CEO

**C & Z SYSTEMS**

Revenue: Less than \$1 Million

2907 Lakeshore Drive #101, Waco, TX 76708. Phone: 817-752-6445

CONTACTS: Ms. Gloria Borden

CAD Software sold: Autodesk

**C GRAPHICS**

13655A Yale, Aurora, CO 80014. Phone: 303-337-7974

CONTACTS: Ms. Cynthia Rudy, CEO

**C.C.S. SYSTEMS**

1 Penn Square West, Suite 600, Philadelphia, PA 19102. Phone: 215-981-1410

CONTACTS: Mr. Michael Duffy

CAD Software sold: Autodesk

**C.S.C. ADVANCED BUSINESS SYSTEMS**

158 W. 29th Street, New York, NY 10001. Phone: 212-714-0850

CONTACTS: Mr. Paul Regensburg

CAD Software sold: Autodesk

**C.S.D., INC.**

12 Willard Grant, Sudbury, MA 01776. Phone: 617-443-2750

CONTACTS: Mr. G. U. Drake, CEO

**CABER SYSTEMS INC.**

5150 N. Federal Highway, Ft. Lauderdale, FL 33308. Phone: 305-491-8600  
CONTACTS: Ms. Paula Grande

**CAD COUNSEL**

Revenue: Less than \$1 Million

5032 Lankershim Blvd., Suite 4, North Hollywood, CA 91601. Phone: 818-505-0952  
CONTACTS: Mr. Ed Labadie, Vice President, Marketing; Ms. Marsha C. Robison, President  
CAD Software sold: Autodesk

**CAD CRAFT**

Revenue: Less than \$1 Million

323 Boston Post Road, Old Saybrook, CT 06475. Phone: 203-388-6657  
CONTACTS: Mr. Chris Wick, President; Mr. Jonathan Solomon, Vice President  
CAD Software sold: Autodesk

**CAD DESIGN SYSTEMS INC.**

1305 Remington Road, Suite D, Schaumburg, IL 60173. Phone: 312-882-0114

CAD Software sold: Orcad

**CAD DEVELOPMENT-DATA DEVELOPMENT**

1718 South Orange Avenue, Orlando, FL 32806. Phone: 305-648-9147  
CONTACTS: Mr. Tom Wilkins  
CAD Software sold: Autodesk

**CAD DISTRIBUTORS**

1414 Pearl Street, Boulder, CO 80302. Phone: 303-938-9333  
CONTACTS: Mr. David Harrington

**CAD PRODUCTIVITY, INC.**

Revenue: \$1 to \$3 Million

5103 LBJ, Suite 250, Dallas, TX 75234. Phone: 214-241-8088  
CONTACTS: Mr. Greg Steinbrenner, President  
CAD Software sold: Autodesk, Computervision, Personal Cad Systems, PADS, Cornerstone

**CAD SOLUTIONS INC.**

Revenue: \$3 to \$5 Million

2841 Junction Avenue, Suite 200, San Jose, CA 95134. Phone: 408-943-1610  
CONTACTS: Mr. Stephen Steele, Chairman; Mr. Richard Nedbal, President  
CAD Software sold: Autodesk, Cadkey, Cimlinc, Personal CAD Systems, Versacad

**CAD SOUTHWEST** Revenue: Less than \$1 Million  
2747 W. Southern #3, Tempe, AZ 85282. Phone: 602-438-9060  
CONTACTS: Mr. Randall Mertz, Vice President, Marketing; Mr. Dominic Pistillo, President  
CAD Software sold: Autodesk, Sigma Design

**CAD SYSTEMS DIV/CAVALIER PRODUCTS** Revenue: \$1 to \$3 Million  
8230 Bay Centers Road, Jacksonville, FL 32256. Phone: 904-739-0099  
CONTACTS: Mr. Cy Marshall, Manager  
CAD Software sold: Autodesk

**CAD SYSTEMS UNLIMITED, INC.** Revenue: Less than \$1 Million  
Techmart Suite 443, 5201 Great America, Santa Clara, CA 95050. Phone: 408-562-5762  
CONTACTS: Mr. Robert Pantangco, President; Mr. Froi Lomotan, R&D Manager  
CAD Software sold: Autodesk

**CAD TECHNOLOGIES** Revenue: Less than \$1 Million  
5225 Old Orchard Road, Suite 4, Skokie, IL 60077. Phone: 312-967-8900  
CONTACTS: Mr. Alan Fabrycky, President  
CAD Software sold: Sigma Design

**CAD TRAIN, INC.** Revenue: Less than \$1 Million  
2377 Crenshaw Blvd., Suite 165, Torrance, CA 90501. Phone: 213-212-6701  
CONTACTS: Mr. Eric Schmidt, CEO

**CAD, INC.**  
40 Foot Road @ Sumneytown Pike, Bos 340 Lamplighter Plaza, Kulpville, PA 19443. Phone: 215-362-1888  
CONTACTS: Mr. Bill Thompson, Manager  
CAD Software sold: Sigma Design

**CAD/CAM INC.** Revenue: \$1 to \$3 Million  
2844 E. River Road, Dayton, OH 45439. Phone: 513-293-3381  
CONTACTS: Mr. Jeff McKinney; Mr. Mike Carrabind  
CAD Software sold: Aries, Autodesk, CADAM

**CAD/CAM TECHNOLOGIES, INC.** Revenue: \$3 to \$5 Million  
504 Totten Pond Road, Walt/OFC/CTR, Waltham, MA 02154. Phone: 617-895-1500  
CONTACTS: Mr. Paul Carney, Vice President; Mr. James Carney, President  
CAD Software sold: Autodesk, Computervision, Intergraph, Parametrics

**CAD/PRO**

4386 S. Federal, Englewood, CO 80110. Phone: 303-794-6751

CONTACTS: Mr. Roger Boethin

CAD Software sold: Autodesk

**CADALYST RESOURCES**

601 Locust Street, 10th Floor, Des Moines, IA 50309. Phone: 515-245-3733

CONTACTS: Mr. Joe Stevens, Vice President; Mr. Jack Linge, President

**CADD BY REON**

Revenue: \$3 to \$5 Million

2003 Cypress Creek, Suite 102A, Ft. Lauderdale, FL 33309. Phone: 305-772-7300

CONTACTS: Ms. Doreen Zammit, Administrator; Mr. Ruben Neiman, President

CAD Software sold: Autodesk, Intergraph, Versacad

**CADD CENTRE**

P.O. Box 4543, Lynchburg, VA 24502. Phone: 804-239-8193

CONTACTS: Mr. Jack L. Thompson, CEO

**CADD PRODUCTIVITY CENTER**

Revenue: Less than \$1 Million

9 Firestone Court, Madison, WI 53717. Phone: 608-831-2517

CONTACTS: Mr. Gregg Plummer, Partner; Mr. Dan Hughes, Partner

CAD Software sold: Autodesk

**CADD SYSTEMS INTERNATIONAL**

Pier 9, San Francisco, CA 94111. Phone: 415-433-7023

CONTACTS: Mr. Bob Moe

**CADD SYSTEMS INTERNATIONAL CORP.**

Pier 9, San Francisco, CA 94111. Phone: 415-433-7023

CONTACTS: Mr. Robert Moe, President

CAD Software sold: Computervision, Sigma Design

**CADD CENTERS, INC.**

Revenue: Less than \$1 Million

6330 East 75th Street, Suite 146, Indianapolis, IN 46250. Phone: 317-849-9808

CONTACTS: Mr. Charles E. Hull, President

CAD Software sold: Autodesk

**CADDTECH PRODUCTIVITY CENTER, INC.** Revenue: \$1 to \$3 Million  
4713 Crossroads Park, Liverpool, NY 13088. Phone: 315-453-7116  
CONTACTS: Mr. Atul Agrawal, Vice President, Marketing; Mr. Jagdish S. Agrawal, President  
CAD Software sold: Autodesk, Automatrix, CADAM, Cadkey

**CADSULTANTS** Revenue: Less than \$1 Million  
10733 Sunset Office Drive 259, St. Louis, MO 63127. Phone: 314-965-1600  
CONTACTS: Mr. Don Spiegel, President  
CAD Software sold: Autodesk, Cadkey, Versacad

**CADSYS, INC.** Revenue: \$3 to \$5 Million  
150 N. Sunnyslope Road, Suite 305, Milwaukee, WI 53005. Phone: 414-785-9495  
CONTACTS: Ms. Denise Chenevert, Vice President; Mr. Jerry Miller, President  
CAD Software sold: Autodesk, Computervision, Synthesis

**CADTEL SYSTEMS, INC.** Revenue: Less than \$1 Million  
8126 North 23rd Avenue, Suite A, Phoenix, AZ 85021. Phone: 602-995-4624  
CONTACTS: Mr. Will McLain, President

**CBM COMPUTER CENTER**  
7330 B George Washington, Memorial Highway, Grafton, VA 23692. Phone: 804-898-3667  
CONTACTS: Mr. Steve Wilson

**CEMAX, INC.**  
1705 Wyatt Avenue, Santa Clara, CA 95054. Phone: 408-970-8411  
CONTACTS: Mr. Bart Colucci, Vice President, Marketing/Sales

**CERRITOS COMPUTER SERVICES, INC.** Revenue: Less than \$1 Million  
4320 Atlantic Avenue, Suite 1, Long Beach, CA 90807. Phone: 213-595-8607  
CONTACTS: Mr. Michael R. Murphy, Vice President, Sales; Mr. Joseph P. Cogan, Jr., President

**CHARETTE CORP.**  
31 Olympia Avenue, Woburn, MA 01888. Phone: 617-935-6000  
CONTACTS: Mr. Jim Downey

**CHARIOT COMPUTERS** Revenue: Less than \$1 Million  
739 South Main Street, Greensburg, PA 15601. Phone: 412-838-9560  
CONTACTS: Mr. Dan Pultz, President; Mr. Bruce Meyer, Manager, Sales

**CHARLES HILL & ASSOCIATES** Revenue: \$1 to \$3 Million  
/dba CADDcenters, 6330 E. 75th Street, Suite 146, Indianapolis, IN 46250. Phone: 317-849-9808  
CONTACTS: Mr. Charles Hill, President  
CAD Software sold: Autodesk

**CHARRETTE CORP.** Revenue: \$1 to \$3 Million  
95 Mount Auburn Street, Cambridge, MA 02138. Phone: 617-495-0270  
CONTACTS: Ms. Susan Stewart, Product Administrator  
CAD Software sold: Autodesk, Microtecture, Skok

**CHEMPRO DATA SCIENCES CORP.** Revenue: Less than \$1 Million  
507 Southampton Road, Westfield, MA 01085. Phone: 413-562-2353  
CONTACTS: Mr. Robert St. Martin, Vice President; Mr. Norman St. Martin, President

**CIVIL COMPUTING CORP.** Revenue: Less than \$1 Million  
3062 East Avenue, Livermore, CA 94550. Phone: 415-455-8086  
CONTACTS: Mr. Russ Greenlaw, President

**CIVILSOFT** Revenue: \$1 to \$3 Million  
1592 N. Batavia Street, Suite 1A, Orange, CA 92667. Phone: 714-974-1864  
CONTACTS: Mr. Tracy Lenocker, President; Mrs. Katie Hill, Vice President  
CAD Software sold: Civilsoft

**CK MICHAELS ASSOCIATES** Revenue: Less than \$1 Million  
340 N. Main Street, Suite 204, Plymouth, MI 48170. Phone: 313-453-0009  
CONTACTS: Mr. Dan Barta, President  
CAD Software sold: Autodesk, MacNeal-Schwendler, VersaCAD

**CLEVENGER CORP.** Revenue: \$3 to \$5 Million  
5672 Peachtree Parkway, Norcross, GA 30092. Phone: 404-446-0210  
CONTACTS: Mr. Tom Beicher, Vice President, Marketing & Sales; Mr. Robert Clevenger, President



**COMPU-TRON** Revenue: Less than \$1 Million  
901 Nottingham Road, Jamesville, NY 13078. Phone: 315-445-2421  
CONTACTS: Ms. Cherie Shea, Vice President; Mr. James Shea, President

**COMPUDRAW**  
P.O. Box 629, Terry, MS 39170. Phone: 601-957-5230  
CONTACTS: Mr. Ron Graves, Owner  
CAD Software sold: Calcomp

**COMPUNIQUES, INC.** Revenue: Less than \$1 Million  
13046 Richmond Avenue, Suite 100, Houston, TX 77082. Phone: 713-530-3107  
CONTACTS: Mr. H. R. McCarter, III, Owner  
CAD Software sold: Autodesk

**COMPUTER AIDED DESIGN, INC.** Revenue: Less than \$1 Million  
6601 Shingle Creek Parkway, Suite 300, Minneapolis, MN 55430. Phone: 612-566-0799  
CONTACTS: Ms. Connie Anderson, Vice President, Sales; Mr. Edgar Jay Anderson, President  
CAD Software sold: Autodesk

**COMPUTER AIDED SOLUTIONS** Revenue: \$1 to \$3 Million  
7519 Mentor Avenue, Suite 108, Mentor, OH 44060. Phone: 216-946-9722  
CONTACTS: Mr. Tony Oliverio, President; Mr. Mike Conley, Sales Manager  
CAD Software sold: Autodesk, Intergraph, Personal CAD Systems, VersaCad

**COMPUTER AIDED TIME SHARE**  
9700B West 76th Street, Eden Prairie, MN 55344. Phone: 612-829-1887  
CONTACTS: Mr. Allen Witters  
CAD Software sold: Computervision

**COMPUTER ANALYTICS CORP.** Revenue: Less than \$1 Million  
4088 Commercial Avenue, Northbrook, IL 60062. Phone: 312-498-0750  
CONTACTS: Mr. Kenneth Kosnik, Vice President; Mr. Dale C. Jessen, President  
CAD Software sold: Autodesk

**COMPUTER ASSISTED DRAFTING**  
5005 W. Laurel Street, Suite 215, Tampa, FL 33607. Phone: 813-875-1818

**COMPUTER BAY OF RALEIGH, INC.** Revenue: \$1 to \$3 Million  
4600 Marrott Drive, Suite 330, Raleigh, NC 27612. Phone: 919-783-6300  
CONTACTS: Mr. Barrett Powell, President; Mr. Jim Compton, Vice President, National Sales  
CAD Software sold: CADAM, Intergraph, Sigma Design

**COMPUTER CHANNEL** Revenue: \$5+ Million  
226 Sherwood Avenue, Farmingdale, NY 11735. Phone: 516-420-1470  
CONTACTS: Dr. Chien Chao, President  
CAD Software sold: Autodesk, Euclid, SDRC, Unica

**COMPUTER CONNECTION** Revenue: Less than \$1 Million  
5962 Brainerd Road, Suite 1, Chattanooga, TN 37421. Phone: 615-892-3253  
CONTACTS: Mr. Steve W. Bunch, Vice President, Sales; Mr. Ronald F. Bunch, President  
CAD Software sold: Autodesk, Mega CADD

**COMPUTER DESIGN EQUIPMENT, INC.**  
400 Brooklyn Avenue, Box 598, Syracuse, IN 46567. Phone: 219-457-5796  
CONTACTS: Mr. Bryan Andrews, Marketing  
CAD Software sold: Autodesk, Computervision

**COMPUTER DYNAMICS** Revenue: \$3 to \$5 Million  
2201 Donley, Suite 365, Austin, TX 78758. Phone: 512-836-5707  
CONTACTS: Mr. David Pair, President

**COMPUTER DYNAMICS, INC.** Revenue: \$5+ Million  
4452 Corporation Lane, Suite 300, Virginia Beach, VA 23462. Phone: 804-490-1234  
CONTACTS: Mr. W. A. Gibson, Sr. Vice President, Marketing; Mr. R. A. Fuentes, President

**COMPUTER GALLERY OF RSH TRIANGLE**  
2300 Englert Drive, Suite B, P.O. Box 14006, Research Triangle Park, NC 277094006. Phone: 919-361-1973  
CONTACTS: Mr. C. James Beacham

**COMPUTER GRAPHICS CENTER, INC.**  
444 High Street, Palo Alto, CA 94301. Phone: 415-325-3111  
  
CAD Software sold: Autodesk

**COMPUTER INPUT CORP.** Revenue: \$5 + Million  
1840 S. Elena, Suite 203, Redondo Beach, CA 90277. Phone: 213-372-2177  
CONTACTS: Mr. G. H. Kench, Vice President; Mr. J. W. Bradley, President

**COMPUTER MODULES, INC.** Revenue: \$1 to \$3 Million  
2348 C Walsh Avenue, Santa Clara, CA 95051. Phone: 408-496-1881  
CONTACTS: Mr. Hon C. Wong, Vice President, Marketing; Mr. Laszlo Zoltan, President  
CAD Software sold: CADAM

**COMPUTER NUMERICAL CONTROL CORP.**  
150-N New Boston Street, Woburn, MA 01801. Phone: 617-933-0091  
CONTACTS: Mr. George C. Kakridas, President

**COMPUTER PORT**  
1430 Route 25A, Port Jefferson Station, NY 11776. Phone: 516-331-6611  
CONTACTS: Ms. Jane McChrie, President  
CAD Software sold: Autodesk

**COMPUTER PRODUCTS, INTERNATIONAL**  
740 S. Hillview, Milpitas, CA 95035. Phone: 408-945-0100  
CONTACTS: Mr. George Mc Closkey, Vice President, Marketing; Mr. Mike Mc Closkey, President

**COMPUTER RESEARCH** Revenue: \$3 to \$5 Million  
Cherrington Ctr Bldg 1, 1700 Beaver Grade, Pittsburgh, PA 15108. Phone: 412-262-4430  
CONTACTS: Mr. Frank Moser  
CAD Software sold: Autodesk, Computervision, Sigma Design, Automatix

**COMPUTER RESOURCES** Revenue: Less than \$1 Million  
101 39th Street N, Birmingham, AL 35222. Phone: 205-591-8810  
CONTACTS: Mr. Billy Hinds, President  
CAD Software sold: Autodesk

**COMPUTER SALES & SERVICES** Revenue: Less than \$1 Million  
110 W. Main Street, Farmington, NM 87401. Phone: 505-326-4525  
CONTACTS: Mr. Cory B. Fabiano, Owner  
CAD Software sold: Autodesk

**COMPUTER SCIENCES APPLICATIONS**

P.O. Box F, Arcadia, CA 91006. Phone: 818-355-8888  
CONTACTS: Mr. Constantine Anaiades, President

**COMPUTER SOURCE INC.**

Revenue: Less than \$1 Million

6700 West Loop Soute, Suite 110, Bellaire, TX 77401. Phone: 713-669-1223  
CONTACTS: Mr. Donald Salter, Vice President; Mr. Paul Eugene Barkwell, President

**COMPUTER STATION**

8000 Arlington Expwy., Jacksonville, FL 32211. Phone: 904-724-3174  
CONTACTS: Mr. Phil Wheeler, President

**COMPUTER SYSTEMS SPECIALISTS INC.**

Revenue: Less than \$1 Million

P.O. Box 1007, Wappinger Plaza, 150 Route 9, Wappingers Falls, NY 12590. Phone: 914-297-1223  
CONTACTS: Mr. Robert Knapp; Mr. David Baily  
CAD Software sold: Autodesk

**COMPUTER SYSTEMS TECHNOLOGY, INC.**

Revenue: \$1 to \$3 Million

226 Sherwood Avenue, East Farmingdale, NY 11735. Phone: 516-420-1470  
CONTACTS: Mr. Shaun Huang, Vice President, Marketing; Dr. Chien F. Chao, President  
CAD Software sold: SDRC, Unicad

**COMPUTER TIME**

187 N. Church Street, Montgomery Bldg., Suite 106, Spartanburg, SC 29301. Phone: 803-585-5004  
CONTACTS: Mr. Steve Bauer, President  
CAD Software sold: Autodesk

**COMPUTER-AIDED TECHNOLOGIES, INC.**

Revenue: \$1 to \$3 Million

605 Baronne Street, New Orleans, LA 70113. Phone: 504-523-2233  
CONTACTS: Dr. Kenneth M. Goldstein, Executive Vice President; Ms. Linda F. Goldstein, President  
CAD Software sold: Autodesk, Sigma Design, VersaCAD

**COMPUTERAID**

Revenue: Less than \$1 Million

E. 10807 Montgomery #9, Spokane, WA 99206. Phone: 509-922-0366  
CONTACTS: Mr. Jim Raschka, President  
CAD Software sold: Autodesk, Computervision, Intergraph

**COMPUTERIZED BUSINESS SYSTEMS, INC.** Revenue: Less than \$1 Million  
2108 West Freeway, Fort Worth, TX 76102. Phone: 817-332-1610  
CONTACTS: Mr. Leon Brachman, Vice President; Mr. Marshall Brachman, President

**COMPUTERLAND**  
2255 John F. Kennedy, Dubuque, IA 52001. Phone: 319-556-6515

**COMPUTERLAND OF EAU CLAIRE**  
1801 S. Hastings Way, Altoona, WI 54720. Phone: 715-835-8082  
CONTACTS: Mr. Charles Christian

**COMPUTERS & CONCEPTS INC.** Revenue: Less than \$1 Million  
6923 Orchard Lake Road, West Bloomfield, MI 48322. Phone: 313-851-0690  
CONTACTS: Mr. Taher F. Rasheed, President  
CAD Software sold: Autodesk, CADAM

**COMPUTERS FOR BUSINESS** Revenue: Less than \$1 Million  
1627 Henthorne Drive, Maumee, OH 43537. Phone: 419-866-5165  
CONTACTS: Mr. Donald Sparks, President

**COMPUTERS UNLIMITED/COMPUTER BAY**  
9055 N. 51st Street, Suite E, Milwaukee, WI 53223. Phone: 414-357-4650  
CONTACTS: Mr. Kailas J. Rao

**COMPUTOOL SYSTEMS & ENGINEERING** Revenue: Less than \$1 Million  
5601 N. Powerline Road, Suite 201, Ft. Lauderdale, FL 33309. Phone: 305-771-4801  
CONTACTS: Mr. Reggie Freedman, President; Ms. Robbie Ratafia, Vice President  
CAD Software sold: Autodesk

**COMSTRAND INC.**  
2852 Anthony Lane South, Minneapolis, MN 55418. Phone: 612-788-9234  
CONTACTS: Mr. Bob Van Den Berg, President  
CAD Software sold: Orcad

**COMTEC COMPUTER SERVICES CO., INC.** Revenue: \$3 to \$5 Million  
1717 West 34th, Suite A, Houston, TX 77018. Phone: 713-680-3300  
CONTACTS: Mr. Robert M. Muntatchy, President  
CAD Software sold: Autodesk

**CONCAD TECHNOLOGIES, INC.** Revenue: Less than \$1 Million  
Univ. of WI Stout, 112 Applied Arts Bldg, Menomonie, WI 54751. Phone: 715-232-2133  
CONTACTS: Mr. Gerald Revelle, President; Mr. John Neubauer  
CAD Software sold: Autodesk

**CONCURRENT CORPORATION** Revenue: Less than \$1 Million  
1870 Madison Road, Cincinnati, OH 45206. Phone: 513-281-2000  
CONTACTS: Mr. Thomas Widlar, President  
CAD Software sold: Generic Software

**COOPERATIVES COMPUTER CENTER** Revenue: Less than \$1 Million  
5159 Woodlane Circle, Tallahassee, FL 32303. Phone: 904-562-0121  
CONTACTS: Mr. Don J. Stockten, President

**CORPORATE COMPUTER, INC.** Revenue: Less than \$1 Million  
1530 Eastlake Avenue E, Suite 101, Seattle, WA 98102. Phone: 206-328-4463  
CONTACTS: Mr. Fred H. Taucher, President; Mr. Walter S. Taucher, Treasurer

**CORPORATE DEVELOPMENT ASSOCIATES** Revenue: Less than \$1 Million  
55 West 22nd Street, Suite 11, Lombard, IL 60148. Phone: 312-932-7100  
CONTACTS: Ms. J. R. Reid, Vice President, Marketing; Ms. Phyllis Anderson, President  
CAD Software sold: Autodesk

**CREVELT COMPUTER SYSTEMS, INC.** Revenue: Less than \$1 Million  
3111 S. Valley View, Suite E-103, Las Vegas, NV 89102. Phone: 702-362-6946  
CONTACTS: Mr. James R. Crevelt, Vice President; Mr. Dwight E. Crevelt, President  
CAD Software sold: Autodesk

**CSS, INC.** Revenue: Less than \$1 Million  
North 3315 Tschirley Road, Spokane, WA 99216. Phone: 509-924-8216  
CONTACTS: Mr. Mark Feichtner, Vice President, Marketing; Ms. Janis Feichtner, President  
CAD Software sold: Autodesk

**CTR BUSINESS SYSTEMS, INC.** Revenue: \$1 to \$3 Million  
825 Southwest 14th Avenue, Portland, OR 97205. Phone: 503-227-2414  
CONTACTS: Mr. Edward Israel, President; Mr. Tom McKasson, CADD/CAM Manager  
CAD Software sold: Cadkey, Parametric

**CYBER RESEARCH** Revenue: \$1 to \$3 Million  
5 Science Park Center, P.O. Box 9565, New Haven, CT 06536. Phone: 203-786-5151  
CONTACTS: Mr. Robert Molloy, President

**D. C. JAEGER CORPORATION** Revenue: Less than \$1 Million  
135 N. Knowles Avenue, Winter Park, FL 32789. Phone: 305-645-1500  
CONTACTS: Mr. Richard Junkins, Director of Technology; Ms. Barbara Scott, Program Manager  
CAD Software sold: Autodesk

**DAT-TEK COMPUTER SERVICES CORP.**  
974 W. 6th Street, Eugene, OR 97402. Phone: 503-687-0070  
CONTACTS: Mr. Phil Winters, President

**DATA AUTOMATION** Revenue: Less than \$1 Million  
125 W. Mission Ave #202, Escondido, CA 92025. Phone: 619-743-3334  
CONTACTS: Mr. Richard Hackworth, CEO; Mr. Fred Cleveland, Vice President, Marketing

**DATA BASE COMPUTER** Revenue: Less than \$1 Million  
10407 South Western, Chicago, IL 60643. Phone: 312-779-3099  
CONTACTS: Mr. Dennis Meade, President

**DATA COM SOUTH** Revenue: \$5+ Million  
222 Weber Street, Orlando, FL 32803. Phone: 305-425-5505  
CONTACTS: Mr. John P. Larkin, President

**DATA HANDLING** Revenue: \$1 to \$3 Million  
3105 San Pedro, N.E., Albuquerque, NM 87110. Phone: 505-884-0284  
CONTACTS: Mr. Ray Rachowski, President; Ms. Carla Rachowski, Software  
CAD Software sold: Autodesk, MCS

**DATA IMAGE, INC.** Revenue: \$1 to \$3 Million  
8704 Royal Lane, Irving, TX 75063. Phone: 214-929-4000  
CONTACTS: Mr. Don Maly, Executive Vice President & GM; Mr. Allen Bowersox, Sales Manager  
CAD Software sold: Autodesk, Microstation, Personal Designer, Anvil, P-CAD

**DAV-TECH COMPUTER CENTER** Revenue: Less than \$1 Million  
2811 Ocean Park Blvd., Santa Monica, CA 90405. Phone: 213-452-2027  
CONTACTS: Mr. Michael Simanian, President  
CAD Software sold: Autodesk

**DAVID MACHANICK CONSULTING** Revenue: Less than \$1 Million  
1701 North Greenville #1100, Richardson, TX 75081. Phone: 214-470-0406  
CONTACTS: Mr. David Machanick, President

**DECI ASSOCIATES** Revenue: Less than \$1 Million  
50 Elm Street, Huntington, NY 11743. Phone: 516-549-1511  
CONTACTS: Mr. Donald E. Clark, President  
CAD Software sold: Autodesk, Evolution Computing, Generic Software

**DECISION GRAPHICS, INC. (AL)**  
555 Sparkman Drive, Suite 652, Huntsville, AL 35816. Phone: 205-837-7710  
CONTACTS: Ms. Lynda W. Geddes, Marketing Director; Mr. Jim Pruitt, President

**DECISION VISION**  
7370-Q Opportunity Road, San Diego, CA 92111. Phone: 619-541-2000  
CONTACTS: Mr. David Gmach

**DESIGNLAB** Revenue: \$1 to \$3 Million  
1414 West 6th Street, Lawrence, KS 66044. Phone: 913-841-1510  
CONTACTS: Mr. Tim Forcade, Vice President, Marketing; Mr. James Surber, President  
CAD Software sold: Autodesk, Microecture, VersaCAD

**DEVTRON, RUSSELL INC.** Revenue: \$1 to \$3 Million  
301 North Bowery Avenue, Gladwin, MI 48624. Phone: 517-426-6574  
CONTACTS: Mr. Edward J. Russell  
CAD Software sold: Autodesk, CADAM



**DGA ASSOCIATES INC.**

155 West Street, Wilmington, MA 01887. Phone: 617-935-3001  
CONTACTS: Mr. Don Glass, President  
CAD Software sold: Orcad

**DIAMOND SOFTWARE SUPPLY INC.**

Revenue: \$5+ Million

7916 Capwell Drive, Oakland, CA 94621. Phone: 415-633-2588  
CONTACTS: Ms. Sherrie De Charton, Vice President, Sales; Mr. Richard Martini, President

**DIGICAD**

1000 Century Park Drive, Suite 401, Tampa, FL 33607. Phone: 813-873-7222  
CONTACTS: Mr. Bill Trimble

**DIGITAL ACCESSORIES**

Revenue: Less than \$1 Million

18 Elizabeth, West Conshohocken, PA 19428. Phone: 215-828-6090  
CONTACTS: Mr. John P. Hopkins, President

**DIGITAL COLOR CORPORATION**

Revenue: Less than \$1 Million

2252 Main Street #15, Chula Vista, CA 92011. Phone: 619-420-2421  
CONTACTS: Mr. Jack Ellis, President

**DIGITAL OFFICE SYSTEMS INT'L**

Revenue: Less than \$1 Million

2715 Australian Avenue, Suite 101, West Palm Beach, FL 33407. Phone: 305-833-4558  
CONTACTS: Ms. Leta Roberts, Vice President, Marketing & Sales; Mr. Lloyd Chesney, President  
CAD Software sold: Autodesk, LandCADD

**DOS COMPUTER CENTER-O'HARE**

1300 W. Higgins Road, Park Ridge, IL 60068. Phone: 312-825-6900  
CONTACTS: Mr. Howard Herbin

**DREWDATA INC.**

Revenue: Less than \$1 Million

114 Four Winds Drive, Middletown, NJ 07748. Phone: - -  
CONTACTS: Mr. Drew D. Sarle, President

**DTI TECHNOLOGIES INC.** Revenue: \$1 to \$3 Million  
55 Constitution Avenue, Bedford, NH 03102. Phone: 603-472-5511  
CONTACTS: Mr. Daniel B. Dolan, President  
CAD Software sold: Autodesk

**DV INTERNATIONAL, INC.** Revenue: Less than \$1 Million  
10420 S. DeAnza Blvd., Cupertino, CA 95014. Phone: 408-253-9810  
CONTACTS: Mr. R. de Villiers, President  
CAD Software sold: Autodesk

**DYNAMIC OFFICE SYSTEMS**  
419 Haddon Avenue, Haddonfield, NJ 08033. Phone: 609-428-4404  
CONTACTS: Mr. Dennis Kirschenman, President

**E-Z CAD, INC.**  
5589 Starcrest Drive, San Jose, CA 95123. Phone: 408-972-0782  
CONTACTS: Mr. Ziya Boyacigiller, Vice President, Marketing & Sales; Mr. Edward Sliger, President  
CAD Software sold: MicroSim Corp.

**EAST COAST COMPUTER SYSTEMS INC.** Revenue: Less than \$1 Million  
24-26 White Street, Red Bank, NJ 07701. Phone: 201-747-6995  
CONTACTS: Ms. Marbeth Shay, President  
CAD Software sold: Autodesk

**EASTERN COMPUTER GRAPHICS**  
22 Meridian Road, Eatontown, NJ 07724. Phone: 201-542-7733  
CONTACTS: Mr. Jeff Dalton; Mr. Bob Dennis

**EASTMARK, INC.**  
240 Smith, Lowell, MA 01851. Phone: 617-453-9150  
CONTACTS: Mr. Marvin Berkowitz, President

**EBERHARD ENGINEERING**  
27 Pine Ridge Drive, Smithtown, NY 11787. Phone: 516-543-7777  
CONTACTS: Mr. Ronald Eberhard

**EDUCALC** Revenue: \$3 to \$5 Million  
27953 Cabot Road, Laguna Niguel, CA 92677. Phone: 714-582-2637  
CONTACTS: Mr. Richard Nelson, Technical Support; Mr. James Carter, President  
CAD Software sold: Hewlett Packard

**EFFECTIVE MANAGEMENT SYSTEMS** Revenue: \$3 to \$5 Million  
12000 W. Park Place, Milwaukee, WI 53224. Phone: 414-359-9800  
CONTACTS: Mr. Michael D. Dunham, President  
CAD Software sold: Autodesk

**EKJ DESIGN AND DRAFTING, INC.**  
2805 Tremainsville Road, Toledo, OH 43613. Phone: 419-475-6225  
CONTACTS: Mr. Greg Johns

**ELCOR ASSOCIATES INC.**  
1800 #10 Wyatt Drive, Santa Clara, CA 95054. Phone: 408-980-8868  
CONTACTS: Mr. Bob Weeks, President  
CAD Software sold: Orcad

**ELECTRO-CADD**  
3981 East West Meadow Drive, Duluth, GA 13136. Phone: 404-446-7523  
CONTACTS: Mr. Torrance, President, Sales & Marketing  
CAD Software sold: Orcad

**ELECTROLOGIC, INC.** Revenue: Less than \$1 Million  
1359 28th Street, Signal Hill, CA 90806. Phone: 213-595-0551  
CONTACTS: Mr. T. Hudson, President

**ELECTRONIC DATA SERVICES** Revenue: Less than \$1 Million  
Route 1 Box 250, Bluemont, VA 22012. Phone: 703-554-8208  
CONTACTS: Mr. A. K. Carbone, President  
CAD Software sold: Cadkey, Generic Software, Isicad

**ELEXOR ASSOCIATES** Revenue: Less than \$1 Million  
P.O. Box 246, Morris Plains, NJ 07950. Phone: 201-299-1615  
CONTACTS: Mr. Timothy Slifkin, Vice President, Marketing; Mr. Lee Glinski, President

**ELITE SOFTWARE DEVELOPMENT, INC.** Revenue: Less than \$1 Million  
P.O. Box Drawer 1194, Bryan, TX 77806. Phone: 409-846-2340  
CONTACTS: Ms. Terri King, Vice President, Marketing; Mr. William W. Smith, President

**EMERY DATAGRAPHIC**  
6767 South Spruce Street No. 140, Englewood, CO 80112. Phone: 303-773-0484  
CONTACTS: Mr. Henry A. Emery, CEO

**ENERGY RESOURCES & PLANNING** Revenue: Less than \$1 Million  
117 W. Harrison Street, Chicago, IL 60605. Phone: 312-922-0220  
CONTACTS: Mr. N. Paul Sood, President

**ENGINEERING DESIGN & GRAPHICS, INC.** Revenue: Less than \$1 Million  
2020 W. North Lane, Phoenix, AZ 85021. Phone: 602-995-9756  
CONTACTS: Mr. David L. Barrett, President

**ENTRE COMPUTER CENTER**  
3812 Rochester Road, Troy, MI 48083. Phone: 313-528-3770  
CONTACTS: Mr. Frank L. Sabina, President; Mr. Jerry Baut, CAD/CAM/MCAE Manager  
CAD Software sold: Aries, Autodesk, CADAM, Computervision

**ENTRE' COMPUTER CENTER**  
17950 Preston Road #75, Dallas, TX 75252. Phone: 214-248-1200  
CONTACTS: Mr. Bud Collins

**EVERGREEN SYSTEMS, INC.** Revenue: \$1 to \$3 Million  
12370 Northrup Way, Bellevue, WA 98005. Phone: 206-455-0825  
CONTACTS: Mr. Mark Astengo, President  
CAD Software sold: Autodesk

**EXECUSOFT, INC.** Revenue: Less than \$1 Million  
2875 Northwind Drive, Suite 218, East Lansing, MI 48823. Phone: 517-332-3414  
CONTACTS: Mr. Jim Topper, President  
CAD Software sold: Autodesk

**FIGGIE SYSTEMS MANAGEMENT GROUP INC** Revenue: \$3 to \$5 Million  
4420 Sherwin Road, Willoughby, OH 44094. Phone: 216-946-9000  
CONTACTS: Mr. Walter Hayes, President

**FINITE GRAPHICS** Revenue: Less than \$1 Million  
5251 Verdugo Way, #L, Camarillo, CA 93010. Phone: 805-987-6033  
CONTACTS: Mr. Darryl Erlandson, President  
CAD Software sold: Autodesk, Cadkey, Computervision

**FOCUS COMPUTER COMMUNICATIONS**  
4320 Viewridge Avenue, Suite D, San Diego, CA 92123. Phone: 619-277-0112  
CONTACTS: Mr. Dennis Bertken  
CAD Software sold: Autodesk

**FORTUNE MICRO SYSTEMS INC.** Revenue: Less than \$1 Million  
23052 Lake Forest Drive, Laguna Hills, CA 92653. Phone: 714-583-1000  
CONTACTS: Mr. Paul L. Bruce, President; Miss Traci Sanderson, Purchasing  
CAD Software sold: Versacad

**FRANKEL ENGINEERING LAB, INC.** Revenue: Less than \$1 Million  
125 S. 5th Street, Reading, PA 19603. Phone: 215-373-5205  
CONTACTS: Mr. Samuel Frankel, President

**FRANSWORTH COMPUTERS** Revenue: \$1 to \$3 Million  
120 W. North Avenue, Villa Park, IL 60181. Phone: 312-941-3444  
CONTACTS: Mr. Mark Phillips  
CAD Software sold: Cadkey

**GENERAL COMPUTER CENTERS INC.** Revenue: \$1 to \$3 Million  
R.D. #3, Box #7, Tamaqua, PA 18252. Phone: 717-668-1595  
CONTACTS: Mr. Ralf L. Bzura, President  
CAD Software sold: Autodesk

**GENERATION 5 TECHNOLOGY** Revenue: \$1 to \$3 Million  
8670 Wolf Court, Sheridan Park, Suite 120, Denver, CO 80030. Phone: 303-427-0055  
CONTACTS: Mr. Mark Wilding, Vice President, Marketing; Mr. Frank Richardson, President  
CAD Software sold: Personal Designer, Aries, P-CAD, Automatix

**GENESYS COMPLETE SYSTEMS CORP.**

2301 Lucien Way, Suite 320, Maitland, FL 32751.

CONTACTS: Mr. William Morris, President

Revenue: Less than \$1 Million

Phone: 305-875-0101

**GENZLINGER ASSOCIATES, INC.**

2 Northfield Plaza, Suite 212, Troy, MI 48098.

CONTACTS: Mr. Vance Genzlinger, President

CAD Software sold: Autodesk

Revenue: Less than \$1 Million

Phone: 313-879-7070

**GEOCAD, INC.**

P.O. Box 186, Pound Ridge, NY 10576. Phone: 914-764-4072

CONTACTS: Mr. Rudolph Horowitz, President

CAD Software sold: Autodesk

**GEOMETRIC DATA FLOW, INC.**

337 N. Vineyard Avenue, Suite 206, Ontario, CA 917644453. Phone: 714-984-1269

CONTACTS: Mr. Randolph Paschal, Vice President, Marketing &amp; Sales; Mr. Russell Mobley, President

Revenue: \$1 to \$3 Million

**GIBBS & HILL, INC.**

11 Penn Plaza, New York, NY 10001. Phone: 212-216-6000

CONTACTS: Mr. W. J. Grabske, President &amp; CEO; Mr. K. J. Conrade, Manager, CAD &amp; Systems Support

CAD Software sold: CADAM

Revenue: Less than \$1 Million

**GIMM CONSULTANTS**

211 Route 38, Maple Shade, NJ 08052. Phone: 609-667-6900

CONTACTS: Mr. Kenneth Gimm, President

CAD Software sold: Autodesk, Personal CAD Systems

Revenue: Less than \$1 Million

**GRADIENT TECHNOLOGIES**

550 Shelby Lane, Los Altos, CA 94022. Phone: 415-949-5434

CONTACTS: Dr. Joseph Binkowski, President

CAD Software sold: Cosmos

**GRAHAM COMPUTER CENTER**

133 S. Pennsylvania Street, Indianapolis, IN 46204. Phone: 317-634-8202

CONTACTS: Mr. Paul Benjamin

**GRAPHICS & INFORMATION SYSTEMS** Revenue: \$1 to \$3 Million  
300 N. 1st Avenue, Suite 350, Minneapolis, MN 55401. Phone: 612-342-9200  
CONTACTS: Mr. P. Victor Grambsch, President  
CAD Software sold: Autodesk, Isicad, Versacad

**GUARANTEED COMPUTER SYSTEMS, INC.** Revenue: Less than \$1 Million  
1982 N.E. 149 Street, Miami, FL 33181. Phone: 305-940-3338  
CONTACTS: Mr. Paul Spiewak, President

**GW SYSTEMS, INC.**  
16 S. Matterson Arcade Bldg., Cookeville, TN 38501. Phone: 615-526-5349  
CONTACTS: Mr. William George, President  
CAD Software sold: Autodesk

**HAGERMAN & COMPANY, INC.** Revenue: \$1 to \$3 Million  
Broadway & Sunset Court, Mt. Zion, IL 62549. Phone: 217-864-2326  
CONTACTS: Mr. Dennis Hagerman, President  
CAD Software sold: Cadkey, Computervision, MCS

**HAMILTON H.G.L. SOFTWARE LTD.** Revenue: \$5+ Million  
6 Pearl Court, Allendale, NJ 07401. Phone: 201-327-1444  
CONTACTS: Mr. Gordon Brown, President

**HARGREAVES & ASSOCIATES** Revenue: Less than \$1 Million  
P.O. Box 14734, Cincinnati, OH 45214. Phone: 513-922-7687  
CONTACTS: Mr. James D. Hargreaves, Owner

**HCS CORPORATION** Revenue: \$1 to \$3 Million  
2525 S. Main Street, Suite 3, Salt Lake City, UT 84115. Phone: 801-483-1000  
CONTACTS: W. L. Pulsipher, Vice President, Marketing; R. L. Larsen, Operations Manager  
CAD Software sold: Autodesk, A/E MicroSystems, Great Softwestern, Synthesis

**HEATH ZENITH COMPUTERS & ELEC. CTR**  
2309 S. Flower Street, Los Angeles, CA 90007. Phone: 213-749-0261  
CONTACTS: Mr. Herb Van Hunnik

**HLA COMPUTERS** Revenue: Less than \$1 Million  
5700-J Sunnyside Avenue, Beltsville, MD 20705. Phone: 301-345-8170  
CONTACTS: Mr. Howard Lefkowitz, President

**HOME BUSINESS & NETWORK CMPTRS INC.**  
711 East Main Street, Bridgewater, NJ 08807. Phone: 201-469-8800  
CONTACTS: Mr. Tom Neston, President  
CAD Software sold: Evolution Computing, Generic Software

**HYLAND/RICE BUSINESS SYSTEMS** Revenue: Less than \$1 Million  
112 River Street, Fitchburg, MA 01420. Phone: 617-342-9707  
CONTACTS: Mr. Rodney Poland, Vice President, Sales; Mr. Parker Rice, President  
CAD Software sold: Autodesk, Versacad

**ILLINI MICROCOMPUTERS INC.**  
630 E. Ogden Avenue, Naperville, IL. Phone: 312-420-8813  
CONTACTS: Mr. Vince Greenen

**INACOMP COMPUTER CENTER**  
1824 West Maple Road, Troy, MI 48084. Phone: 313-649-0910

**INDUSTRIAL CYBERNETICS**  
18 Broad Street, Charleston, SC 29401. Phone: 803-577-7838  
CONTACTS: Mr. Giles E. Lovelace, CEO

**INDY MICRO/TCBC** Revenue: \$5+ Million  
814 S. Rangeline Road, Carmel, IN 46032. Phone: 317-846-5996  
CONTACTS: Mr. Thomas A. Brush, President; Mr. Robert L. Collins, Marketing Manager

**INFOMAX COMPUTERS**  
One Market Plaza, San Francisco, CA 94105. Phone: 415-929-2280



**INFORMATION DEVELOPMENT & APP'S INC** Revenue: \$3 to \$5 Million  
10741 Tucker Street, Beltsville, MD 20705. Phone: 301-937-3600  
CONTACTS: Mr. Louis M. Brown, President

**INFORMATION SYSTEMS GROUP**  
348 Waverly Road, Holland, MI 49423. Phone: 616-396-5006  
CONTACTS: Mr. Raymond E. Munson

**INGRAM**  
, Buffalo, NY. Phone: - -  
CONTACTS: Ms. Cindy Wager, Manager, Strategic Products Div.  
CAD Software sold: Generic CADD

**INNOVA BUSINESS SYSTEMS** Revenue: Less than \$1 Million  
2701 St. Louis Avenue, Signal Hills, CA 90806. Phone: 213-427-6726  
CONTACTS: Mr. Mark Fowle, President

**INNOVATION CO.** Revenue: Less than \$1 Million  
16529 Lakeshore Drive, Cleveland, WI 53015. Phone: 414-693-8062  
CONTACTS: Mr. James R. Voigt, President

**INNOVATION, AN ENGINEERING FIRM** Revenue: Less than \$1 Million  
1399 Ygnacio Valley Road, Suite 32, Walnut Creek, CA 94598. Phone: 415-943-1604  
CONTACTS: Dr. Ron Tolmei, President  
CAD Software sold: Autodesk

**INSYNC SYSTEMS, CORP.** Revenue: Less than \$1 Million  
County Road 172, Alvin, TX 77511. Phone: 713-331-2024  
CONTACTS: Mr. Romeo F. Goddard III, President

**INT'L TECHNOLOGY MARKETING, INC.**  
120 Cedar Street, Wellesley, MA 02181. Phone: 617-237-2089  
CONTACTS: Mr. Julius Dorfman, President

**INTEGRATED COMPUTER SYSTEMS**

Revenue: \$1 to \$3 Million

7120 Northwest 72nd Avenue, Miami, FL 33166. Phone: 305-887-4777

CONTACTS: Mr. Alan Bigio, Vice President, Marketing; Mr. Moises Pancer, President

**INTEGRATED SOLUTIONS**

925 West Kenyon, Suite 1A, Englewood, CO 80110. Phone: 303-761-9591

CONTACTS: Mr. Bob Darveaux

**INTEGRATED SUPPORT SERVICES**

Revenue: Less than \$1 Million

100 Santa Fe Building, Suite 220-B, Norman, OK 73069. Phone: 405-329-3267

CONTACTS: Mr. Eric Johnson

CAD Software sold: American Small Business, CADAM, VersaCad

**INTEGRATED SYSTEMS & ENDEAVORS CORP**

Revenue: \$1 to \$3 Million

1600 Wyatt Avenue #15, Santa Clara, CA 950541525. Phone: 408-496-6746

CONTACTS: Mr. David Smith, President; Mr. Edward Konvalin, CAD Services &amp; Support Manager

CAD Software sold: Personal CAD

**INTEGRATED TECHNOLOGY CORP.**

Revenue: Less than \$1 Million

1228 N. Stadem Drive, Tempe, AZ 85281. Phone: 602-968-3459

CONTACTS: Mr. Rod Schwartz, Vice President, Marketing; Mr. Gary Orman, President

**INTEGRITY COMPUTERS ELECTRONICS**

Revenue: \$1 to \$3 Million

2245 Losantiville Road, Cincinnati, OH 45237. Phone: 513-531-8324

CONTACTS: Mr. Jim Rixey, Vice President, Marketing; Mr. Phillip G. Waller, President

**INTELLIGENT DEVICES**

12140 Artesia Blvd., Suite 210, Artesia, CA 90701. Phone: 714-730-1071

CONTACTS: Mr. Donald Wong

**INTELLIGENT IMAGES, INC.**

Revenue: \$1 to \$3 Million

1730 Elton Road #11, Silver Spring, MD 20903. Phone: 301-445-5544

CONTACTS: Mr. Martin Fries

CAD Software sold: Autodesk, Aries

**INTERCAD** Revenue: \$1 to \$3 Million  
3175 De La Cruz Blvd., Santa Clara, CA 95054. Phone: 408-727-2929  
CONTACTS: Mr. Larry Sargent; Ms. Laura Harbeson  
CAD Software sold: Autodesk, Synthesis, Triumph

**INTERCAD CORP.** Revenue: \$3 to \$5 Million  
2525 Riva Road, Annapolis, MD 21401. Phone: 301-224-2926  
CONTACTS: Mr. Joe Gasper, Marketing Director; Mr. Thomas O. Mills, President

**INTERFACE ELECTRONICS, INC.** Revenue: \$1 to \$3 Million  
37500 Enterprise Court, Farmington Hills, MI 48331. Phone: 313-553-9820  
CONTACTS: Mr. Ketan Bakshi, Vice President, Marketing; Mr. Kirit Bakshi, President  
CAD Software sold: Computervision, Valid Logic

**INTERNATIONAL RESEARCH & EVALUATION** Revenue: \$5+ Million  
21098 IRE Control Center, Eagan, MN 55121. Phone: 612-888-9635  
CONTACTS: Mr. George Franklin, Jr., Vice President, Marketing; Mr. R. L. Voight, Chairman & CEO  
CAD Software sold: Ire-CAD

**ITAL BUSINESS COMPUTER SYSTEMS, LTD**  
6425 Hollywood Blvd., Suite 300, Los Angeles, CA 90028. Phone: 213-466-0552  
CONTACTS: Mr. Ken Richards, CEO  
CAD Software sold: Autodesk

**IVY COMPUTER SYSTEMS** Revenue: Less than \$1 Million  
1 W. 85th Street, Suite 3E, New York, NY 10014. Phone: 212-362-2023  
CONTACTS: Mr. Alain Benzaken, President

**J. FLYNN & ASSOCIATES**  
345 N. Canal Street, Chicago, IL 60606. Phone: 312-454-0277  
CONTACTS: Mr. James J. Flynn, President  
CAD Software sold: Autodesk

**J.P. EGAN CO.** Revenue: \$3 to \$5 Million  
53 Park Place, New York, NY 10007. Phone: 212-587-9600  
CONTACTS: Mr. Jack Schwartz, President

**J.Z.A. SYSTEMS SERVICES, INC.** Revenue: Less than \$1 Million  
102 Greyfriar Drive, Pittsburgh, PA 15215. Phone: 412-963-7780  
CONTACTS: Mr. Jim Zaenger, President  
CAD Software sold: Autodesk

**JIM DYE INTERNATIONAL**  
P.O. Box 19458, Seattle, WA 98109. Phone: 206-285-5233  
CONTACTS: Mr. Jim Dye, CEO

**JONATHAN'S COMPUTER CENTERS** Revenue: Less than \$1 Million  
444 W. Route 70, Marlton, NJ 08053. Phone: 609-983-0668  
CONTACTS: Mr. John H. Heitmann  
CAD Software sold: Autodesk, Versacad

**JONES ENGINEERING ASSOCIATES** Revenue: Less than \$1 Million  
P.O. Box 26037, Charlotte, NC 28221. Phone: 704-455-9616  
CONTACTS: Mr. Ben Beall  
CAD Software sold: Autodesk, Graytech, Parametric Technology

**K & R CUSTOM SOFTWARE, INC.** Revenue: Less than \$1 Million  
11048 Warwick Blvd., Suite 202, Newport News, VA 23601. Phone: 804-595-5400  
CONTACTS: Mr. Thomas H. Rees, President

**KC/CAD**  
P.O. Box 9206, Bakersfield, CA 93389. Phone: 805-323-7228  
CONTACTS: Mr. Michael Largent, Vice President, Marketing & Sales; Mr. Gary Coats, President  
CAD Software sold: Autodesk

**KDS ENGINEERING** Revenue: Less than \$1 Million  
2319 J Street, Sacramento, CA 95816. Phone: 916-446-3310  
CONTACTS: Mr. David Berry, President  
CAD Software sold: Autodesk

**KEISER COMPUTERS** Revenue: Less than \$1 Million  
1401 W. Cypress Creek Road, Ft. Lauderdale, FL 33309. Phone: 305-771-3511  
CONTACTS: Mr. Jeffrey Keiser, President  
CAD Software sold: Autodesk, VersaCad

**KELAR** Revenue: \$1 to \$3 Million  
4000 Bridgeway, Sausalito, CA 94965. Phone: 415-331-2171  
CONTACTS: Mr. Bruce Poropat, CAD Consultant  
CAD Software sold: Autodesk, Computervision, VersaCad

**KELAR CORP.**  
5456 McConnell Avenue, Los Angeles, CA 90066. Phone: 213-827-1200  
CONTACTS: Ms. Adriana K. Vernon, Vice President, Marketing; Mr. Kambiz Taleghani, President  
CAD Software sold: Autodesk, CIVILSOFT, Computervision, Mega CADD, Timberline

**KENFIL**  
, Van Nuys, CA. Phone: - -  
CONTACTS: Mr. Bob Shumate, V.P., Sales and Marketing  
CAD Software sold: Generic CADD

**KETIV TECHNOLOGIES** Revenue: Less than \$1 Million  
6645 NE 78th Court, C-2, Portland, OR 97218. Phone: 503-252-3230  
CONTACTS: Mr. Robert Palioca  
CAD Software sold: Autodesk, Sigma Design, Timberline

**KHAN PHILLIPS & ASSOCIATES, INC.** Revenue: \$1 to \$3 Million  
1140 Lake Street, Suite 401, Oak Park, IL 60301. Phone: 312-848-2233  
CONTACTS: Mr. Sam Khan, President  
CAD Software sold: Autodesk, Cimlinc, Computervision

**LAMBDA SYSTEMS, INC.**  
593 Skippack Pike, Suite 100, Blue Bell, PA 19422. Phone: 215-643-9050  
CONTACTS: Mr. David Sharp  
CAD Software sold: Autodesk

**LANGHAM/MATHIS**  
941 Berryessa Road, Suite E, San Jose, CA 95113. Phone: 408-286-0568  
CONTACTS: Mr. Steve Langham, President  
CAD Software sold: Skok

**LASERCAD TECHNOLOGIES, INC.**  
335 Main Street, Farmingdale, NY 11735. Phone: 516-293-1166  
CONTACTS: Mr. William Deger, CEO

**LASSEN RESEARCH** Revenue: Less than \$1 Million  
Forward Road, Manton, CA 96059. Phone: 916-474-3966  
CONTACTS: Mr. Robert W. Lee, General Partner; Ms. Karen Lee, General Partner

**LEVEL ONE SYSTEMS, INC.** Revenue: Less than \$1 Million  
198 North Main Street, Rutland, VT 05701. Phone: 802-775-6512  
CONTACTS: Mr. Tom Gallivan, President

**LITTLE SYSTEMS INC.** Revenue: \$1 to \$3 Million  
d/b/a DARDICK-connecting Point, 10825 Midlothian Turnpike, Richmond, VA 23235. Phone: 804-379-1122  
CONTACTS: Mr. Glen S. Dardick, President; Mr. Burl Wingold, Executive Vice President  
CAD Software sold: Autodesk

**LODESTAR** Revenue: \$1 to \$3 Million  
347 Pendleton Way, Oakland, CA 94621. Phone: 415-638-3585  
CONTACTS: Mr. Greg Eyrich, Vice President  
CAD Software sold: Autodesk, Cimatron CAD/CAM Systems

**LODESTAR SYSTEMS, INC.** Revenue: \$1 to \$3 Million  
1420 N. Claremont Blvd. #102-A, Claremont, CA 91711. Phone: 714-625-7961  
CONTACTS: Mr. Gerald Eyrich, President  
CAD Software sold: Autodesk, Cimatron

**LOGIC DATA SYSTEMS INC.** Revenue: Less than \$1 Million  
7055 Engle Road, Bldg. 6-604, Middleburg Heights, OH 44130. Phone: 216-234-8008  
CONTACTS: Mr. Don Wingate, President

**LOGICAL RESOURCES, INC.** Revenue: Less than \$1 Million  
74 14th Street N.W., Atlanta, GA 30309. Phone: 404-892-3000  
CONTACTS: Dr. Herbert W. Eber, President

**LOOKING GLASS MICROPRODUCTS**  
4233 W. Eisenhower, Loveland, CO 80537. Phone: 303-669-2681  
CONTACTS: Mr. Phillip Kreiker  
CAD Software sold: Autodesk

**LOVELAND COMPUTER CENTER** Revenue: Less than \$1 Million  
Orchard's Center, 285 E. 29th Street, Loveland, CO 80538. Phone: 303-667-9095  
CONTACTS: Ms. Sally A. Landes; Mr. William Whittrick  
CAD Software sold: Autodesk, Generic Software

**M.I.B. CHOCK**  
1048 24th Street, Santa Monica, CA 90403. Phone: 213-828-4788  
CONTACTS: Ms. Margaret Chock, CEO

**MACHINERY ALTERNATIVE** Revenue: Less than \$1 Million  
23011 Moulton Parkway, Suite C1, Laguna Hills, CA 92653. Phone: 714-951-9323  
CONTACTS: Mr. Mike Costello, Vice President, Marketing; Mr. Kim Karpowitz, President  
CAD Software sold: Micro Cadcam

**MAINE SURVEYORS/SOLUTIONS COMPUTER**  
28 US Rt. 1, Yarmouth, ME 04096. Phone: 207-846-5143  
CONTACTS: Mr. Gus McDonald, President  
CAD Software sold: VersaCAD

**MANUFACTURING DESIGN SYSTEMS** Revenue: Less than \$1 Million  
23011 Moulton Parkway Bldg. C1, Laguna Hills, CA 92653. Phone: 714-951-7332  
CONTACTS: Mr. Monty Feyen, CAD/CAM Account Rep.; Mr. Paul Leveque, CAD Account Rep.  
CAD Software sold: Micro CAD/CAM

**MARFAM COMPUTER SOLUTIONS** Revenue: Less than \$1 Million  
5765 Winfield Blvd. #3, San Jose, CA 95123. Phone: 408-365-1588  
CONTACTS: Ms. Sally Marler, President; Mr. John R. Marler, CEO  
CAD Software sold: Autodesk, Personal CAD Systems

**MARTCO** Revenue: Less than \$1 Million  
12952 W. Louisiana Avenue, Lakewood, CO 80228. Phone: 303-989-0848  
CONTACTS: Mr. Marty Jones, Owner  
CAD Software sold: Foresight Resources

**MEDIA CYBERNETICS, INC.** Revenue: Less than \$1 Million  
8484 Georgia Avenue, Silver Spring, MD 20910. Phone: 301-495-3305  
CONTACTS: Ms. Pam Kerwin, Vice President, Marketing & Sales; Mr. William E. Strum, President

**MEDIA SOFT INC.**

d/b/a Data Warehouse, 7512 Broadway Extension, Suite 308, Oklahoma City, OK 73116. Phone: 405-843-8739  
CONTACTS: Mr. Robert H. Alfson

**METRON GROUP**

Revenue: Less than \$1 Million

1701 North Greenville #1100, Richardson, TX 75081. Phone: 214-470-0406  
CONTACTS: Mr. David Machanick, President

**METROPOLITAN CAD SYSTEMS, INC.**

Revenue: \$3 to \$5 Million

P.O. Box 1406, 190 Lincoln Highway, Edison, NJ 08818. Phone: 201-548-4040  
CONTACTS: Mr. Michael Basch  
CAD Software sold: Autodesk, Cimatron

**MFE ASSOCIATES, INC.**

Revenue: Less than \$1 Million

P.O. Box 851, Amherst, MA 01004. Phone: 413-549-7626  
CONTACTS: Mr. Daniel Kaden, Vice President, Marketing & Sales; Mr. Stephen Ervin, President  
CAD Software sold: Autodesk

**MGM VISUALS**

6155 Viewcrest Drive, Oakland, CA 94619. Phone: 415-482-1804  
CONTACTS: Ms. Mary Metcalfe, Senior Partner  
CAD Software sold: Orcad

**MICAD SYSTEMS, INC.**

Revenue: \$1 to \$3 Million

419 Park Avenue South, New York, NY 10016. Phone: 212-213-9350  
CONTACTS: Mr. D. R. Taylor, President; Mr. Dan Belmont, Vice President, Sales  
CAD Software sold: Autodesk

**MICRO COMPUTER COMPANY, INC.**

Revenue: \$1 to \$3 Million

101 Wheaton Plaza, Wheaton, MD 20902. Phone: 301-942-5442  
CONTACTS: Mr. Bruce Kiefaber; Mr. Steven Hulsey  
CAD Software sold: Autodesk

**MICRO COMPUTER TECHNIQUES**

Revenue: Less than \$1 Million

807 Second Avenue South, Nashville, TN 37210. Phone: 615-244-2808  
CONTACTS: Mr. Ken Hibbitt, Vice President; Mr. David Miller, President



**MICRO CONCEPTS INC.** Revenue: Less than \$1 Million  
5700 Vanguard Drive, Ft. Wayne, IN 46809. Phone: 219-478-8088  
CONTACTS: Mr. Richard McElhinney  
CAD Software sold: Autodesk

**MICRO D**  
Santa Ana, CA. Phone: - -  
CONTACTS: Mr. Bruce Frederickson, V.P., Sales and Marketing  
CAD Software sold: Generic CADD

**MICRO ENGINEERING SOLUTIONS, INC.** Revenue: \$1 to \$3 Million  
470 Murdock Avenue, Meriden, CT 06450. Phone: 203-630-3630  
CONTACTS: Mr. Mitch Slater, President; Mr. Michael Schary, Vice President  
CAD Software sold: Autodesk, Cadkey

**MICRO FLASH COMPUTER SYSTEMS INC.** Revenue: Less than \$1 Million  
1110 Burnett Avenue, Concord, CA 94520. Phone: 415-680-1157  
CONTACTS: Ms. Nancy Comstock, President

**MICRO INSTALLATIONS, INC.**  
419 Park Avenue South, New York, NY 10016. Phone: 212-213-9350  
CONTACTS: Mr. Ira Fuchs

**MICRO MASTERS, INC.** Revenue: Less than \$1 Million  
211 East 43rd Street, New York, NY 10176. Phone: 212-661-6110  
CONTACTS: Mr. Ira Barkoe, President  
CAD Software sold: Versacad

**MICRO SERVICES OF NEW ENGLAND, INC.**  
430 Winchester Street, Keene, NH 03431. Phone: 603-357-1113  
CONTACTS: Mr. Bob Hanson

**MICRO SOLUTIONS** Revenue: Less than \$1 Million  
2124 10th Avenue South, Birmingham, AL 35205. Phone: 205-251-4628  
CONTACTS: Mr. L. Vaughan, President

**MICRO SPECIALISTS** Revenue: Less than \$1 Million  
3202 18th Street, Rockford, IL 61109. Phone: 815-399-0326  
CONTACTS: Mr. Marvin Permenter, President  
CAD Software sold: Autodesk

**MICROAGE**  
9602 N. May Avenue, Oklahoma City, OK 73120. Phone: 405-752-0802  
CONTACTS: Mr. Bruce Parker

**MICROAGE COMPUTER STORES INC.**  
3611 Youree Drive, Shreveport, LA 71105. Phone: 318-869-1282  
CONTACTS: Mr. C. Wayne Baldrige

**MICROCOMPUTER RESOURCES**  
12-D Oak Branch Drive, Oak Hollow Business Park, Greensboro, NC 274072145. Phone: 919-854-5400  
CONTACTS: Mr. Jeff Jackson

**MICRODEC COMPUTER CENTER** Revenue: \$1 to \$3 Million  
3065 Nutley Street, Fairfax, VA 22031. Phone: 703-280-1600  
CONTACTS: Ms. Janet S. Comfort, President; Mr. Edward H. Comfort, Manager, Operations  
CAD Software sold: Autodesk

**MICROLOG**  
1909 N. Glenville, Suite 103, Richardson, TX 75081. Phone: 214-644-2945

**MICROPLUS BUSINESS SYSTEMS**  
1020 E. El Camino Real, Sunnyvale, CA 94087. Phone: 408-737-2525  
CONTACTS: Mr. Bui Han  
CAD Software sold: Autodesk

**MICROSOURCE CAD/CAM, INC.** Revenue: \$5 + Million  
400 W. Cummings Park, Woburn, MA 01801. Phone: 617-935-3320  
CONTACTS: Mr. Charles Skeelee, President  
CAD Software sold: Aries, Autodesk, Computervision, MCS, Personal CAD Systems

**MICROSOUTH** Revenue: \$5 + Million  
1009 Sun Valley Drive, Roswell, GA 30076. Phone: 404-993-6245  
CONTACTS: Mr. Tom Woolsey, President  
CAD Software sold: Autodesk

**MICROTEL SYSTEMS CORPORATION** Revenue: Less than \$1 Million  
8663 Staples Mill Road, Richmond, VA 23229. Phone: 804-264-8480  
CONTACTS: Mr. Doug Crosby, Vice President, Marketing; Mr. Alvah Wyatt, President

**MICROWARE COMPUTING** Revenue: Less than \$1 Million  
17971 Skypark Circle, Irvine, CA 92714. Phone: 714-551-6866  
CONTACTS: Mr. Donald Geller, President

**MID-AMERICA INFORMATION SYSTEM, INC** Revenue: Less than \$1 Million  
2603 22nd Street, Suites 23 & 24, Oak Brook, IL 60521. Phone: 312-574-3633  
CONTACTS: Mr. Peter Youngwith, President  
CAD Software sold: Autodesk, MCS

**MID-WEST CAD SERVICES**  
620 S.E. 291 Highway, Lee's Summit, MO 64063. Phone: 816-525-5767  
CONTACTS: Mr. Roger Roberts  
CAD Software sold: Autodesk

**MIDWEST BUSINESS SYSTEMS** Revenue: \$3 to \$5 Million  
24660 Lahser Road, Southfield, MI 48034. Phone: 313-358-0890  
CONTACTS: Mr. Andy Prescott, Vice President, CAD/CAM Division  
CAD Software sold: Autodesk, CADAM, Computervision, Versacad

**MINCAD SYSTEMS** Revenue: \$3 to \$5 Million  
2001 E. 24th Street, Minneapolis, MN 55404. Phone: 612-722-1120  
CONTACTS: Mr. Paul Morley, Division Manager  
CAD Software sold: Autodesk, Computervision

**MINI-SYSTEMS, INC.** Revenue: Less than \$1 Million  
308 Main Street, Orange, NJ 07050. Phone: 201-678-5686  
CONTACTS: Mr. F. Giovacco, President

**MINNCAD SYSTEMS** Revenue: Less than \$1 Million  
2001 E. 24th Street, Minneapolis, MN 55404. Phone: 612-722-1120  
CONTACTS: Mr. Paul Morley  
CAD Software sold: Autocad, Personal Designer

**MONTEREY COMPUTER CONSULTING** Revenue: Less than \$1 Million  
494 Alvarado Street, Monterey, CA 93940. Phone: 408-646-1146  
CONTACTS: Mr. Jerry C. McConnell, President

**MORRISON-ROONEY ASSOCIATES, LTD.** Revenue: Less than \$1 Million  
1535 W. Jackson Blvd., Chicago, IL 60607. Phone: 312-738-2955  
CONTACTS: Ms. Murtha G. Rooney, President

**NATIONAL BUSINESS DATA SYSTEMS** Revenue: \$1 to \$3 Million  
1509 Energy Park Drive, Saint Paul, MN 55108. Phone: 612-647-0143  
CONTACTS: Mr. Ron Fishback, President

**NATIONAL CAD PRO INC.** Revenue: \$5+ Million  
400 West Brooklyn St., P. O. Box 598, Syracuse, IN 46567. Phone: 219-457-5796  
CONTACTS: Mr. Gordon Medlock, President  
CAD Software sold: Autodesk, Computervision, MCS, Sigma Design, Versacad

**NATIONAL TECH TEAM INC.** Revenue: \$1 to \$3 Million  
22000 Garrison Avenue, Dearborn, MI 48124. Phone: 313-277-2277  
CONTACTS: Mr. William Coyro, Chairman; Mr. Thomas Judd, Director of Technical Graphics  
CAD Software sold: Autodesk, CADAM, Cimlinc

**NATIONWIDE DATA SERVICE** Revenue: Less than \$1 Million  
16204 Doublebrook Place, Tampa, FL 33624. Phone: 813-962-6556  
CONTACTS: Mr. M. Nolan Rodrick, Marketing  
CAD Software sold: Autodesk

**NEW FOCUS INFORMATION SYSTEMS, INC.** Revenue: Less than \$1 Million  
40 Morristown Road, Bernardsville, NJ 07924. Phone: 201-953-0315  
CONTACTS: Mr. James A. Kinsman, Vice President, Marketing & Sales; Mr. Donald E. Ellis, President  
CAD Software sold: Autodesk

**NIELSEN ASSOCIATES INC.** Revenue: Less than \$1 Million  
One Circle West, Stamford, CT 06902. Phone: 203-978-0400  
CONTACTS: Mr. James Oliver, President  
CAD Software sold: Autodesk

**NN/CA(NAT'L NUMERICAL CONTROL APPS)** Revenue: Less than \$1 Million  
4053 Maple Road, Amherst, NY 14226. Phone: 716-837-6070  
CONTACTS: Mr. Dennis Wrazen, President  
CAD Software sold: Autodesk

**NOGUSKA INDUSTRIES** Revenue: Less than \$1 Million  
735-741 N. Countryline, Fostoria, OH 44830. Phone: 419-435-0404  
CONTACTS: Mr. Norman Gibat, Vice President, Direct Marketing; Ms. Kathleen Howard, President

**NSS CORPORATION** Revenue: Less than \$1 Million  
14825 Wentworth Street, Dolton, IL 60419. Phone: 312-849-0217  
CONTACTS: Mr. N. Paul Sood, President

**NUMERAX, INC.** Revenue: Less than \$1 Million  
3924 Linden Avenue, Long Beach, CA 90807. Phone: 213-426-6339

**NUVATEC, INC.** Revenue: \$5+ Million  
3110 Woodcreek Drive, Downers Grove, IL 60515. Phone: 312-971-8500  
CONTACTS: Mr. William H. Slavik, President

**O'CONNOR CONSULTING, INC.** Revenue: Less than \$1 Million  
30100 Telegraph, Suite 478, Birmingham, MI 48010. Phone: 313-644-8870  
CONTACTS: Mr. Timothy C. O'Connor, CEO  
CAD Software sold: Autodesk, Computervision

**O/E SYSTEMS** Revenue: \$1 to \$3 Million  
3290 Big Beaver Road, Suite 116, Troy, MI 48064. Phone: 313-643-7220  
CONTACTS: Mr. Andy Stebbins, CADAM Market Manager  
CAD Software sold: CADAM

**OMNI COMPUTER STORE**

4702-J Johnson Street, Lafayette, LA 70506. Phone: 318-981-9124  
CONTACTS: Ms. Frances Garrard

**OMNICON ELECTRONICS**

Revenue: Less than \$1 Million

11240 East 9 Mile Road, Warren, MI 48089. Phone: 313-757-8192  
CONTACTS: Mr. Bill Melucci, Vice President, Marketing; Mr. Michael Tattan, President  
CAD Software sold: Autodesk, Bishop Graphics, Robo Systems, Versacad

**ONLINE COMPUTERS PLUS INC.**

6789 N. Blackstone, Fresno, CA 93710. Phone: 209-432-4324  
CONTACTS: Mr. Merrill C. Oberg

**OPTIMIZED DESIGN SERVICES, INC.**

Revenue: Less than \$1 Million

10475 Perry Highway, Town Center Bldg., Suite 3, Wexford, PA 15090. Phone: 412-935-0670  
CONTACTS: Mr. R. Scott Theissen, President; Mr. Gerald J. Hatrup, Vice President  
CAD Software sold: CADAM

**ORTHSTAR, INC.**

Revenue: Less than \$1 Million

P.O. Box 3430, Elmira, NY 14905. Phone: 607-734-3448  
CONTACTS: Mr. James Orsillo, President

**P.A.C.T. SYSTEMS, INC.**

36963 Amerheim Road, P.O. Box 51280, Livonia, MI 48150. Phone: 215-362-2766  
CONTACTS: Mr. Russell Wayne  
CAD Software sold: Autodesk

**PACIFIC COMPUTER OUTPUT MICROFORM**

Revenue: Less than \$1 Million

970 N. Kalaheo Avenue, Pali Palms Plaza, Suite C202, Kailua, HI 96734. Phone: 808-531-2067  
CONTACTS: Mr. Joseph Tracy, President; Mr. Gary E. Weller, Vice President

**PACIFIC DATAWARE**

Revenue: \$1 to \$3 Million

15840 S.W. Upper Boones Ferry Road, Lake Oswego, OR 97035. Phone: 503-620-9858  
CONTACTS: Mr. Richard Grossman, Vice President, Sales & Marketing  
CAD Software sold: Versacad

**FACT SYSTEMS** Revenue: \$3 to \$5 Million  
36963 Amrhein, Livonia, MI 48150. Phone: 313-464-7620  
CONTACTS: Mr. Russell L. Wayne, General Manager  
CAD Software sold: Autodesk, Mega CADD

**PERSONAL COMPUTER PRODUCTS**  
104 East 23rd Street, New York, NY 10010. Phone: 212-475-8977  
CONTACTS: Mr. Alan Waxenburg

**PERSONAL COMPUTER RESOURCES INC.** Revenue: Less than \$1 Million  
2100 Washington Street, Hanover, MA 02339. Phone: 617-871-5396  
CONTACTS: Mr. George Hamrah; Mr. Lee Adler  
CAD Software sold: Versacad

**PERSONAL WORKSTATIONS, INC.** Revenue: \$1 to \$3 Million  
1201 Western Avenue, Suite 204, Seattle, WA 98101. Phone: 206-682-4803  
CONTACTS: Mr. Davis Straub, Owner  
CAD Software sold: Autodesk, Computervision, Mfg. Consulting Services

**PETER DREW & ASSOCIATES**  
1141 E. Walnut Avenue, Dalton, GA 30270. Phone: 414-226-1153  
CONTACTS: Mr. Franklin Cobos

**PHOTO & SOUND COMPANY**  
116 Natoma, San Francisco, CA 94105. Phone: 415-421-0410

**PIEDMONT CAD/CAM, INC.** Revenue: \$3 to \$5 Million  
814 Tyvola Road, Suite 126, Charlotte, NC 28217. Phone: 704-523-2400  
CONTACTS: Mr. Spec Hall, President; Mr. Mitch Lemons, Vice President  
CAD Software sold: CADAM, Cimlinc, MCS, Personal CAD Systems, Sigma Design

**PMX, INC.** Revenue: \$3 to \$5 Million  
33129 Schoolcraft, Livonia, MI 48150. Phone: 313-422-3740  
CONTACTS: Mr. Richard Carter, Vice President, Marketing; Mr. Jerry Peterson, President  
CAD Software sold: Cadkey, XLNC

**PRACTICAL MICRO DESIGN, INC.** Revenue: Less than \$1 Million  
6397 Little River Turnpike, Alexandria, VA 22312. Phone: 703-642-2510  
CONTACTS: Mr. Stephen C. Stallings, President  
CAD Software sold: Autodesk, VersaCAD

**PREFERRED BUSINESS SYSTEMS** Revenue: Less than \$1 Million  
11500 Stemmons Freeway, Suite 1, Dallas, TX 75229. Phone: 214-241-5580  
CONTACTS: Mr. Bill Degan, President

**PREMIER DESIGN SYSTEMS, INC.**  
1107 Kenilworth, Suite 100, Towson, MD 21204. Phone: 301-494-8444  
CONTACTS: Mr. Matt Richards, Vice President; Mr. Brice P. Schaeffer, President  
CAD Software sold: Autodesk

**PRINCETON CONSULTANTS, INC.** Revenue: Less than \$1 Million  
Two Research Way, Princeton, NJ 08540. Phone: 609-987-8787  
CONTACTS: Mr. S. Sashihara, President; Mr. Kevin C. Lippert, Manager, CAD Group  
CAD Software sold: Autodesk

**PRISM BUSINESS COMPUTER SYSTEMS** Revenue: Less than \$1 Million  
228 Main Street, Pawtucket, RI 02860. Phone: 401-725-6555  
CONTACTS: Mr. Babak Taleghani, President  
CAD Software sold: Autodesk, Versacad

**PRO, INC.** Revenue: Less than \$1 Million  
181 N. 200 West #4, Bountiful, UT 84010. Phone: 801-298-5207  
CONTACTS: Mr. Sheldon K. Green, President  
CAD Software sold: Sigma Design

**PROBLEM SOLVERS** Revenue: Less than \$1 Million  
1059 East Cliff Road, Burnsville, MN 55337. Phone: 612-894-6230  
CONTACTS: Ms. Colleen Carothers, President

**PROFESSIONAL CONTROL CORP.**  
P.O. Box 130, Germantown, WI 53022. Phone: 414-251-3000



**PROGRESS ENGINEERING, INC.**

Revenue: Less than \$1 Million

P.O. Box 700270, Tulsa, OK 74170. Phone: 918-627-1181

CONTACTS: Mr. Donol Klundade, Vice President, Sales & Marketing; Mr. Dan B. Mc Devitt, President  
CAD Software sold: Evolution Computing, Versacad

**PROTO PC**

, St. Paul, MN. Phone: 612-644-4660

**QBIC, INC.**

5540 Rock Hampton Court, Indianapolis, IN 46268. Phone: 317-849-2139

**QMS, INC.**

Revenue: \$5+ Million

1 Magnum Pass, Mobile, AL 36618. Phone: 205-633-4300

CONTACTS: Ms. Ann Strople, Director, Marketing Communications; Mr. James Busby, President

**QUAD MACHINE DESIGN**

10999 Jay Street, Bldg. 3, Rochester, NY 14611. Phone: 716-436-9983

CONTACTS: Mr. Paul Dubman

**QUANNON COMPUTER PRODUCTS, INC.**

Revenue: \$1 to \$3 Million

6400 Flying Cloud Drive, Suite 107, Eden Prairie, MN 55344. Phone: 612-944-5616

CONTACTS: Mr. John S. McLeod, President

CAD Software sold: Autodesk, Cadkey, Synthesis

**RAINBOW COMPUTERS**

797 E. Big Beaver, Troy, MI 48083. Phone: 313-528-3535

CONTACTS: Ms. Kate Gabriel

**REMEX/TCBC**

6095 28th Street, S.E., Grand Rapids, MI 49506. Phone: 616-942-9800

CONTACTS: Mr. Michael Noordyke

**REMTECH, INC.** Revenue: Less than \$1 Million  
2603 Artie Street, Suite 21, Huntsville, AL 35805. Phone: 205-536-8581  
CONTACTS: Mr. Charles E. Fuller, President

**RESULTS** Revenue: Less than \$1 Million  
725 Second Street, Suite 201, San Francisco, CA 94107. Phone: 415-777-1981  
CONTACTS: Mr. Thuy Nguyen Smith, Vice President, Sales & Marketing; Mr. Scott Smith, President

**RETAIL COMPUTER CENTER INC.**  
394 S. Hunter Blvd., Birmingham, MI 48011. Phone: 313-644-4820  
CONTACTS: Fida H. Bohra

**ROBEC, INC.** Revenue: \$5+ Million  
675 Bethlehem Pike, Montgomeryville, PA 18936. Phone: 215-368-9300  
CONTACTS: Mr. Robert H. Beckett, President

**ROBERT MCNEEL & ASSOCIATES**  
1310 Ward Street, Suite 200, Seattle, WA 98109. Phone: 206-628-8822  
CONTACTS: Mr. Robert McNeel  
CAD Software sold: Autodesk

**ROGERS PRODUCTS COMPANY, INC.** Revenue: Less than \$1 Million  
1010-F North Batavia, Orange, CA 92667. Phone: 714-771-0514  
CONTACTS: Mr. James E. Rogers, President  
CAD Software sold: Autodesk

**RRG ENGINEERING** Revenue: \$5+ Million  
975 Jefferson Road, Rochester, NY 14623. Phone: 716-424-7492  
CONTACTS: Mr. Kenneth P. VanAlstine, Systems Consultant; Mr. Robert A. Giese, President  
CAD Software sold: Autodesk

**S.A.I.L. SYSTEMS** Revenue: Less than \$1 Million  
86 W. University, Suite 103, Mesa, AZ 85201. Phone: 602-962-1876  
CONTACTS: Ms. Cheri Eicher, Vice President, Sales & Marketing; Mr. Michael B. Boland, President  
CAD Software sold: Autodesk, Generic Software

**S.C.D.S., INC.** Revenue: Less than \$1 Million  
755 E. Lakefield Road, Westlake Village, CA 91361. Phone: 805-495-7777  
CONTACTS: Mr. Dave Roberts, Sales & Marketing  
CAD Software sold: Autodesk, Calcomp, Summagraphics

**SARCOM** Revenue: \$1 to \$3 Million  
dba Inacomp Computer Centers, 510-D E. Wilson Bridge, Worthington, OH 43085. Phone: 614-431-2228  
CONTACTS: Mr. Randy Wilcox, President  
CAD Software sold: Autodesk, Sigma Design, VersaCad

**SAUER COMPUTER SYSTEMS, INC.** Revenue: Less than \$1 Million  
1750 S. Brentwood Avenue, St. Louis, MO 63144. Phone: 314-962-0382  
CONTACTS: Mr. Robert Sauer, President; Mr. Roger W. Gruen, Vice President  
CAD Software sold: Autodesk

**SCAN-GRAPHICS, INC.**  
700 Abbott Drive, Broomall, PA 19008. Phone: 215-328-1040  
CONTACTS: Mr. Larry Krueger, Vice President, Sales & Marketing; Mr. Andrew Trolio, President

**SCORPION SYSTEMS INC.** Revenue: Less than \$1 Million  
P.O. Box 728, 40 E. Patrick Street, Frederick, MD 21701. Phone: 301-663-0539  
CONTACTS: Ms. Karen Blood, President  
CAD Software sold: Cadkey

**SECAD**  
4707 S.W. 72 Avenue, Miami, FL 33155. Phone: 305-661-5092

**SECTOR SYSTEMS CO.**  
416 Ocean Avenue, Marblehead, MA 01945. Phone: 617-631-2878  
CONTACTS: Mr. J. Lehto, President  
CAD Software sold: Generic Software

**SELTECH INC.**  
1800 N W 169th Place, Bldg. A100, Beaverton, OR 97006. Phone: 503-645-6628  
CAD Software sold: Orcad

**SEMAPHORE INC.** Revenue: Less than \$1 Million  
60 E. 42nd Street, Suite 933, New York, NY 10165. Phone: 212-697-1196  
CONTACTS: Mr. Raymond King, President

**SIERRA RESOURCE**  
3739 Meadow Wood Road, Carson City, NV 89701. Phone: 702-885-8106  
CONTACTS: Mr. Don Asp, President  
CAD Software sold: Autodesk

**SIGMA DYNAMICS CORPORATION** Revenue: \$1 to \$3 Million  
7935 E. Prentice Avenue, Suite 209, Englewood, CO 80111. Phone: 303-850-5404  
CONTACTS: Mr. Bill Bollinger, President; Mr. Scot Susmann, Vice President

**SILICON WEST** Revenue: Less than \$1 Million  
2699 E. 28th Street, Suite 416, Signal Hill, CA 90806. Phone: 213-426-3327  
CONTACTS: Mr. Edward Evans, President

**SILTRAN DIGITAL** Revenue: Less than \$1 Million  
2250 Monterey Road, Atascadero, CA 93422. Phone: 805-466-3209  
CONTACTS: Mr. M. F. Hordeski, CEO  
CAD Software sold: Autodesk, VersaCad

**SMALL BUSINESS SYSTEMS, INC.** Revenue: Less than \$1 Million  
P.O. Box 635, Brookfield, IL 60513. Phone: 312-485-8338  
CONTACTS: Mr. Emil I. Bohach, President

**SOCRATES SYSTEMS, INC.**  
9206 12th Avenue S., Minneapolis, MN 55420. Phone: 612-888-2464  
CONTACTS: Mr. John E. Grimaldi, CEO

**SOFTWARE CENTER**  
3821 South Bristol, Santa Ana, CA 92704. Phone: 714-641-0332  
CONTACTS: Mr. Tom Pederson

**SOFTWARE MANAGEMENT**

Revenue: Less than \$1 Million

P.O. Box 767010, Roswell, GA 30076. Phone: 404-998-8281

CONTACTS: Mr. Robert Skor, President

CAD Software sold: Autodesk

**SOUTHERN CAD/CAM INC.**

Revenue: Less than \$1 Million

215 Center Park Drive, Suite 100, Knoxville, TN 37922. Phone: 615-966-3956

CONTACTS: Mr. Calvin Armistead; Ms. Jan Cook

CAD Software sold: Autodesk, Cadkey, Computervision, MCS, Sigma Design

**SPEC SYSTEMS CORPORATION**

Revenue: \$1 to \$3 Million

1088 Bishop Street, Suite 310, Honolulu, HI 96813. Phone: 808-923-9988

CONTACTS: Mr. Gregory D. Kosky, President; Ms. Margot Sharer, Vice President

CAD Software sold: Autodesk, Sigman Design

**SPECIALTY SYSTEMS OF THE SOUTH, INC**

Revenue: Less than \$1 Million

7910 Wrenwood, Suite A, Baton Rouge, LA 70809. Phone: 504-925-5521

CONTACTS: Mr. George J. Harris, Jr., Owner, Vice President, Sales; Mr. Robert Hodges, President

CAD Software sold: Autodesk, Isicad, Sigma Design

**SPECTRUM COMPUTER SERVICES INC.**

Revenue: Less than \$1 Million

141 Orange Street, New Haven, CT 06510. Phone: 203-777-2001

CONTACTS: Mr. James Vanpelt, President

**SPI SOFT PAC INTERNATIONAL**

1871 The Alameda, Suite 100, San Jose, CA 95126. Phone: 408-241-7710

**STEPHEN & ASSOCIATES**

Revenue: Less than \$1 Million

5205 Kearny Villa Way, Suite 104, San Diego, CA 92123. Phone: 619-571-5624

CONTACTS: Mr. Gerry Stephen, President; Mr. Mike Pirie, Engineering Manager

CAD Software sold: Autodesk

**STEVENS ASSOCIATES**

10 Eli's Lane, Duxbury, MA 02332. Phone: 617-773-7383

CONTACTS: Mr. Wayne J. Stevens, CEO

**SUMMIT COMPUTER SYSTEMS**

Revenue: Less than \$1 Million

225 Lafayette Street, New York, NY 10012. Phone: 212-334-8087

CONTACTS: Mr. Stephen K. Swaney, Partner

CAD Software sold: Autodesk, CalComp, Sigma Design, Skok

**SUN-FLEX**

20 Pimental Court, Novato, CA 94947. Phone: 415-883-1221

CONTACTS: Mr. David Render

**SUN-FLEX CO., INC.**

20 Pimental Court, Novato, CA 94927. Phone: 415-883-1221

CONTACTS: Mr. Tony Galt, President

**SUNGRAF AUTOMATED SYSTEMS**

311 W. Ansin Blvd., Hallandale, FL 330093183. Phone: 305-458-5100

CONTACTS: Mr. Bob Flipse, Marketing Director; Mr. James Quinn, Vice President

**SUPPORT SYSTEMS**

Revenue: Less than \$1 Million

514 Parquet Street, Sebastopol, CA 95472. Phone: 707-829-0569

CONTACTS: Mr. Clay Von Mueller, President

**SYS COMP CORP.**

Revenue: \$1 to \$3 Million

9977 Jefferson Blvd., Culver City, CA 90230. Phone: 213-204-1175

CONTACTS: D. F. Burnside, Vice President, Marketing; T. V. O'Rourke, President

**SYSTEC CONSULTING GROUP**

510 E. William Street, Ann Arbor, MI 48104. Phone: 313-761-1266

CONTACTS: Keason Sanvordenker, President

CAD Software sold: Autodesk

**SYSTEMS DESIGN**

45 Colvin Avenue, Albany, NY 12206. Phone: 518-438-8410

CONTACTS: Mr. Pierre Douyon, Partner

**SYSTEMS SUPPORT, INC.** Revenue: Less than \$1 Million  
436 12th Street, Dunbar, WV 25064. Phone: 304-766-7762  
CONTACTS: Mr. Max Damaschko, President

**SYSTEMS UNLIMITED**  
100 N. Winchester, Suite 260, San Jose, CA 95120. Phone: 408-247-1142  
CONTACTS: Mr. Robert Pantangco

**TECHNICAL SOFTWARE, INC.** Revenue: \$1 to \$3 Million  
28790 Chagrin blvd., Suite 300, Cleveland, OH 44122. Phone: 216-765-1133  
CONTACTS: Mr. Greg Malkin  
CAD Software sold: Autodesk

**TECHNIDATA, LTD.** Revenue: Less than \$1 Million  
1067 Kentwood Avenue, Cupertino, CA 95014. Phone: 408-255-1317  
CONTACTS: Mr. Michael Landis, President  
CAD Software sold: Autodesk

**TELECAD**  
7952 Capwell Drive, Oakland, CA 94621. Phone: 415-635-1988

**TELEWARE, INC.**  
48 Brattle Street, Cambridge, MA 02138. Phone: 617-876-5571  
CONTACTS: Mr. Timothy W. Armour, Vice President, Marketing & Sales; Mr. Allan D. Stejskal, President  
CAD Software sold: Autodesk

**THE BEYDLER COMPANY/CADD** Revenue: \$1 to \$3 Million  
9850 North 32nd Street, Suite One, Phoenix, AZ 85028. Phone: 602-482-9333  
CONTACTS: Mr. John Beydler, President  
CAD Software sold: Autodesk, Computervision, Sigma Design

**THE CAD ROOM INC.** Revenue: Less than \$1 Million  
707 N. Washington, Wichita, KS 67214. Phone: 316-264-8148  
CONTACTS: Mr. Jim Clough  
CAD Software sold: Aries, CADAM

**THE ESSENTIAL DESIGN, INC.**

Revenue: Less than \$1 Million

Tower Two 4th State Avenue, Suite 101, Kansas City, KS 66101. Phone: 913-321-3300

CONTACTS: Mr. Edwin Coleman, President

**THE KNOWLEDGE BANC**

Revenue: Less than \$1 Million

7301 Mission Road, Suite 248, Prairie Village, KS 66208. Phone: 913-432-7762

CONTACTS: Mr. Wayne Auer, Vice President, Marketing & Sales; Mr. Steve Chandler, President  
CAD Software sold: ProDesign**THE KOFFLER GROUP**

3029 Wilshire Blvd., Santa Monica, CA 90403. Phone: 213-453-1844

CONTACTS: Ms. Eileen Norton, Marketing Director

**THE LAUNCHING PAD STUDIOS, INC.**

500 East 77th Street, New York, NY 10021. Phone: 212-734-7513

CONTACTS: Mr. Barry Waldman, CEO

**THE LOOKOUT COMPUTER TECH**

P.O. Box 1210, Grand Union Plaza, Hopewell Junction, NY 12533. Phone: 914-221-2781

CONTACTS: Mr. Bill Matthes

**THE MICROCOMPUTER CENTER INC.**

7668 Belair Road, Baltimore, MD 21236. Phone: 301-668-2600

CONTACTS: Mr. Jack D. Snell

**THE OFFICE WORKS COMPUTER CENTER**

1706 Hempstead Road, P.O. Box 10128, Lancaster, PA 17605. Phone: 717-397-7766

CONTACTS: Mr. Dave Warfel, Inventory Control Manager; Mr. Kurt Kilheffer, System Engineer  
CAD Software sold: Autodesk**THE POSTHAUER COMPANY, INC.**

Revenue: \$1 to \$3 Million

P.O. Box 820349, Houston, TX 772820349. Phone: 713-493-2085

CONTACTS: Mr. Louis Posthauer, CEO



**THE SOFTWARE FIRM** Revenue: Less than \$1 Million  
736 E. Cork Street, Kalamazoo, MI 49001. Phone: 616-381-4527  
CONTACTS: Mr. Frank Lucatelli, President

**TIME COMPUTER DISTRIBUTION** Revenue: Less than \$1 Million  
4402 S. 800 E., Zionsville, IN 46077. Phone: 317-769-6183  
CONTACTS: Mr. Bob Lueck, President, Owner

**TINGEN TECHNICAL SALES**  
2809 Milbrook Road, Suite 203, Rolly, NC 27604. Phone: 919-878-4440  
CONTACTS: Ms. Judy Tingen, Office Manager  
CAD Software sold: Orcad

**TIPNIS, INC.** Revenue: Less than \$1 Million  
10815 Indeco Drive, Cincinnati, OH 45241. Phone: 513-791-3805  
CONTACTS: Mr. V. A. Tipnis, President

**TKF SYSTEMS** Revenue: Less than \$1 Million  
Suite A3, 5478 Harpers Farm Road, Columbia, MD 21044. Phone: 301-730-3542  
CONTACTS: Mr. Ted Fryberger, President

**TODAYS COMPUTERS BUSINESS CENTER** Revenue: \$1 to \$3 Million  
5530 O Street, Lincoln, NE 68510. Phone: 402-466-8191  
CONTACTS: Mr. Eiden Ehrlich, Sales Manager  
CAD Software sold: Autodesk

**TOTAL SUPPORT COMPUTER SYSTEMS**  
3804 W. Alva Street, P.O. Box 15395, Tampa, FL 33614. Phone: 813-876-5990  
CONTACTS: Mr. Gib Gerard, President  
CAD Software sold: Autodesk, A/E Microsystems, Civilsoft

**TRA-TECHNICAL RESOURCES OF AMERICA**  
158 W. 29th Street, New York, NY 10001. Phone: 212-714-0850  
CONTACTS: Mr. Terry J. Taddeo, Marketing Director; Mr. Elliott Kayne, Sales Director  
CAD Software sold: Autodesk

**TRIAD INTERNATIONAL**

Revenue: Less than \$1 Million

151 Mineola Avenue, Roslyn Heights, NY 11577. Phone: 516-625-0910

CONTACTS: Mr. Lee Epstein, Vice President, Marketing; Mr. Richard Brassel, President

**TRINITY GRAPHICS, INC.**

11 South 2nd Avenue, St. Charles, IL 60174. Phone: 312-584-0505

CONTACTS: Mr. Dennis Mitchell

**TUSAR CORPORATION**

6016 E. Lark Fur, Scottsdale, AZ 85254. Phone: 602-998-3688

CAD Software sold: Orcad

**US DESIGN CORP.**

Revenue: \$5 + Million

4311 Forbes Blvd., Lanham, MD 20706. Phone: 301-577-2880

CONTACTS: Mr. Warren Allen, Vice President, Marketing; Mr. John Tincler, President

**VALCOM COMPUTER CENTER**

25-29 W. 6th, Fremont, CA 68025. Phone: 402-721-1102

CONTACTS: Mr. Ed Dullea

CAD Software sold: Autodesk

**VEGRZYN SARVER ASSOCIATES**

Revenue: Less than \$1 Million

218 W. Laffayette Street, Ottawa, IL 61350. Phone: 815-434-7225

CONTACTS: Mr. Dennis Graham, President

CAD Software sold: Civilsoft

**VENTURE DATA SYSTEMS INC.**

Revenue: Less than \$1 Million

1311 N. El Camino Real, San Clemente, CA 92672. Phone: 714-496-9387

CONTACTS: Mr. Charles Haycraft, President

**VERITECHNOLOGY ELECTRONICS CORP.**

P.O. Box 167, St. Joseph, MI 49085. Phone: 616-982-3202

CONTACTS: Mr. Joseph M. Schulte

**VIDON SYSTEMS**

2414 S. Fairview Street, Suite 207, Santa Ana, CA 92704. Phone: 714-540-0626  
CONTACTS: Mr. Don J. Albano, President  
CAD Software sold: Autodesk

**VILLAGE COMPUTERS**

Revenue: Less than \$1 Million

704 Broadway, New York, NY 10012. Phone: 212-254-9191  
CONTACTS: Mr. Scott Anderson, Sales Manager  
CAD Software sold: Autodesk, Generic Software

**VIRGINIA PANEL COMPANY**

1400 New Hope Road, Waynesboro, VA 22980. Phone: 703-949-8376  
CONTACTS: Mr. Walter Hageman

**W. C. KOEPF ASSOCIATES**

68 Olive Street, Chagrin Falls, OH 44022. Phone: 216-247-5129  
CONTACTS: Mr. William Koepf  
CAD Software sold: Computervision

**WALKER ENGINEERING INC.**

9301 Sturgeon Drive, Overland Parks, KS 66231. Phone: 913-888-0089  
CONTACTS: Mr. Ron Walker, President  
CAD Software sold: Orcad

**WAREFORCE**

106 Standard Street, El Segundo, CA 90245. Phone: 213-233-0838  
CONTACTS: Ms. Kallie Sparman, President  
CAD Software sold: Autodesk

**WASHINGTON COMPUTER SERVICES**

Revenue: \$1 to \$3 Million

155 Avenue of the Americas, New York, NY 10013. Phone: 212-741-2320  
CONTACTS: Mr. Jeffrey Goldberg, President  
CAD Software sold: Autodesk

**WESTERN DATAGRAPHICS CORP.**

14 Hughes Street, Suite 160, Irvine, CA 92718. Phone: 714-768-3345  
CONTACTS: Mr. Steven Jester, President

**WESTWOOD COMPUTERS**

Revenue: \$1 to \$3 Million

155 Route 22 East, Springfield, NJ 07081. Phone: 201-376-4242

CONTACTS: Mr. Louis Tischler, President

**WILSON SYSTEMS GROUP INC.**

4927 West Genessee Street, Camillus, NY 13031. Phone: 315-487-3033

CONTACTS: Mr. James M. Wilson, President

**WJW SALES**

4611 North 79th Drive, Phoenix, AZ 85033. Phone: 602-954-3081

CONTACTS: Ms. Cindy Dupont

**WOLF COMPUTER**

Revenue: \$5+ Million

105 N. Santa Cruz Avenue, Los Gatos, CA 95030. Phone: 408-354-1210

CONTACTS: Mr. Donald A. Wolf, President

CAD Software sold: Autodesk, Versacad

**WORDLINK, INC.**

Revenue: Less than \$1 Million

24 East Green Street, Champaign, IL 61820. Phone: 217-359-9378

CONTACTS: Mr. Dennis Graham, President

**XCEL COMPUTER SYSTEMS**

Revenue: Less than \$1 Million

1540 West 6th Street, Mishawaka, IN 46544. Phone: 219-255-9608

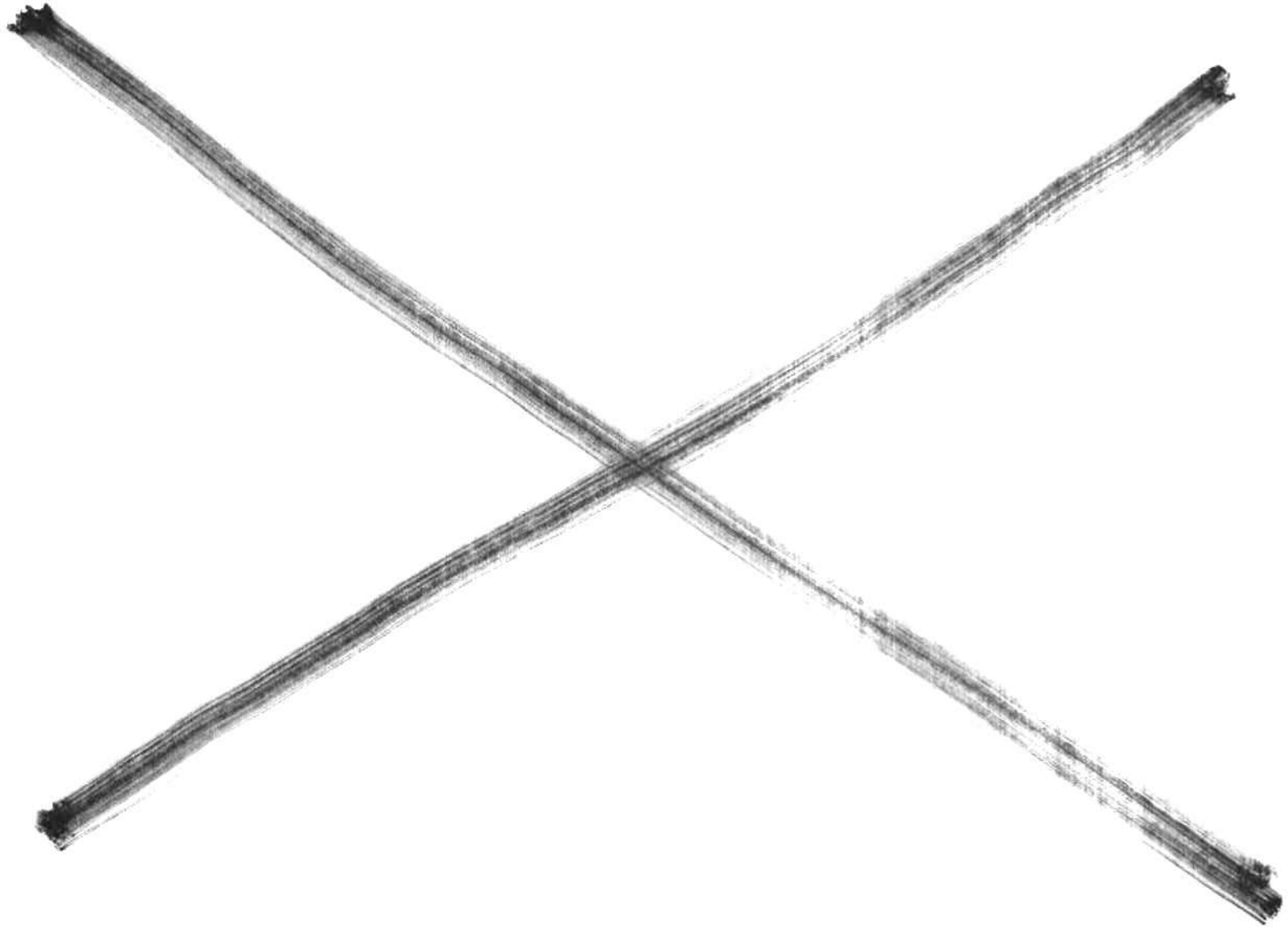
CONTACTS: Mr. John A. Brickley, Jr., President

CAD Software sold: Autodesk, Cimlinc

**XE-DAK, INC.**

3322 Maple Drive, Pittsburgh, PA 15237. Phone: 412-761-7801

CONTACTS: Ms. Kathryn Ernst, President



# Research Newsletter

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## PC CAD HITS ITS STRIDE

### THE PC CAD MARKET IN 1988

PC CAD flourished in 1988, continuing another year of record growth. Revenue rose 24 percent, which was above the industry average. (See Tables 1 through 9 at the end of this newsletter for a complete overview of the PC CAD market from 1988 through 1993). The 1988 market leaders featured well-known brand names: Apple, Autodesk, and Compaq. By the end of the year, Compaq had unseated IBM for the number one market position in two important categories:

- Total CAD/CAM/CAE revenue on the PC platform
- Number of seats shipped in the entire CAD/CAM/CAE market

In software, Autodesk's number one market position appears untouchable for the foreseeable future. Among the second tier companies, PC products from large traditional CAD companies grew faster than those from the small unknown vendors. Few companies entered the PC CAD market in 1988.

The revenue of PC CAD vendors of all sizes generally grew or held steady in 1988. Our PC CAD data represent revenue from a very large sample: 175 vendors and their subsidiaries, some of which are miniscule. While the CAD industry as a whole experienced mind-numbing consolidation, the small PC CAD software vendors generally neither left the market nor were acquired in 1988, with the notable exception of Autodesk's purchase of Generic Software.

Typically, vendors were busy either developing products for the Macintosh, or wringing higher performance from existing software. The scrappy, upstart nature of the PC CAD market has not vanished, but cost-conscious innovation has shifted from improving application software to wresting better CAD performance from hardware and system software.

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## **The PC CAD Platform**

The Intel 80386 processor deserves significant credit for PC CAD growth in 1988, because its power was just what existing CAD software needed. More than any other PC-based application, existing CAD software provided the showcase for 80386 performance. Buyers saw existing PC software change from being a "make-do" product on the 286 CPU to being an "almost-workstation" product on a 386-based system. By midyear, it was clear that CAD is a key driver of the high-end PC market, and vendors of PC CAD system components began cooperating to produce more powerful systems.

During 1988, relationships strengthened among CAD software suppliers, computer manufacturers (especially Compaq), graphics hardware suppliers, and operating system suppliers. PC hardware manufacturers focused on CAD as a key driver of their high-end products and worked steadily to drive up product performance. Thus, the CAD software supplier is no longer working alone to deliver the highest performance on a PC system. Vendors supplying any component of a high-end PC CAD system typically tweak their products toward boosting CAD software performance.

## **Where Do PCs End and Workstations Begin?**

PC and technical workstation vendors achieved significant overlap in 1988, with PC hardware vendors relentlessly driving up performance and options while technical workstation vendors pushed their products toward the commodity arena by lowering prices and adding DOS compatibility. For several years, Dataquest had been predicting the merger of the PC and low-end technical workstation CAD markets, and 1988 was the year it became measurable.

## **PC and Workstation Definitions**

### *Personal Computer*

This is a single-user computer that is distinguished from a technical workstation by its features and by the user's potential range of expansion on the platform. Features found in technical workstations (such as a virtual operating system, networking, high-performance graphics, and multiuser/multitasking capability) are optional, rather than integrated by the manufacturer. Many users reach a migration path ceiling at the high end of the PC product line, both in computer performance and sophistication of available application software (for example, a Mac II or Compaq 386 user is operating at the platform ceiling; the next move upward is to the technical workstation platform).

### *Technical Workstation*

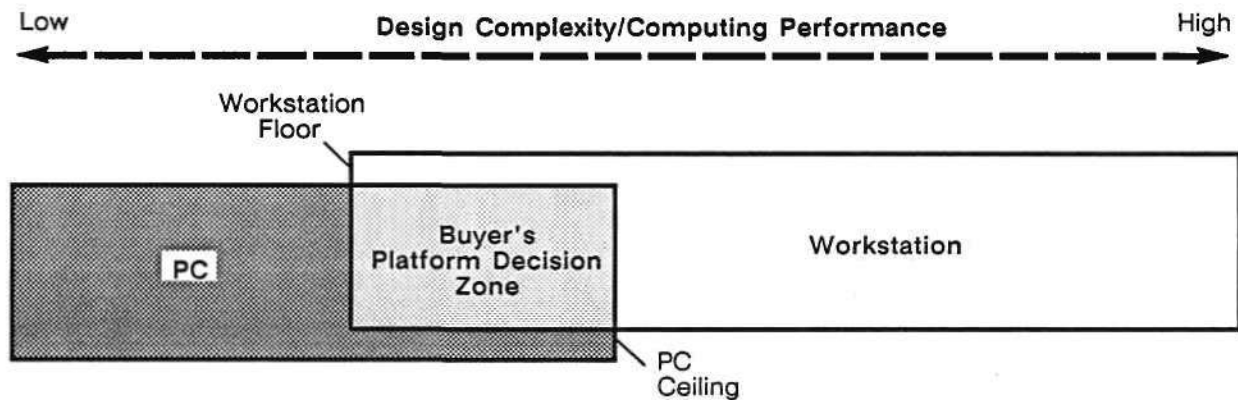
This is a single-user computer that is distinguished from a personal computer by its features and by the user's potential range of expansion on the platform. Its features include a virtual, multitasking operating system (UNIX, VMS, or DOMAIN). The computer is designed by a manufacturer to run high-performance graphic applications in a

multiuser/multitasking environment. Many users reach a migration path limit at the low end of the workstation product line (for example, the Sun 386i user is operating at the platform floor; the next move downward is to the personal computer platform).

Although Dataquest's glossary definition clearly distinguishes between the two platforms (see Figure 1), computer manufacturers are working overtime to claim every feature possible, and distinctions blur a little more each week. As a result, we expect long-term distinctions between the two platforms to eventually become more a function of intended use than of performance. "PC" will continue to describe a product bought by the price-conscious user to solve design problems limited to the lower end of the design complexity spectrum. "Technical workstation" will continue to describe a product bought by the user who must be able to solve—or grow to solve—the more complex design problems, at an admittedly higher cost per system seat.

Figure 1

Personal Computers versus Technical Workstations



PC Advantages

- Price-conscious image
- Wide range of low-cost business software
- Low system overhead cost
- Model upgrades easy to justify by passing castoffs downward throughout organization
- Future platform for software with "80% of the function at 20% of the price."

Workstation Advantages

- Prestige image
- Wide range of design and analysis software
- High graphics/computing power
- Integrated multitasking/multiuser work-group environment
- Future platform for leading edge design software

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Source: Dataquest  
May 1989



## CURRENT INDUSTRY TRENDS

The trends driving the low-end CAD market in 1988 and 1989 are as follows:

- Moving up—Growth is occurring at the high end of PC systems, which means that the trend to grow or at least maintain average selling prices on this platform will continue.
- Wait and see—Uncertainty over the future of low-end operating systems appears to have discouraged entrants, innovation, and investments in both PC CAD/CAE software and third-party hardware.
- Lookalike PCs and workstations—Now that PCs and low-end technical workstations are converging toward becoming one market, they will start offering more and more of each other's features, much like diners at a potluck sampling one another's entrées.
- Maturing vendor distribution strategies—For CAD software suppliers, developing effective distribution strategies in a consolidating dealer channel will be as important as the product itself.
- Challenges for resellers—Technical workstations will start to actually ship through dealers and VARs, and may sorely test the resellers' abilities to grow to meet new and more sophisticated support requirements.
- Power for Apple—Increased market presence for Apple in 1989, as Autodesk's presence legitimizes the Mac as a CAD platform.

## MARKET SHARES

Table 4 illustrates the position of CAD/CAE in the overall PC marketplace. The percent of 386-based units shipped to CAD/CAE applications reaches as high as 20 to 25 percent for computers offering a brand name recognized for CAD performance (such as Compaq) or products packaged for dealer needs (such as Everex). Still, the industry average of 12 percent of 386-based machines shipped to CAD applications emphasizes the importance that CAD now has to high-end PC manufacturers.

Software unit prices stabilized and actually rose somewhat in 1988. Autodesk, which sets the pace, has driven its Autocad factory revenue up to a worldwide average of \$1,550 (\$1,400 in the United States) per unit during the past five years. These are now the price points against which other high-end PC CAD vendors negotiate.

Facing the fact that low prices produce low revenue, several vendors of software list priced at less than \$500 also worked to boost factory average selling prices (ASP), with a small net gain in the marketplace. In 1988 the less than \$500 software accounted for 8 percent of software revenue and 56 percent of the units sold, up from 6 percent of PC CAD software revenue and 56 percent of units sold in 1987.

## **Autodesk**

Every year of Autodesk's existence has been remarkable, and 1988 was no exception. Autodesk's 20.7 percent market share in PC-based CAD software understates the company's influence. Autodesk, Mentor Graphics, and Prime/Computervision all have approximately equal software revenue. These companies also have approximately equal influence in CAD/CAE, but each in very different market segments.

Autodesk has no close, direct competition; instead, it has hundreds of small competitors worldwide. Today, Autodesk's financial strength, large installed base, and control of the DXF file format means that its products are perceived as the safe buy in many PC-based mechanical and AEC applications.

Despite its soaring revenue, Autodesk did experience frustrations in 1988, particularly with the delay in shipping Autocad for the Macintosh. Autodesk's push to move up in performance with AutoSolid was another disappointment, as the product captured little attention. However, Autocad itself is now so popular that 5 percent of Autocad revenue comes from workstation- and host-based products.

## **Compaq**

Compaq, with its emphasis on system engineering, met market demand for PC-priced high-performance systems precisely. The company reaped its reward in revenue, unseating IBM for the number one position in total PC CAD revenue. It is now fair to say that both Compaq and Autodesk represent the leading vendors influencing PC-based CAD, even though Compaq only manufactures computers.

During 1988, Compaq drove its product line upward with its leading-edge 80386 systems. Just as important, the company also reached out to influence a wide variety of third-party developers. The company is now functionally operating as "glue" in the high-performance PC market by serving as an information and coordination resource to any supplier that can make the Compaq computer look good in high-end applications. Compaq's well-coordinated activity contributed significantly to the PC challenge to workstations.

## **IBM**

IBM's position on its Micro Channel Architecture cost the company its number one position in PC CAD revenue in 1988. In 1988, demand in CAD was at the high end of all PC product lines, at a time when the high end of IBM's PS/2 line emphasized OS/2 and the Micro Channel Architecture, features for which there were no available CAD products. Although IBM shipped slightly fewer personal computers in 1988 than in 1987—in all applications—the drop was especially acute in CAD.

## **Apple**

In 1988, Apple shipped record numbers of Macintoshes into technical and engineering environments (19 percent of Mac IIs, at last count), and established a clear market awareness of its potential as a serious CAD platform. However, few CAD software vendors actually shipped packages for the Mac in 1988. Thus, we place much of Apple's revenue in the general-purpose technical application category, rather than in the CAD category.

However, after a year of frantic development by independent software vendors, Apple is exquisitely positioned this year for a drive in CAD. A reasonable selection of CAD software is finally available, and the product is already selling briskly into engineering environments. The Mac has enormous potential to meet the demand from the legions of architects, engineers, and designers who either do not like computers or want the machine to explain itself.

## **MARKET OUTLOOK FOR THE 1990S**

Major growth opportunities we see in the low-end CAD market over the next five years include the following:

- High-end, PC-based CAD systems will continue to win price-conscious buyers by offering low-end workstation performance at a substantially lower system cost per seat.
- Products will incorporate ease of learning for casual users (the Macintosh is the only example of this).
- Distribution channels will be developed as competitive weapons.
- AEC prospects will be more willing to make purchases now that CAD is a known quantity and as PC-based CAD becomes even easier to learn.

## **Application Forecast**

AEC, mapping, and mechanical applications represent the best opportunities for growth during the next five years (see Table 5). Electronic applications on the PC have already begun to drop, and the future looks even dimmer. We believe that, because of both the current level of sophistication in the application and the demand for integrated design environments, technical workstations will be the machine of choice in most future EDA sales.

## **Regional Forecast**

Dataquest's regional PC CAD forecast is shown in Table 6. Compared with the rest of the CAD/CAE industry, the North American market is forecast to remain substantially larger than the other regional markets, primarily because of the more developed CAD dealer channel in the United States and Canada.

## **Average Selling Prices**

Dataquest's forecast for average selling prices of PC-based CAD products is shown in Table 7. PC prices in both hardware and software are expected to hold relatively steady during the next five years (particularly compared with the sharper drop in ASPs we predict for technical workstations).

## **Revenue Source Forecast**

We expect PC CAD software to increase as a percent of system revenue, as software vendors continue to focus on moving workstation-based software features down to personal computers, in order to grow average selling prices (see Table 8).

## **Distribution Forecast**

The last of the turnkey PC CAD markets crumbled in 1988, as the larger CAD companies became increasingly committed to selling PC-based products through dealers. The temptation to have the best of both worlds is strong, however. Vendors of both software and hardware still claim rights to sell direct to high-volume accounts, so a small amount of turnkey sales may persist for a few years (see Table 9).

Distribution is PC CAD's battle zone. The entire PC dealer/distributor industry appears to be entering a period of consolidation, and CAD applications will be taken along for the ride. Two factors are pushing this consolidation:

- The easiest way for a dealer to grow is through acquisition.
- The one constant in the vendors' shifting reseller policies has been a bias toward volume-based discounts, which rewards the biggest buyers in the distribution chain.

Generally, distribution of PC-based products has operated as a cutthroat business, and discounting—with its accompanying pressure on profits—will likely continue to plague PC CAD resellers. We believe that distribution in the 1990s will be much more competitive—for the vendors. Distribution of computers is at a much more rough-and-tumble state than distribution of more mature industries, such as foods or automotive. The early 1990s should produce considerable experimentation in the search for a stable and economically efficient division of labor in distributing personal computers and low-end technical workstations. One fact is clear: The pool of skilled technical application resellers is painfully small. Vendors will likely be forced to grant more concessions and give more support to distribution channels.

*Kathryn Hale*

Table 1

Personal CAD 1988 Worldwide Market Share  
(Millions of Dollars and Actual Units)

	Revenue	Units	Revenue Share	Units Share
	=====	=====	=====	=====
Compaq	250.0	48,000	14.0%	19.9%
IBM	170.6	26,966	9.6%	11.2%
Apple Computer	150.0	35,000	8.4%	14.5%
Autodesk	111.4	0	6.3%	.0%
NEC	93.0	9,978	5.2%	4.1%
Mutoh Industries	56.8	1,355	3.2%	.6%
Hewlett-Packard	50.0	10,000	2.8%	4.1%
Fujitsu	44.5	2,031	2.5%	.8%
Hitachi	38.5	700	2.2%	.3%
Prime Computer	35.8	257	2.0%	.1%
Hakuto	26.2	298	1.5%	.1%
Zenith	23.6	8,000	1.3%	3.3%
Racal-Redac	22.6	0	1.3%	.0%
CADAM	16.9	0	1.0%	.0%
Olivetti	16.7	2,992	.9%	1.2%
Daisy Systems	14.8	265	.8%	.1%
Intergraph	14.2	0	.8%	.0%
Ziegler Instruments GmbH	14.1	0	.8%	.0%
Everex	13.5	6,750	.8%	2.8%
Futurenet	12.8	0	.7%	.0%
Other	605.3	88,531	34.0%	36.7%
All Companies	1,781.4	241,122	100.0%	100.0%
All U.S.-Based Companies	1,341.4	219,155	75.3%	90.9%
All Asian-Based Companies	326.6	16,672	18.3%	6.9%
All European-Based Companies	113.4	5,295	6.4%	2.2%
All Hardware Companies	989.8	225,519	55.6%	93.5%
All Turnkey & SW Companies	791.6	15,603	44.4%	6.5%

Source: Dataquest  
May 1989

Table 2

Personal CAD 1988 Software Market Share by Revenue

	Software Revenue *****	Software Units *****	Revenue Share *****	Units Share *****
Autodesk	111.4	94,194	20.7%	19.8%
Prime Computer	28.7	15,880	5.3%	3.3%
Racal-Redac	22.5	5,760	4.2%	1.2%
Mutoh Industries	20.3	2,317	3.8%	.5%
CADAM	15.9	3,037	3.0%	.6%
Intergraph	13.4	8,645	2.5%	1.8%
Ziegler Instruments GmbH	13.3	1,000	2.5%	.2%
Hitachi	11.6	1,171	2.1%	.2%
Futurenet	10.8	3,613	2.0%	.8%
Fujitsu	10.6	2,760	2.0%	.6%
Hakuto	10.4	582	1.9%	.1%
CADKEY	10.3	7,360	1.9%	1.5%
Xilinx	9.7	1,900	1.8%	.4%
Daisy Systems	7.2	319	1.3%	.1%
Generic Software	7.1	66,000	1.3%	13.9%
View Logic	6.7	2,625	1.2%	.6%
Wacom	6.5	1,000	1.2%	.2%
Olivetti	6.4	901	1.2%	.2%
Andor	6.3	2,130	1.2%	.4%
EESOF	6.1	610	1.1%	.1%
All Companies	538.4	476,094	100.0%	100.0%

Source: Dataquest  
May 1989

Table 3

Personal CAD 1988 Software Market Share by Units

	Software Revenue *****	Software Units *****	Revenue Share *****	Units Share *****
Autodesk	111.4	94,194	20.7%	19.8%
Generic Software	7.1	66,000	1.3%	13.9%
Evolution Computing	1.8	35,750	.3%	7.5%
American Small Business Comp.	3.3	21,667	.6%	4.6%
Innovative Data Design	2.5	18,000	.5%	3.8%
Prime Computer	28.7	15,880	5.3%	3.3%
Foresight Resources	3.1	15,500	.6%	3.3%
Orcad	4.9	13,514	.9%	2.8%
Micrografx	3.0	13,333	.5%	2.8%
Omaton	3.5	11,666	.7%	2.5%
Superdraft	2.6	8,944	.5%	1.9%
Intergraph	13.4	8,645	2.5%	1.8%
CIVILSOFT	1.1	8,000	.2%	1.7%
CADKEY	10.3	7,360	1.9%	1.5%
Racal-Redac	22.5	5,760	4.2%	1.2%
ISICAD	5.2	5,200	1.0%	1.1%
Accel Technologies	2.0	5,000	.4%	1.1%
Strategic Locations Planning	2.3	5,000	.4%	1.1%
Robocom	4.1	4,925	.8%	1.0%
Design Automation	5.4	4,000	1.0%	.8%
All Companies	538.4	476,094	100.0%	100.0%

Source: Dataquest  
May 1989

Table 4

PC CAD/CAE Share of Total PC Market  
(Thousands of Units)

	All PCs	CAD Applications	Percent in PC CAD
80386-based	1,124	135	12%
80286-based	6,147	73	1%
Macintosh	878	35	4%
PCs in Scientific/Technical Applications	889	243	27%
All PCs (excluding home/hobby)	6,509	243	4%

Source: Dataquest  
May 1989



Table 5

Personal CAD Worldwide Forecast by Application  
(Millions of Dollars and Actual Units)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
<b>All Applications</b>							
Revenue	1,782	2,071	2,259	2,334	2,308	2,292	5.2%
Systems	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
Workstations	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
<b>Mechanical</b>							
Revenue	970	1,079	1,115	1,135	1,083	1,024	1.1%
Systems	143,354	164,320	177,310	188,970	192,810	191,920	6.0%
Workstations	143,354	164,320	177,310	188,970	192,810	191,920	6.0%
<b>AEC</b>							
Revenue	385	513	636	711	755	803	15.8%
Systems	61,867	83,730	104,870	121,970	136,730	150,940	19.5%
Workstations	61,867	83,730	104,870	121,970	136,730	150,940	19.5%
<b>Mapping</b>							
Revenue	78	118	168	214	256	310	31.7%
Systems	4,977	6,780	8,450	9,190	9,430	9,580	14.0%
Workstations	4,977	6,780	8,450	9,190	9,430	9,580	14.0%
<b>Electronic CAE</b>							
Revenue	179	178	163	127	95	63	-19.0%
Systems	15,873	15,830	16,000	13,420	11,240	7,530	-13.9%
Workstations	15,873	15,830	16,000	13,420	11,240	7,530	-13.9%
<b>IC Layout</b>							
Revenue	14	18	19	13	9	6	-14.4%
Systems	358	600	700	490	400	280	-4.5%
Workstations	358	600	700	490	400	280	-4.5%
<b>PCB Layout</b>							
Revenue	156	165	158	133	109	86	-11.1%
Systems	15,606	17,390	17,270	14,260	11,600	9,140	-10.1%
Workstations	15,606	17,390	17,270	14,260	11,600	9,140	-10.1%

Source: Dataquest  
May 1989

Table 6

Personal CAD Worldwide Forecast by Region  
(Millions of Dollars and Actual Units)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
<b>Worldwide</b>							
Revenue	1,782	2,071	2,259	2,334	2,308	2,292	5.2%
Systems	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
Workstations	242,037	288,650	324,610	348,300	362,200	369,390	8.8%
<b>North America</b>							
Revenue	826	971	1,079	1,132	1,146	1,162	7.1%
Systems	139,164	163,750	180,250	191,380	198,830	200,480	7.6%
Workstations	139,164	163,750	180,250	191,380	198,830	200,480	7.6%
<b>Europe</b>							
Revenue	455	545	595	605	591	575	4.8%
Systems	61,484	74,770	85,230	90,920	94,410	95,760	9.3%
Workstations	61,484	74,770	85,230	90,920	94,410	95,760	9.3%
<b>Far East</b>							
Revenue	475	528	553	559	530	510	1.4%
Systems	37,210	45,850	53,910	59,440	61,570	64,250	11.5%
Workstations	37,210	45,850	53,910	59,440	61,570	64,250	11.5%
<b>Rest of World</b>							
Revenue	26	27	32	38	40	45	11.6%
Systems	4,178	4,270	5,220	6,560	7,390	8,910	16.4%
Workstations	4,178	4,270	5,220	6,560	7,390	8,910	16.4%

Source: Dataquest  
May 1989

**Table 7**

**Personal CAD Worldwide Average Selling Price Forecast  
(Thousands of Dollars)**

	1988	1989	1990	1991	1992	1993	CAGR
	----	----	----	----	----	----	----
Turnkey & Hardware-Only	5.3	5.1	4.8	4.5	4.1	3.9	-6.0%
Turnkey	18.5	18.8	17.3	16.1	15.1	13.7	-5.8%
Hardware-Only	4.3	4.4	4.3	4.1	3.8	3.6	-3.5%

Source: Dataquest  
May 1989

**Table 8**

**Personal CAD Worldwide Forecast by Revenue Sources  
(Millions of Dollars)**

	1988	1989	1990	1991	1992	1993	CAGR
	----	----	----	----	----	----	----
Hardware	1,214	1,346	1,451	1,466	1,400	1,337	1.9%
Software	534	654	734	794	835	883	10.6%
Service	67	71	73	74	73	72	1.5%
Total	1,782	2,071	2,259	2,334	2,308	2,292	5.2%

Source: Dataquest  
May 1989

Table 9

Personal CAD Worldwide Forecast by Distribution Class  
(Millions of Dollars and Actual Units)

	1988	1989	1990	1991	1992	1993	CAGR
	****	****	****	****	****	****	****
<b>Total Hardware and Software Revenue</b>							
Turnkey	280	306	250	227	202	173	-9.2%
Unbundled	1,468	1,694	1,936	2,033	2,033	2,047	6.9%
Total	1,748	2,000	2,185	2,260	2,235	2,220	4.9%
<b>Hardware Revenue</b>							
Turnkey	184	183	138	119	103	83	-14.8%
Unbundled	1,030	1,163	1,313	1,347	1,297	1,254	4.0%
Total	1,214	1,346	1,451	1,466	1,400	1,337	1.9%
<b>Software Revenue</b>							
Turnkey	96	123	112	108	99	90	-1.1%
Unbundled	439	531	622	686	736	793	12.6%
Total	534	654	734	794	835	883	10.6%
<b>Workstation Shipments</b>							
Turnkey	16,518	14,375	11,876	11,177	10,379	9,346	-10.8%
Unbundled	225,519	274,280	312,730	337,120	351,820	360,040	9.8%
Total	242,037	288,650	324,610	348,300	362,200	369,390	8.8%

Source: Dataquest  
May 1989

# Research Newsletter

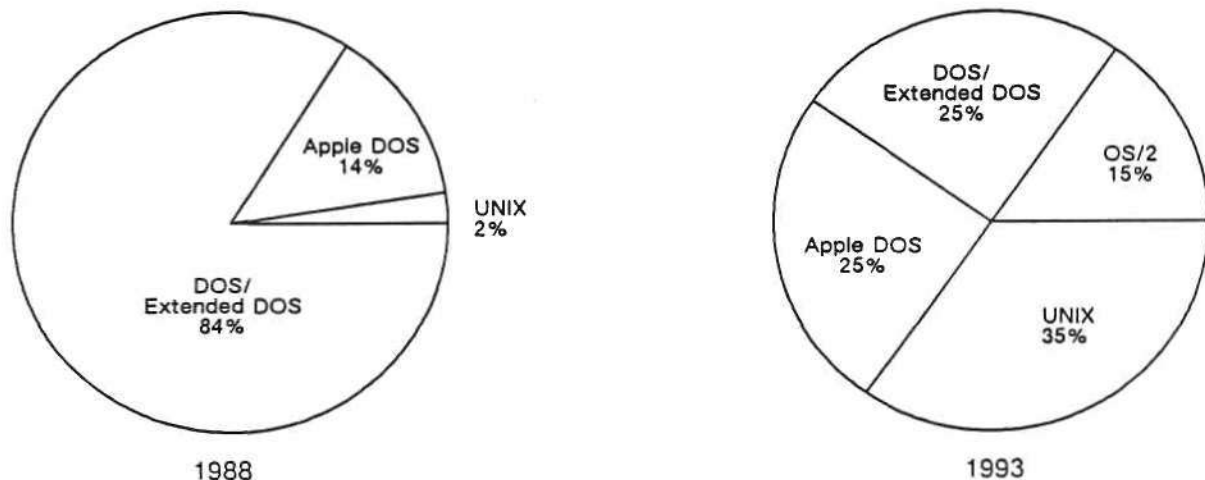
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## CHANGE AND CHALLENGE IN PC CAD OPERATING SYSTEMS

Some of the most important PC CAD software changes in the last year have had more to do with operating systems than with CAD/CAE features and functions. Because the future of low-end operating systems is vital to every participant in this market, Dataquest completed a forecast for low-end operating systems in CAD applications, and its results are shown in Figure 1. This newsletter presents our forecast and discusses some of the changes and challenges facing PC CAD operating systems.

Figure 1

### PC CAD Operating System Forecast



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Source: Dataquest  
May 1989

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## THE FUTURE OF LOW-END CAD OPERATING SYSTEMS

The anticipated success of several operating systems reflects our conviction that software vendors that commit to one operating system are taking a significant business risk. Forecast growth in Apple DOS reflects our positive outlook for the Macintosh. The growth in UNIX indicates our expectation that, when engineering users leave the DOS operating system, they will go to UNIX, where their more computer-sophisticated peers are. OS/2 is generally perceived as a high-overhead office-oriented product that limits CAD performance. We believe that a single-user, lower-overhead UNIX will take hold among PC CAD users, and that Santa Cruz Operations' Open Desktop (a device-independent, standards-oriented UNIX for 386-based computers) will be the principal contender.

Dataquest believes that OS/2 will achieve virtually negligible penetration in PC CAD unless and until it first achieves compelling success in business application software, which is not available under DOS. This is unlikely to occur before 1992 or 1993. Although OS/2 is forecast to have the lowest penetration in CAD in our five-year forecast, IBM is holding the card that could turn the tables. OS/2 is seen universally as a product that is tied to the Micro Channel Architecture. If IBM were to drastically reduce or eliminate royalties on its Micro Channel Architecture, it is likely that the major developers would enthusiastically commit to OS/2. But as long as IBM continues to demand payment for a proprietary specification in a market that was built on an open bus, the thrifty, and the canny, are likely to find other alternatives.

## TRACKING THE DOS TRAIL: AN EXPANDED FUTURE

While DOS use is forecast to shrink considerably in the next five years, this operating system will be tough to kill, because it still has much to offer. The gap across DOS, OS/2, and UNIX (and between PC and workstation) performance was quietly but considerably reduced in 1988 by two small bridge product suppliers, Phar Lap Software and A.I. Architects. These companies expanded DOS so that it functions as a demand-paged virtual operating system that runs programs of up to 4GB (the limit of the 80386 processor), while still appearing to the user as ordinary DOS.

Very few high-end DOS-based PC CAD programs exist that do not either offer, or have waiting in the wings, a product based on a DOS extender (including products from Autodesk, CAD Software, Cadam, Cadkey, Fluid Dynamics International, Futurenet, Hewlett-Packard, Integrated Silicon Systems, Intusoft, MacNeal-Schwendler, MCS, SMOS, SRAC, Swanson Analysis, Versacad, and Viewlogic). DOS programs larger than 640K first arrived in CAD/CAE, but will begin appearing in more mainstream software, such as Lotus 1-2-3.

To achieve the highest performance with a DOS extender, the typical application software developer rewrites the product to run in the 80386 32-bit protected (unsegmented) mode. Completing this task creates more portable software, thus reducing the amount of work required later that is ported to either UNIX or OS/2. In the meantime, programs can grow under DOS, and success stories are accumulating.

Cadkey represents a good example of a company that is upgrading its bridges one step at a time by first extending DOS performance for its mechanical CAD software, and then moving easily to the UNIX-based Silicon Graphics workstation. Cadkey is now able to offer a product with files that are compatible without translation across both operating systems, thus creating a cost-conscious, sophisticated product line where design and analysis tasks can be assigned to a Silicon Graphics workstation and drafting to a PC.

Conversely, Cadam is moving an increased percentage of its mainframe-based product down to the DOS-based Microcadam Plus, because space is now available. This move should significantly expand Cadam's presence among suppliers to the automotive industry, which now can buy more functional, but still low-cost, compatibility with Cadam.

### THE MISSING LINK

By creating a bridge that allows DOS-based software to grow, Phar Lap and A.I. Architects helped the PC CAD industry evolve during a period of high uncertainty about the future of low-end operating systems. At the other end of the bridge, Santa Cruz Operations organized industry participants to specify a smaller, friendlier Intel-based UNIX that is primarily focused on the single user. However, there is an important—and needless—gap. Although almost all purveyors of UNIX tout their “DOS window,” these windows will not accommodate a program written with DOS extenders. Thus, sophisticated DOS programs will not run in a UNIX “DOS window.”

Unfortunately, users that buy extended DOS programs are the very users we would expect to move up to an Open Desktop-type product. While UNIX suppliers naturally have little interest in making DOS look good, accommodating only the lowest-level DOS products may prove shortsighted.

### DATAQUEST CONCLUSIONS

Dataquest believes that it is a relatively simple matter for industry participants to create a specification allowing extended-DOS products (ideally in multiple windows) to run on Open Desktop. To ignore this issue will leave the leading-edge PC users only partway over an unfinished bridge, inviting them to jump to the traditional technical workstations, thus reducing the overall market for Intel-based products. Resolving the issue will help grow the PC CAD market.

*Kathryn Hale*

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# CAD/CAM Industry Service

## Personal CAD:

### Markets at the Low End

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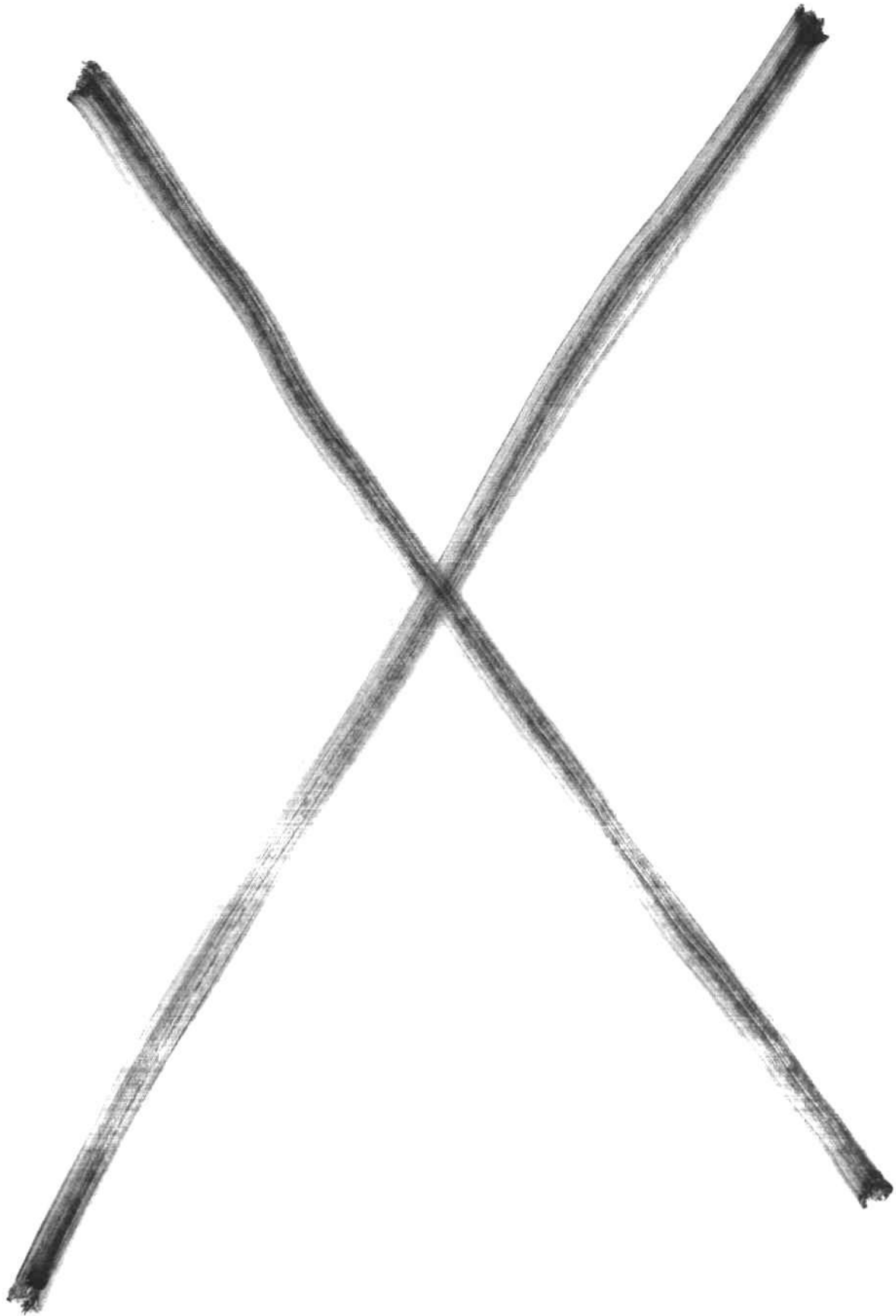


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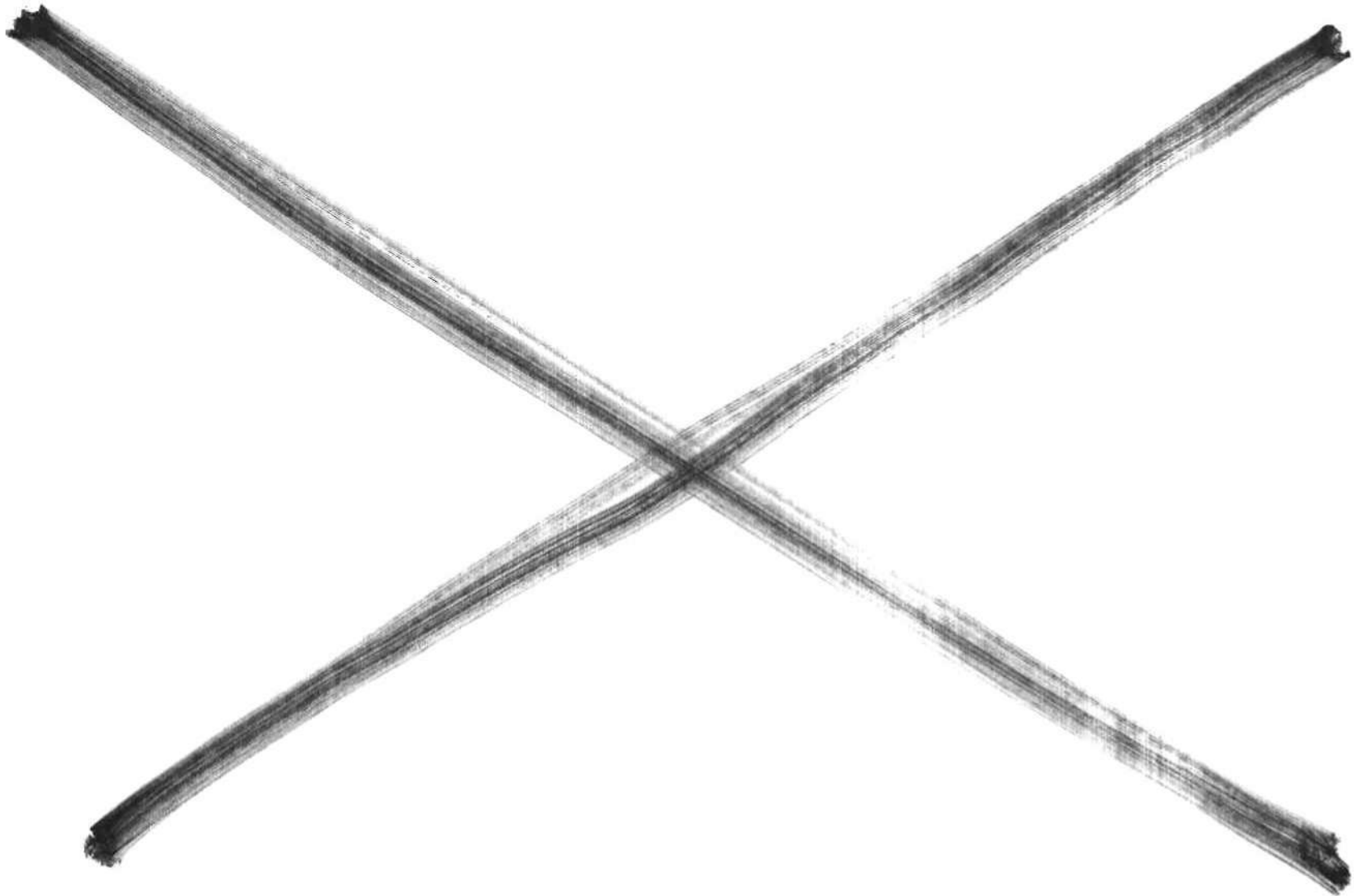
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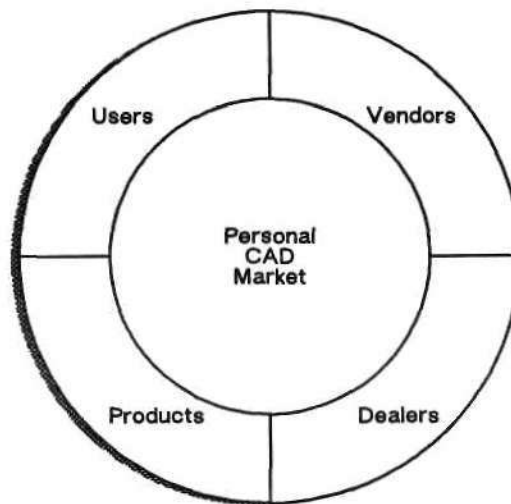
## 1.1 Personal CAD Definitions

The personal CAD application segment addresses CAD/CAM/CAE products that are used in virtually all design applications, are low in cost, and are generally sold to end users through nondirect sales channels. One general term often used to define this market is "PC CAD." Although it is true that the vast majority of both revenue and units are attributable to personal computer products, there are a number of low-end workstation products that are also contributing to this market. As PCs and workstations continue to converge in both price and functionality, Dataquest believes that to label this segment "PC CAD" would do a disservice to the industry by being overly restrictive and narrow. The definitions that follow will serve to clarify the selection of the title "Personal CAD: Markets at the Low End."

Figure 1.1-1 shows Dataquest's approach to this rapidly growing market. This view of the market is somewhat different from that presented for the traditional application segments.

Figure 1.1-1

The Personal CAD Market



Source: Dataquest  
July 1988

### PRICE BOUNDARY: A SOFT DEFINITION

The concept of price as a means by which to measure or define low-cost CAD is attractive. Nevertheless, the price measure can be complex to apply. Dataquest is using \$15,000 as the general boundary for the cost of a personal CAD system composed of hardware and software. A personal CAD system buyer, however, has an endless list of possible system configurations. The computers can range from as low as \$1,000 up to

between \$12,000 and \$14,000. Personal CAD software can be purchased for amounts ranging from less than \$100 up to \$8,000. Given competing scenarios, which could include either a \$1,000 PC clone with a \$200 software package or a \$7,000 computer and an \$8,000 software application, we have been forced to be somewhat flexible in counting hardware and software revenue and units. Some of the higher-end software packages combined with a high-end computer will exceed the \$15,000 boundary, yet both would be counted as personal CAD products.

### DISTRIBUTION CHANNEL DEFINITIONS

The price boundary presented above has resulted in the establishment of channels of distribution that are generally quite different from those employed by the traditional CAD vendors. The distribution channel participants are defined as follows:

- **Direct Seller**
  - System manufacturer using own sales force selling directly to end users
  - System sale usually exceeding \$40,000 (If less, the cost of sales with respect to the margin makes it difficult for manufacturers to be profitable in small system sales.)
  - Expensive channel to create, maintain, and manage
- **Distributor**
  - Negotiates wholesale purchase agreements with suppliers
  - Provides a warehouse of suitable computer systems, hardware, or software
  - Typically sells to dealers and VARs; sometimes sells to large end-user accounts
- **Dealer**
  - A retailer whose primary added value is distribution, sometimes over a wide geographic area; may include service, training, and support
  - Generally relies on distributors and manufacturers for products
  - Has a storefront—that is, a glass entry open to walk-in trade

- Value-Added Reseller (VAR)
  - Buys hardware and/or software and adds value to it—often in the form of software—and delivers the value-added product to end users
  - Final product usually a specific application solution
  - Generally operates from a single geographic area
  - Generally sells through an outbound sales force and does not maintain a storefront

An important point to keep in mind regarding these definitions is that they are not mutually exclusive—i.e., a single company may fit more than one of these categories. A more detailed discussion of these categories is presented in the section covering the distribution environment, Section “4.2 Channel Dynamics.”

#### PERSONAL CAD APPLICATIONS DEFINITIONS

Applications definitions presented here are identical to the definitions used in the other Dataquest CAD/CAM Industry Service publications. The application areas are the following:

- Mechanical CAD/CAM—computer-aided tools to design, analyze, document, and manufacture discrete parts, components, and assemblies
- Electronics Design Automation (EDA)—computer-based tools that are used to automate the process of designing an electronic product, including boards, ICs, and systems
- Facilities Design (Formerly AEC)—computer-aided tools used by architects, engineers, and construction professionals for the design of buildings, process or power plants, ships, and other similar projects
- Mapping—computer-aided tools that allow geographically related data to be captured, edited, analyzed, displayed, and managed

Personal CAD users, while often creative in their use of CAD tools, generally can be assigned to one application category through the type of design work that they undertake.

**DEFINITION OF INDUSTRY CLASSIFICATIONS**

Users of the different CAD/CAM applications can generally be classified by the industries in which they work. These industries are classified by the federal government into a schema that assigns a unique business code number to each principal line of business. The resulting Standard Industrial Classification (SIC) codes are used by Dataquest to define the end-user markets for the different applications.

In this binder, because the focus is on all applications of personal CAD, no attempt will be made to target the specific SIC codes that define personal CAD. In addition, Dataquest research has indicated that there is significant CAD use within industries that are not traditionally thought of as target SIC industries for CAD.

## **1.2 Personal CAD Executive Summary**

This summary highlights the key points and analyses presented in this module. Please refer to the module in its entirety for a comprehensive analysis of the personal CAD market segment. Highlights include the following:

- Personal CAD revenue reached \$1,323 million in 1987; it is forecast to reach \$2,270 million in 1992, reflecting an 11.4 percent compound annual growth rate (CAGR) for the period.
- Revenue for 1988 is forecast at \$1,665 million, representing a strong 25.9 percent increase over the 1987 figure.
- Personal computer workstation shipments in 1987 totaled 167,995. As a consequence of a 19.8 percent CAGR, that figure will reach 425,040 in 1992.
- Workstation shipments are forecast to grow to 226,240 in 1988. This growth reflects a single-year increase of 34.7 percent from 1987.
- Software unit shipments were estimated at 422,000 in 1987, 58.5 percent of which resulted from products with a list price less than \$500. Of the corresponding \$418 million in software revenue, only 6.4 percent resulted from products priced less than \$500.
- End users buying personal CAD software for already-owned computers constitute nearly 40 percent of the market. The remaining 60 percent of software buyers purchase unbundled CAD software and hardware at the same time.
- Users are generally satisfied; more than 80 percent of the software buyers would buy the same software product again, and they would buy it through the same channel.
- Discontent is high among dealers and distributors, however. Pricing competition is strong, and most dealers say that they are actively seeking more profitable product combinations.
- Vendors of personal CAD software products are perplexed, scrambling to find the "right" platforms and dealers.

## 1.3 Personal CAD Market Overview

### HISTORY

The history of personal CAD is inextricably tied to the history of the personal computer and, to a lesser extent, to the history of technical workstations. It may be useful to think of the personal computer as the father of personal CAD and to view the technical workstation as a more distant though influential relative. With that perspective in mind, a brief history follows.

#### The Personal Computer in the Pre-CAD Era

Dataquest recognizes a series of distinct phases in the evolution of the personal computer market. Although not all of these phases are useful for an understanding of the history of personal CAD, the first four provide excellent background. The following phases reflect the increasing growth in the technical complexity, distribution channel development, and market acceptance of the personal computer:

- Kludge kit phase (1975 to 1977)—characterized by low-level, mail order kits sold to computer enthusiasts for hardware development and experimentation
- Pet phase (1977 to 1979)—characterized by assembled systems sold through electronics stores to hobbyists for programming and tinkering
- Apple phase (1979 to 1981)—characterized by modular systems, supporting disk drives and color graphics, sold through computer speciality stores to home and small business users for productivity tools, games, and education
- IBM phase (1982 to 1984)—characterized by expandable 8/16-bit systems sold through retail and direct sales channels to a relatively broad audience of home, education, and business users for a wide variety of uses

The arrival of the Apple phase in the evolution of the personal computer market heralded the beginning of the personal CAD era. In 1981, a little-known company named T&W Systems, Inc., introduced a simple CAD drafting package called T-Square. It ran on the Terak personal computer. Later that year, the company introduced CADAPPLE software for the Apple II line of computers. By the time Autodesk brought its IBM PC-based AutoCAD software to the market in 1984, the seeds of the PC CAD market had been sown far and wide.

#### PC CAD in the Mid-1980s

In the mid-1980s, traditional turnkey CAD vendors were struggling to maintain acceptable profit margins in the face of the rapid decline in the price of the hardware component of their integrated offerings. At the same time, the hardware market was developing an even greater threat to their dominance of the CAD market—user-expandable personal computers.

Previously, only turnkey vendors had the know-how to pull a variety of peripherals together and create a system. Separate subsystems for storage, display, output, and processing could be integrated only by true systems specialists. The personal computer, if not supplied with a specific subsystem such as high-resolution color graphics, could now be expanded by the user. The simplification of the integration process provided a significant market opportunity—and one that did not go unnoticed.

Once the ability to configure personal CAD systems was demystified, the next problem was one of supply. The economies of scale created by the burgeoning personal computer market began to remove the prohibitive costs associated with the development and manufacture of computer subsystems. Spurred on by the successes of dozens of small supplier companies, dozens more came into being, solely for the purpose of designing and manufacturing keyboards, monitors, disk drives, tablets, and memory for the expandable personal computer. Because of the relatively low cost and margins associated with these add-on devices, they could not be sold profitably through the traditional direct sales channel. In response, an entire industry evolved to deliver these products effectively to the end-user market. The turnkey vendors now faced competition from value-added resellers, distributors, and retail outlets. The expandable personal computer became a CAD platform to be reckoned with.

Dataquest believes that the most significant forces shaping the early PC CAD market were the following:

- The popularity of the IBM PC and its DOS operating system
- The establishment and acceptance for standards for PC peripherals
- The availability of simple drafting software
- The prohibitive price of traditional CAD solutions for many prospects

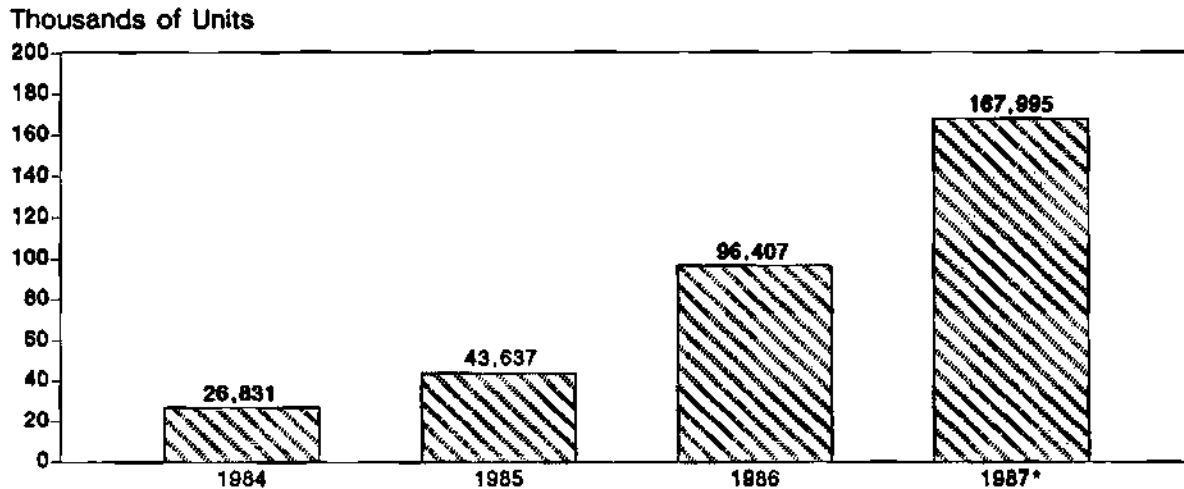
The cumulative result of these individual factors was to create a market opportunity for the development and delivery of the 80/20 solution for CAD/CAM: many CAD prospects would gladly accept 80 percent of the functionality of the turnkey CAD offerings for 20 percent of the cost.

This development should not have come as a surprise to anyone familiar with the various design disciplines. First, the majority of the design work consists of relatively straightforward drafting and documentation, which can be accomplished by a minimum CAD system. Second, much design work had historically been accomplished with very little capital equipment; the move from drafting tables up to personal computers could be presented to management as an incremental budget change. This was a user-driven market, and most users would accept slower hardware, poorer display resolution, and partial applications solutions. Figure 1.3-1 shows the rapid growth in the number of personal computer workstation units. The stage was set for the next step in the personal CAD market—the explosive growth of 1987.



Figure 1.3-1

**PC CAD Workstation Unit Shipments  
1984 - 1987**



\*Personal CAD takes off in 1987.

Source: Dataquest  
July 1988

### Personal CAD Takes Off: 1987

The 1987 CAD/CAM market totaled approximately \$8.663 billion, of which PC CAD was about \$1.325 billion, or 15.3 percent of the total. Though this is not a particularly impressive proportion of the total revenue, the workstation figures for 1987 are indeed impressive. Of a total of 260,867 CAD/CAM workstations, 64.4 percent, or nearly two-thirds, were personal computers. In addition, there was a relatively small number of low-end technical workstations that were purchased by users of low-cost software products.

By way of comparison, the 1987 figures show gains in market share of more than 2 percent on the revenue side, and 5 percent in the workstation column over comparable 1986 figures. One could argue that, in fact, the personal CAD market was already firmly entrenched; however, Dataquest believes that 1987 was the pivotal year for that market, because of the following:

- Pioneering days were over. The available software products were not simply being purchased out of curiosity, but for production use; PCs had become a way of life in nearly all businesses and most homes.
- Acceptable functionality had arrived. Software functionality reached new heights of completeness in most CAD applications, and technical publication capability became widespread.

- Hardware performance leaped forward. The performance of the newer personal computer models took a jump with the 386- and 68020-based models. Laser printers began to shrink in size, cost, and complexity.

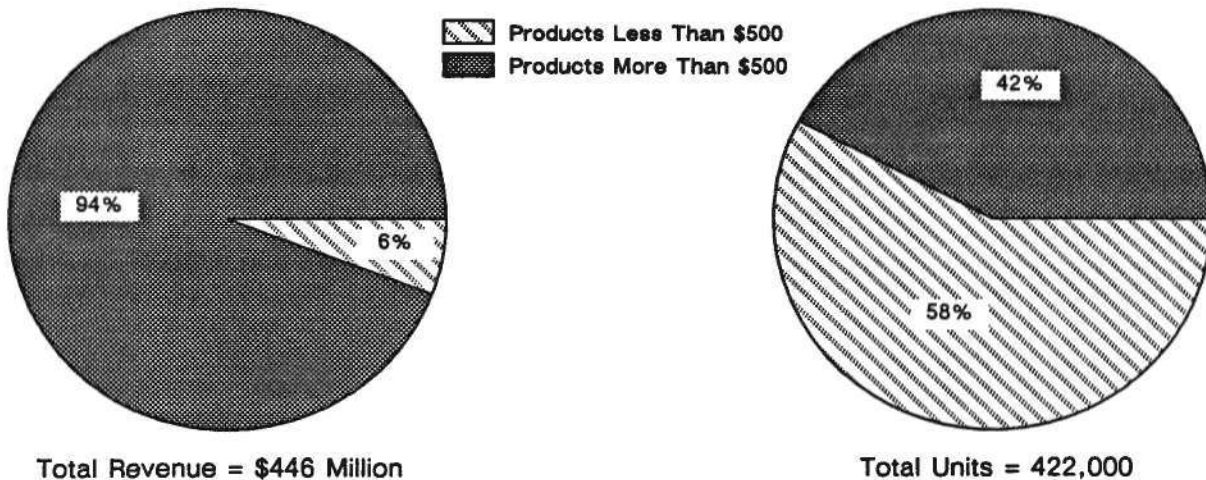
Personal CAD hardware revenue honors in 1987 went to IBM. Most notable in the hardware market were the gains in revenue made by Compaq and Apple Computer. Although neither is in any danger of catching IBM soon, both established that they intend to be serious contenders for the hardware revenue dollars of the future.

Autodesk continued its dominance on the software front, maintaining its strategy of providing an open software architecture to encourage third-party vendors to develop the application-specific tools necessary for a complete design environment. The third-party vendors have developed nearly 300 software offerings. This combined body of software has contributed to the growing functionality of PC CAD.

Very low cost PC CAD software began to be taken seriously in 1987. Relative newcomers offering products priced at less than \$500 shipped those products in volume, causing discomfort in an industry that had only recently adjusted to the reality of \$3,000 software. Nevertheless, these impressive unit shipments produced relatively little revenue. As Figure 1.3-2 shows, although PC CAD software products priced at less than \$500 constituted 58 percent of the 422,000 units shipped, these low-cost products produced only 6 percent of the \$446 million in revenue.

Figure 1.3-2

PC CAD Software Units by Price Category—1987



Source: Dataquest  
July 1988

The personal CAD workstation breakout by application shows that the top users are from mechanical, with 42.6 percent of the seats, and facilities design, with 39.4 percent. Electronic applications do not appear to be scalable for the personal computer. Mapping, with its strong orientation toward large data bases, is still not completely at home with personal computers.

#### **THE FUTURE: PLATFORM CONVERGENCE**

The introduction of versions of UNIX on PCs in 1987, the 386- and 68020-based PCs, OS/2's future developments all combine to lead to a single conclusion: It is difficult to identify the line between between a PC and a technical workstation. Dataquest is evaluating the current definitions for both platforms. Although no solution to the problem has been agreed upon, one possible platform differentiator may be the operating system.

Another measure being examined is the development of a scale of performance, ranging from very high performance, personal workstations to lower-cost, minimally configured platforms. Dataquest believes that the future will see continued strong growth in the personal CAD market, despite any definitional changes that may occur.

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## 1.4 Personal CAD Market Forecasts

### TOTAL MARKET

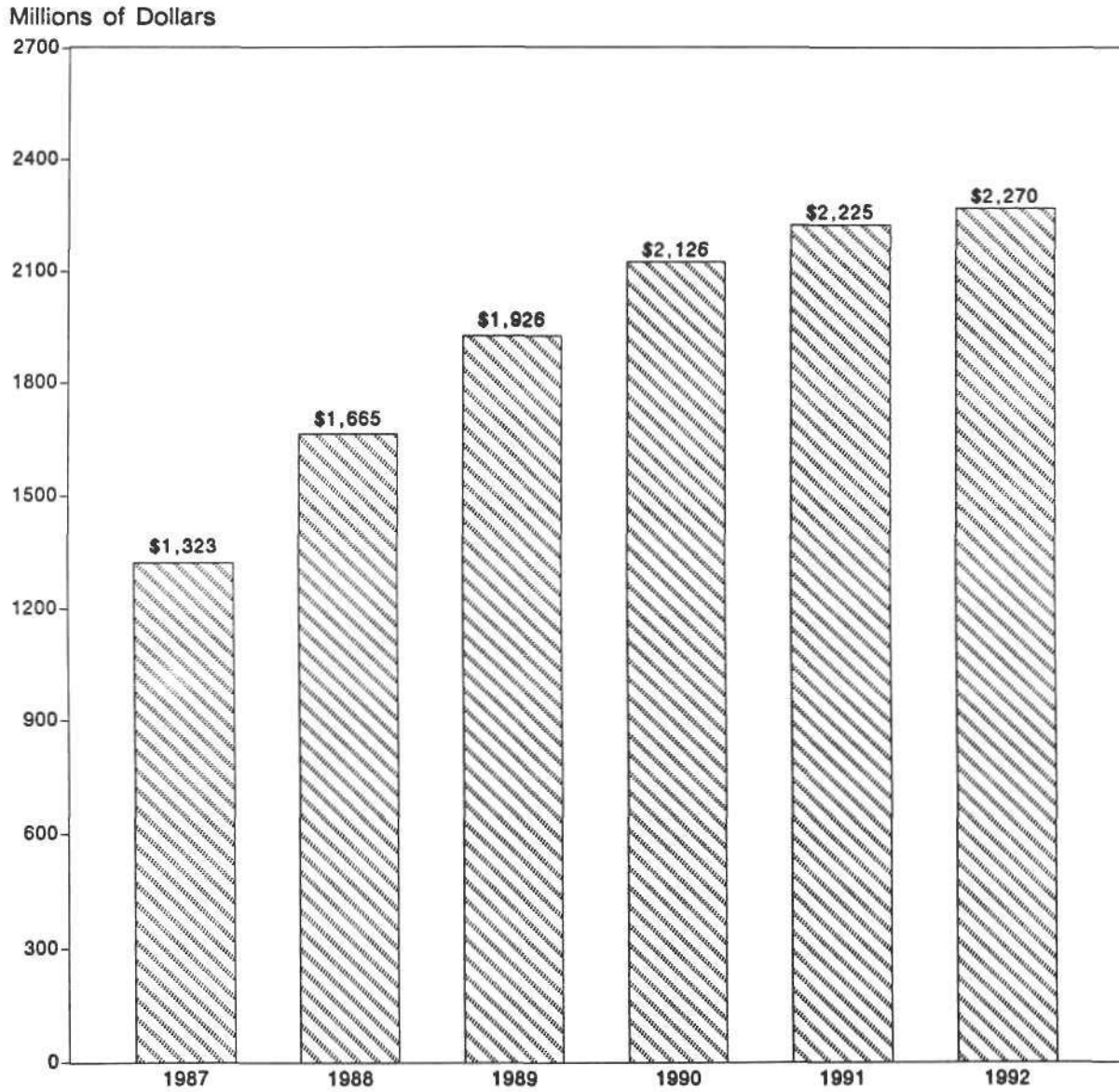
All forecast and analysis data contained in this section reflect only data for the personal computer portion of the personal CAD market. Dataquest believes that these PC data represent and reflect more than 95 percent of that market.

Figures 1.4-1 and 1.4-2 and Table 1.4-1 present Dataquest's forecast and analysis for the total personal CAD market for all regions and applications, as follows:

- The personal CAD market segment, valued at \$1.323 billion in 1987, is forecast to grow to \$2.270 billion in 1992, representing a compound annual growth rate (CAGR) of 11.4 percent.
- Dataquest estimates that the personal CAD market will grow at a 25.9 percent rate in 1988, reaching \$1.665 billion in revenue.
- An estimated 167,995 workstation units were shipped in 1987; shipments in 1992 are forecast to reach 415,040, representing a 19.8 percent CAGR.
- Workstation shipments will grow to 226,240 in 1988, reflecting a single-year growth rate of 34.7 percent.

Figure 1.4-1

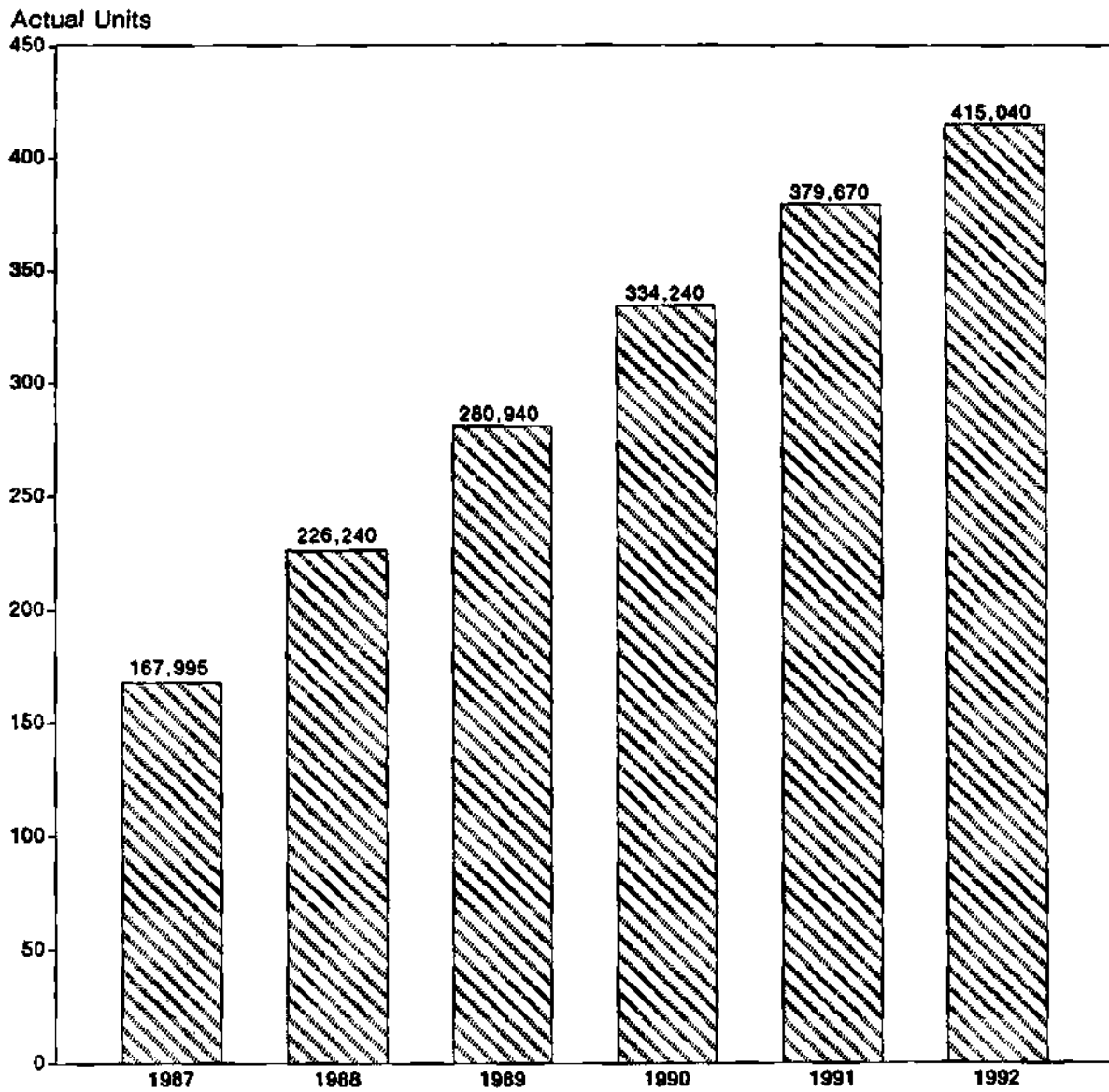
Personal CAD Worldwide Forecast Revenue



Source: Dataquest  
July 1988

Figure 1.4-2

Personal CAD Worldwide Forecast Shipments



Source: Dataquest  
July 1988

## 1.4 Personal CAD Market Forecasts

---

Table 1.4-1

**Personal CAD Worldwide Forecast  
(Millions of Dollars, Actual Units)**

	1987	1988	1989	1990	1991	1992	CAGR
	====	====	====	====	====	====	====
Revenue	1,323	1,665	1,926	2,126	2,225	2,270	11.4%
Systems	167,995	226,240	280,940	334,240	379,670	415,040	19.8%
Workstations	167,995	226,240	280,940	334,240	379,670	415,040	19.8%

Source: Dataquest  
July 1988



## APPLICATIONS

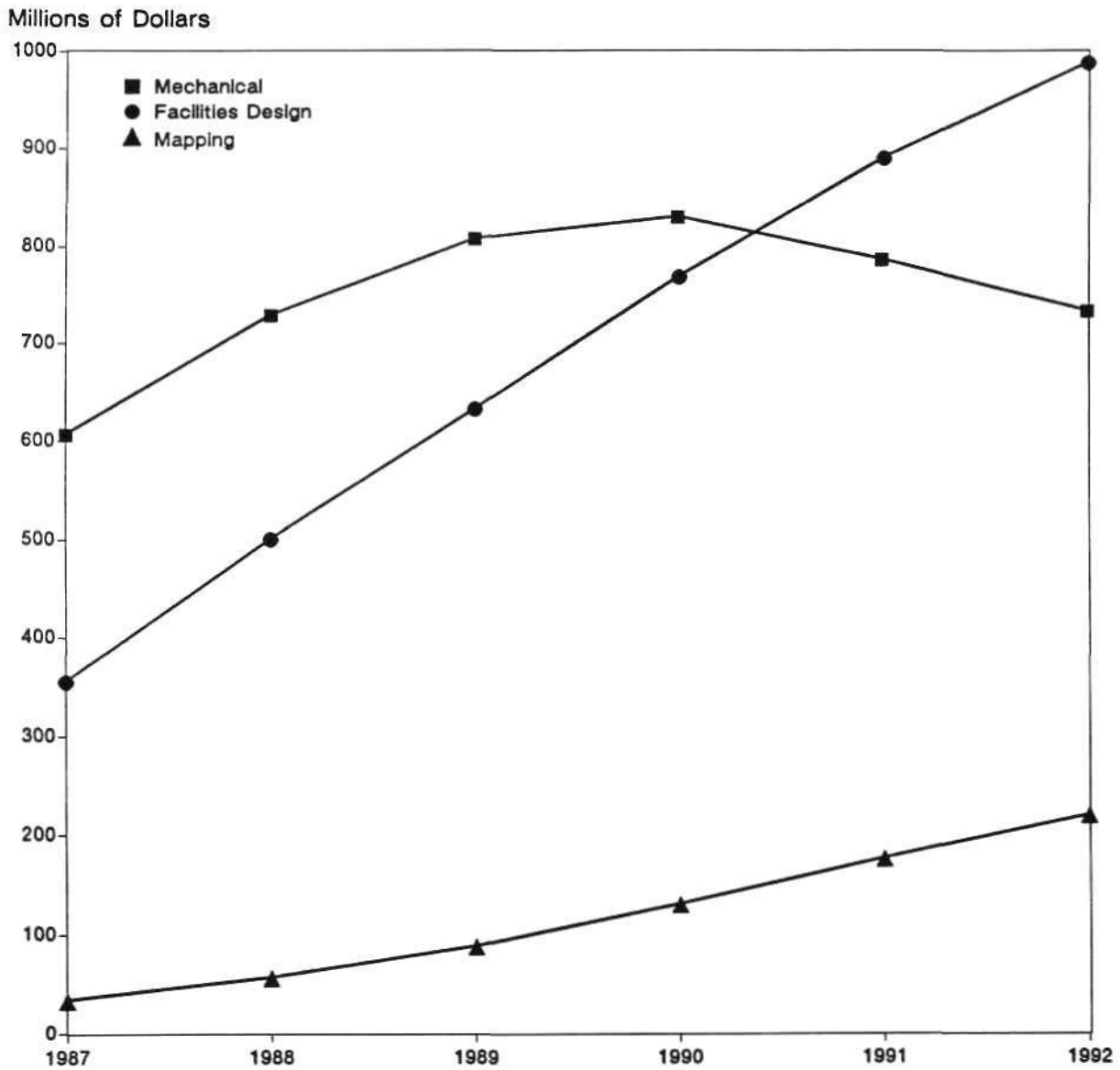
Figures 1.4-3 and 1.4-4 and Tables 1.4-2 and 1.4-3 present Dataquest's forecast and analysis of the personal CAD market by application, as follows:

- The leading applications in 1987 in personal CAD were mechanical, with 46 percent share of the revenue, and facilities design, with 27 percent. The positions will reverse by 1992, when facilities design will be 43.6 percent and mechanical will have declined to 32.4 percent, reflecting 22.6 percent and 3.9 percent CAGRs, respectively.
- Mapping, with 2.6 percent of the 1987 revenue, will grow at a 44.5 percent CAGR by 1992, resulting in a revenue total of \$222 million, or 9.8 percent of that year's revenue.
- Electronic design automation applications will lose 10 percent of their share of the revenue total between 1987 and 1992, dropping from 24.3 percent to 14.3 percent of the personal CAD market.
- The top applications for workstation shipments in 1987 (mechanical and facilities design), with 81.9 percent of the total, will increase that proportion to 87.3 percent by 1992.
- Facilities design will be the second fastest growing and the dominant segment by 1992, totaling 256,410 units and a CAGR of 31.1 percent.

The forecast contained in this section reflects the composite views of analysts in Dataquest's CAD/CAM Industry Service. As a composite forecast, it contains a variety of widely varying assumptions about the suitability of PCs as CAD platforms, the future of application-specific design settings, and trends in specific vendor performance.

Figure 1.4-3

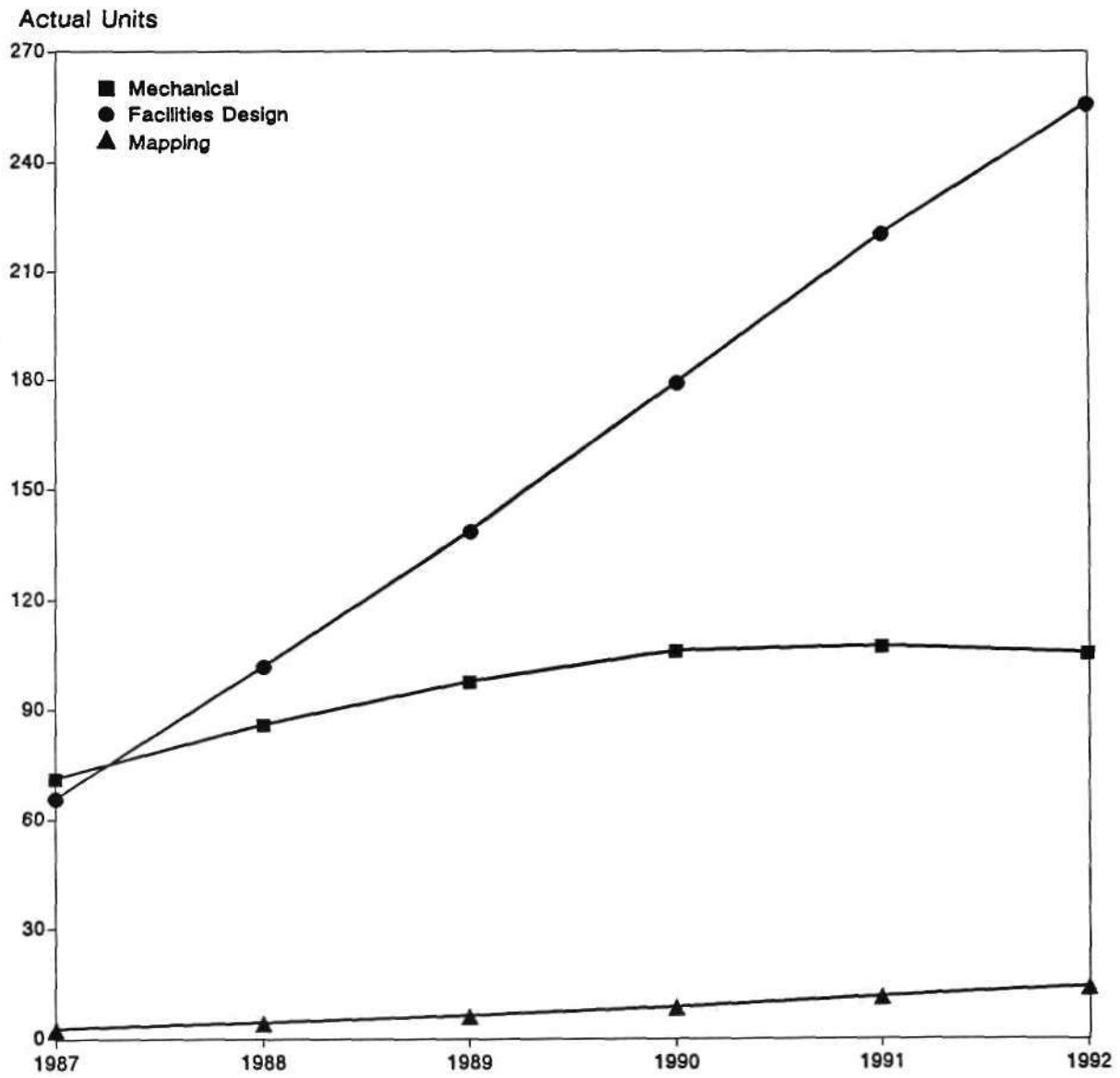
Personal CAD Worldwide Forecast by Application Revenue



Source: Dataquest  
July 1988

Figure 1.4-4

Personal CAD Worldwide Forecast by Application Shipments



Source: Dataquest  
July 1988

## 1.4 Personal CAD Market Forecasts

Table 1.4-2

**Personal CAD Worldwide Forecast by Application  
(Millions of Dollars, Actual Units)**

	1987	1988	1989	1990	1991	1992	CAGR
	----	----	----	----	----	----	----
<b>All Applications</b>							
Revenue	1,323	1,665	1,926	2,126	2,225	2,270	11.4%
Systems	167,995	226,240	280,940	334,240	379,670	415,040	19.8%
Workstations	167,995	226,240	280,940	334,240	379,670	415,040	19.8%
<b>Mechanical</b>							
Revenue	608	730	809	831	788	735	3.9%
Systems	71,556	86,280	97,880	106,470	107,740	105,810	8.1%
Workstations	71,556	86,280	97,880	106,470	107,740	105,810	8.1%
<b>Facilities Design</b>							
Revenue	357	501	634	770	891	989	22.6%
Systems	66,109	102,090	138,720	179,230	220,580	256,410	31.1%
Workstations	66,109	102,090	138,720	179,230	220,580	256,410	31.1%
<b>Mapping</b>							
Revenue	35	58	89	132	178	222	44.5%
Systems	2,956	4,510	6,500	8,780	11,540	14,330	37.1%
Workstations	2,956	4,510	6,500	8,780	11,540	14,330	37.1%
<b>Electronic CAE</b>							
Revenue	174	194	200	194	180	156	-2.2%
Systems	17,550	21,180	24,110	25,680	25,860	24,810	7.2%
Workstations	17,550	21,180	24,110	25,680	25,860	24,810	7.2%
<b>IC Layout</b>							
Revenue	19	22	25	24	18	11	-11.0%
Systems	1,049	1,200	1,600	1,490	1,250	1,150	1.9%
Workstations	1,049	1,200	1,600	1,490	1,250	1,150	1.9%
<b>PCB Layout</b>							
Revenue	129	159	170	174	170	158	4.1%
Systems	8,775	10,970	12,130	12,600	12,690	12,530	7.4%
Workstations	8,775	10,970	12,130	12,600	12,690	12,530	7.4%

Source: Dataquest  
July 1988

Table 1.4-3

**Personal CAD Worldwide Forecast by Application  
(Percentage of Total)**

	1987	1988	1989	1990	1991
	****	****	****	****	****
<b>All Applications</b>					
Revenue	26%	16%	10%	5%	2%
Systems	35%	24%	19%	14%	9%
Workstations	35%	24%	19%	14%	9%
<b>Mechanical</b>					
Revenue	20%	11%	3%	-5%	-7%
Systems	21%	13%	9%	1%	-2%
Workstations	21%	13%	9%	1%	-2%
<b>Facilities Design</b>					
Revenue	40%	27%	21%	16%	11%
Systems	54%	36%	29%	23%	16%
Workstations	54%	36%	29%	23%	16%
<b>Mapping</b>					
Revenue	63%	54%	49%	35%	25%
Systems	53%	44%	35%	31%	24%
Workstations	53%	44%	35%	31%	24%
<b>Electronic CAE</b>					
Revenue	12%	3%	-3%	-8%	-13%
Systems	21%	14%	7%	1%	-4%
Workstations	21%	14%	7%	1%	-4%
<b>IC Layout</b>					
Revenue	16%	14%	-3%	-28%	-39%
Systems	14%	33%	-7%	-16%	-8%
Workstations	14%	33%	-7%	-16%	-8%
<b>PCB Layout</b>					
Revenue	24%	7%	2%	-2%	-7%
Systems	25%	11%	4%	1%	-1%
Workstations	25%	11%	4%	1%	-1%

Source: Dataquest  
July 1988

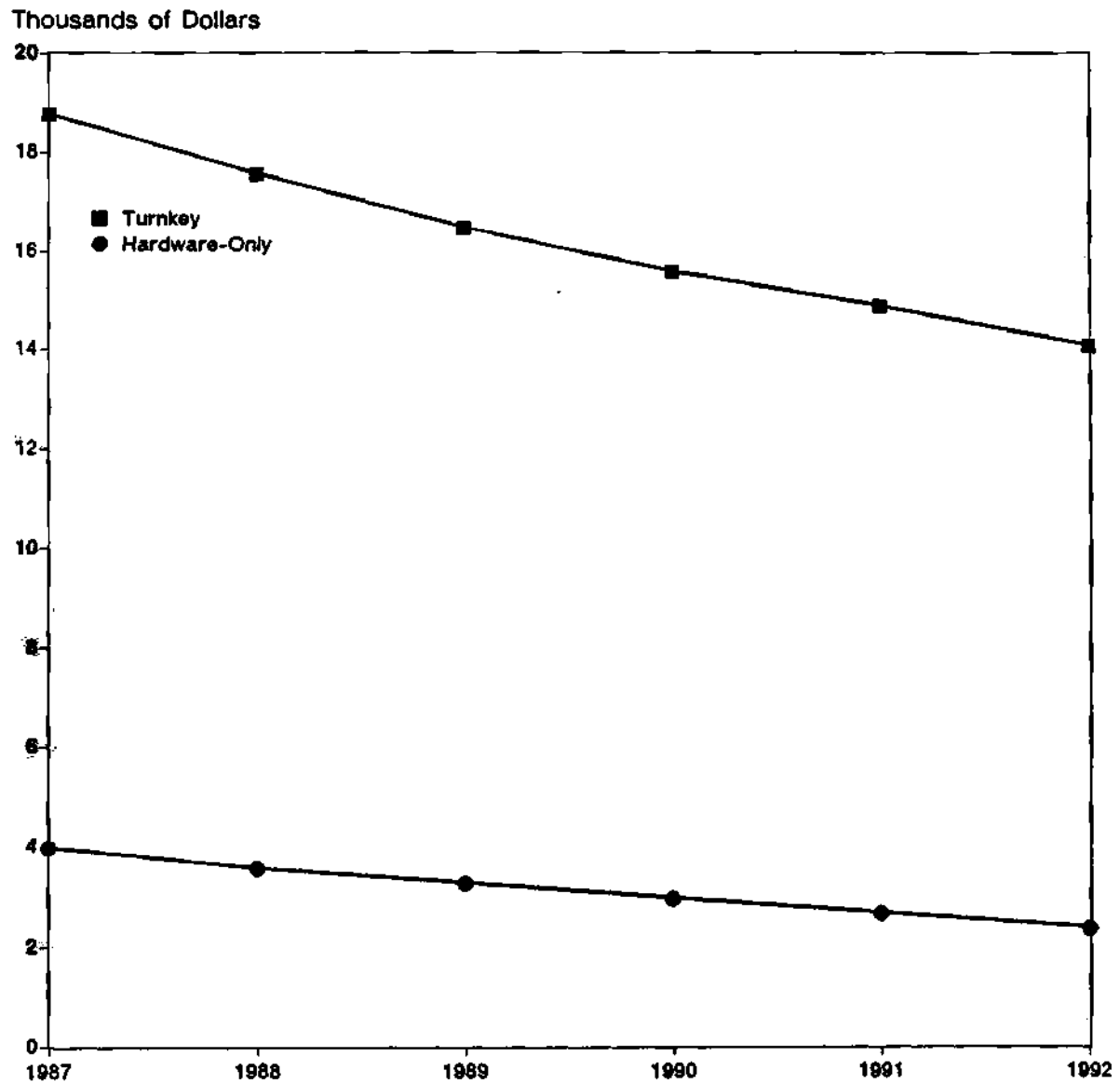
### AVERAGE PRICE PER SEAT

Figure 1.4-5 and Table 1.4-4 present Dataquest's forecast and analysis of the average price per seat for personal computer-based CAD systems on a worldwide basis, as follows:

- The average price per seat for all PC-based systems, which includes both turnkey and hardware-only systems, will drop from \$5,600 in 1987 to \$2,900 in 1992, for a negative CAGR of 12.3 percent.
- Turnkey average price per seat will decline from \$18,800 in 1987 to \$14,100 in 1992, as a result of a negative 5.6 percent CAGR.
- Hardware-only PC systems are forecast to drop in their average price per seat from \$4,000 to \$2,400 between 1987 and 1992, reflecting a minus 9.7 percent CAGR.
- The sharp decline in the total price per seat over the period is not simply being driven by the decline in each of the component pieces; rather, it is largely a result of a significant shift in the mix between turnkey and hardware-only systems.

Figure 1.4-5

Personal CAD Worldwide Average Price Per Seat  
Turnkey and Hardware-Only



Source: Dataquest  
July 1988

## 1.4 Personal CAD Market Forecasts

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Table 1.4-4

**Personal CAD Average Price Per Seat  
(Thousands of Dollars)**

	1987	1988	1989	1990	1991	1992	CAGR
	****	****	****	****	****	****	****
Turnkey & Hardware-Only	5.6	4.9	4.4	3.9	3.4	2.9	-12.3%
Turnkey	18.8	17.6	16.5	15.6	14.9	14.1	-5.6%
Hardware-Only	4.0	3.6	3.3	3.0	2.7	2.4	-9.7%

Source: Dataquest  
July 1988



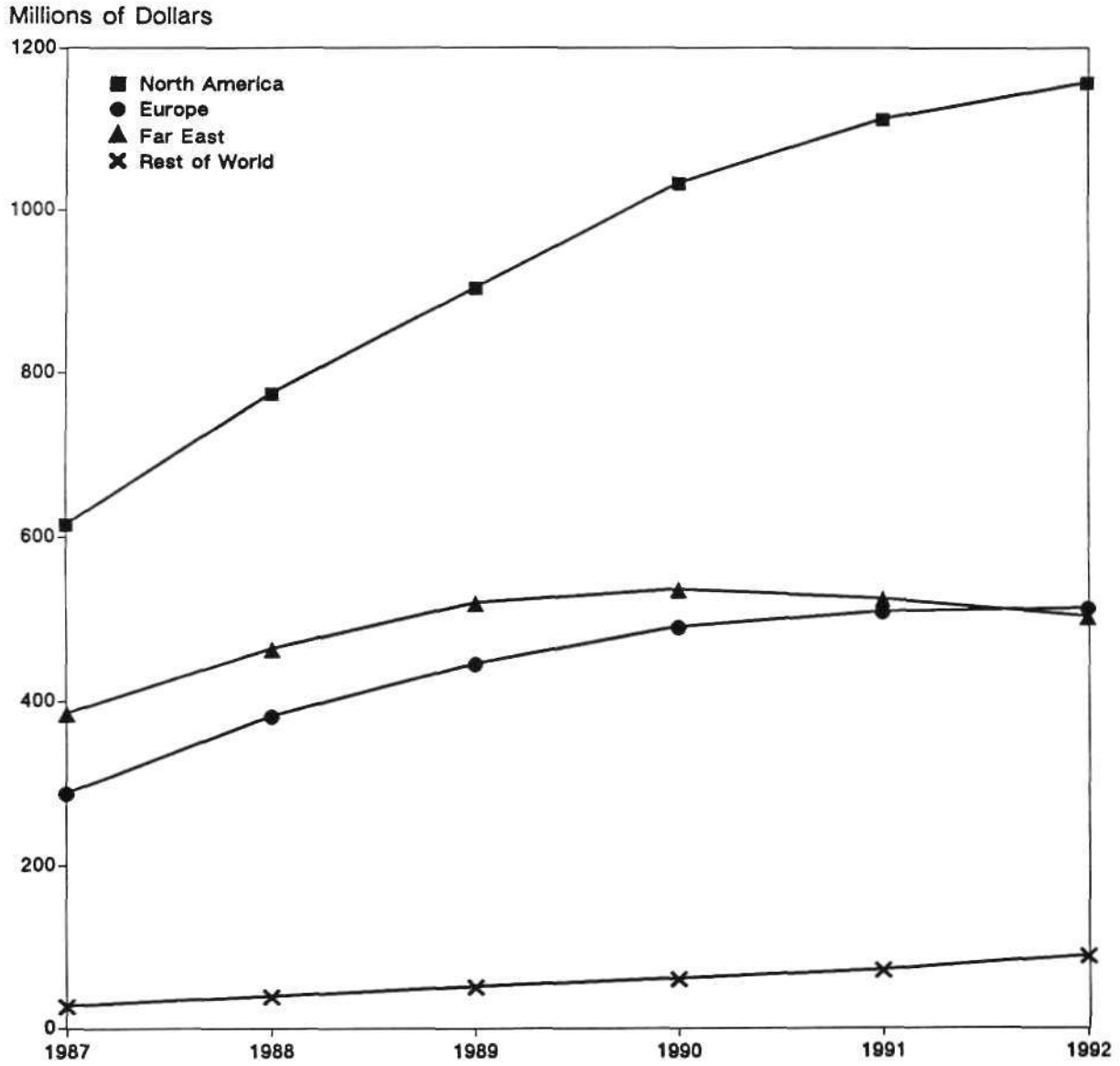
## REGIONS

Figures 1.4-6 and 1.4-7 and Tables 1.4-5 and 1.4-6 present Dataquest's forecast and analysis of the personal CAD market segmented by region, as follows:

- North American 1987 PC CAD revenue was \$617 million; it is forecast to grow to \$1.159 billion by 1992, reflecting a CAGR of 13.4 percent.
- Workstation shipments to North America totaled 98,418 in 1987 and will reach 243,200 in 1992, for a 19.8 percent CAGR.
- The North American share of the personal CAD revenue will rise from 47 percent in 1987 to 51 percent by 1992, while its workstation share will hold steady at 59 percent over the period.
- Europe, which had personal CAD revenue of \$290 million in 1987, will see its 1992 revenue climb to \$515 million at a CAGR of 12.2 percent.
- European workstation shipments will grow from 38,305 units in 1987 to 90,980 units by 1992, representing a CAGR of 18.9 percent.
- The European share of the revenue total will increase by 1 percent between 1987 and 1992, from 22 to 23 percent; over the same time period, its workstation share will decline by 1 percent from 23 to 22 percent.
- The Far Eastern market will have a more mixed look to it, with revenue growing at only a 5.5 percent CAGR from \$387 million to \$505 million between 1987 and 1992; workstations will grow at a 20.0 percent CAGR, from 25,951 to 64,600, in the same five years.
- The regional market shares for the Far East will decline 7 percent in revenue in the 1987 to 1992 time frame, from 29 to 22 percent, as the workstation share gains a percentage point from 15 to 16 percent.

Figure 1.4-6

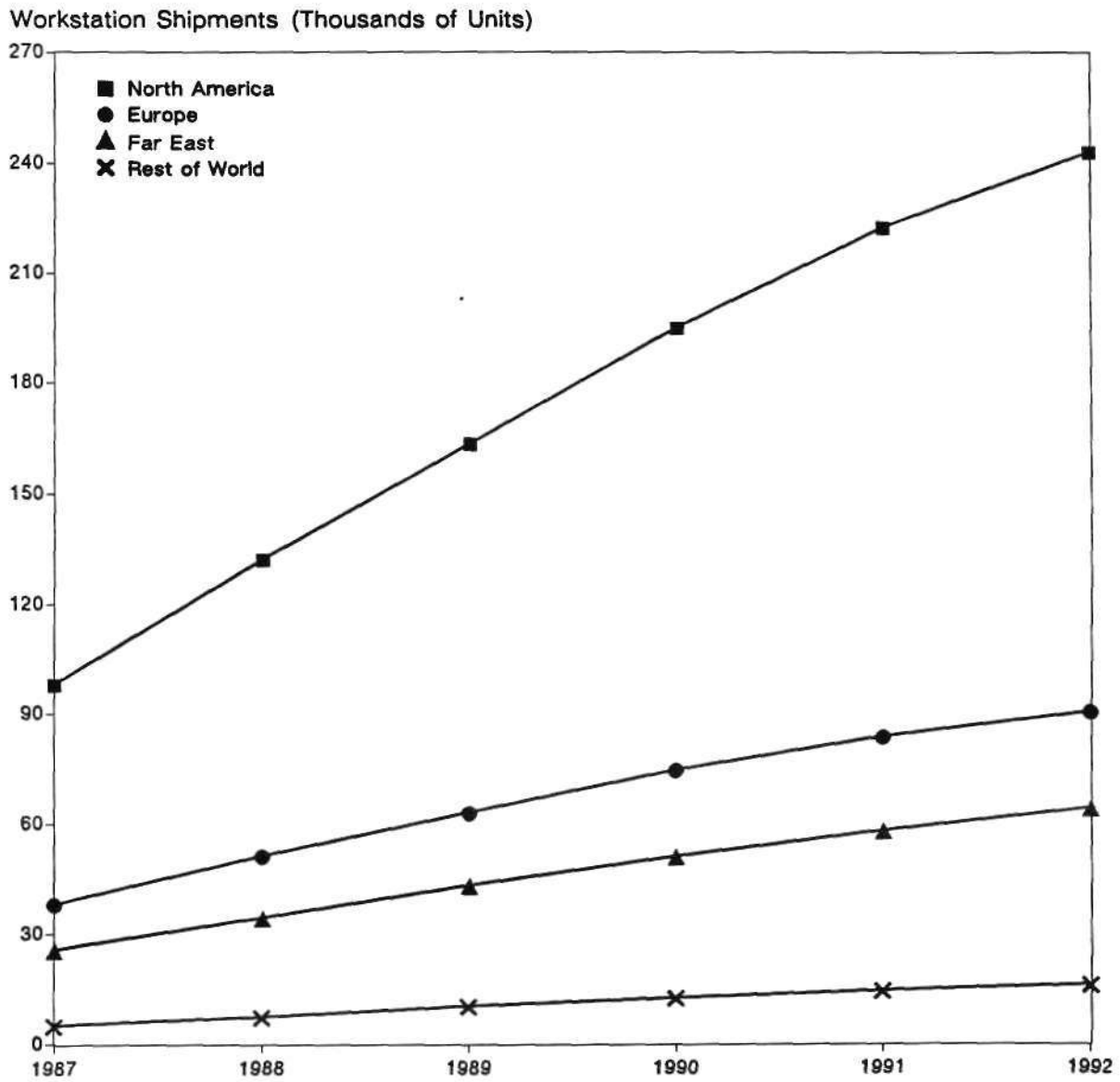
Personal CAD Regional Forecast for All Applications Revenue



Source: Dataquest  
July 1988

Figure 1.4-7

Personal CAD Regional Forecast for All Applications Shipments



Source: Dataquest  
July 1988

Table 1.4-5

Personal CAD Regional Forecast for All Applications  
(Millions of Dollars, Actual Units)

	1987	1988	1989	1990	1991	1992	CAGR
	====	====	====	====	====	====	====
<b>Total Market</b>							
Revenue	1,323	1,665	1,926	2,126	2,225	2,270	11.4%
Systems	167,995	226,240	280,940	334,240	379,670	415,040	19.8%
Workstations	167,995	226,240	280,940	334,240	379,670	415,040	19.8%
<b>North America</b>							
Revenue	617	776	906	1,034	1,114	1,159	13.4%
Systems	98,418	132,470	163,760	195,140	222,560	243,200	19.8%
Workstations	98,418	132,470	163,760	195,140	222,560	243,200	19.8%
<b>Europe</b>							
Revenue	290	383	447	492	511	515	12.2%
Systems	38,305	51,430	63,310	75,000	84,210	90,980	18.9%
Workstations	38,305	51,430	63,310	75,000	84,210	90,980	18.9%
<b>Far East</b>							
Revenue	387	465	521	538	526	505	5.5%
Systems	25,951	34,670	43,400	51,340	58,310	64,600	20.0%
Workstations	25,951	34,670	43,400	51,340	58,310	64,600	20.0%
<b>Rest of World</b>							
Revenue	29	40	52	62	73	91	25.6%
Systems	5,322	7,660	10,470	12,760	14,580	16,270	25.0%
Workstations	5,322	7,660	10,470	12,760	14,580	16,270	25.0%

Source: Dataquest  
July 1988

Table 1.4-6

**Personal CAD Regional Forecast for All Applications  
(Percentage of Total)**

	1987	1988	1989	1990	1991	1992
	****	****	****	****	****	****
<b>North America</b>						
Revenue	47%	47%	47%	49%	50%	51%
Systems	59%	59%	58%	58%	59%	59%
Workstations	59%	59%	58%	58%	59%	59%
<b>Europe</b>						
Revenue	22%	23%	23%	23%	23%	23%
Systems	23%	23%	23%	22%	22%	22%
Workstations	23%	23%	23%	22%	22%	22%
<b>Far East</b>						
Revenue	29%	28%	27%	25%	24%	22%
Systems	15%	15%	15%	15%	15%	16%
Workstations	15%	15%	15%	15%	15%	16%
<b>Rest of World</b>						
Revenue	2%	2%	3%	3%	3%	4%
Systems	3%	3%	4%	4%	4%	4%
Workstations	3%	3%	4%	4%	4%	4%

Source: Dataquest  
July 1988

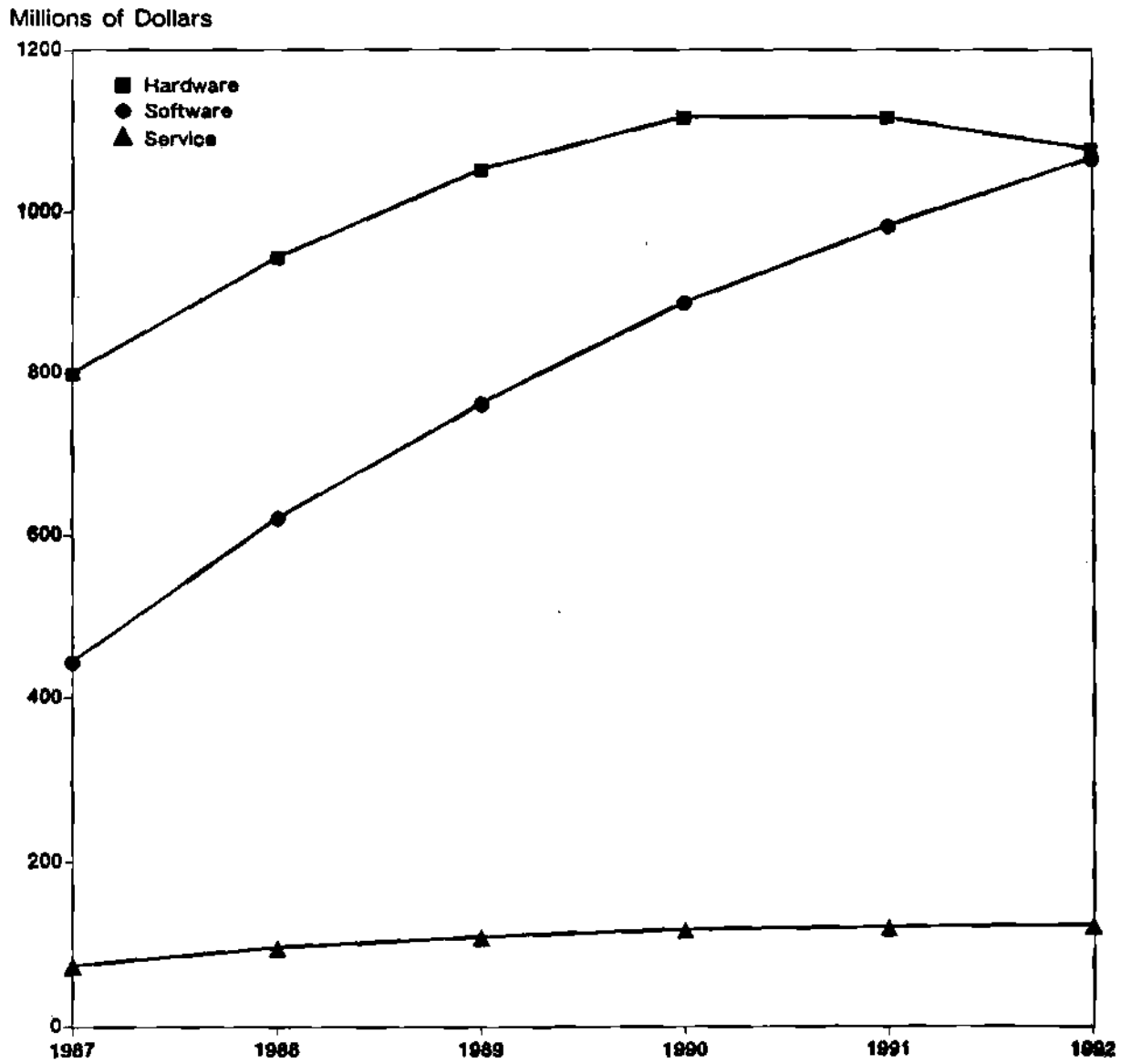
## REVENUE SOURCES

Figure 1.4-8 and Tables 1.4-7 and 1.4-8 present Dataquest's forecast and analysis of the personal CAD market segmented by revenue source, as follows:

- Dataquest estimates that hardware revenue for personal CAD was \$801 million in 1987 and forecasts it to grow at a 6.1 percent CAGR to \$1,078 million in 1992. In terms of total personal CAD revenue, we expect hardware to decline from 61 percent in 1987 to 48 percent in 1992.
- Software revenue, which accounted for \$446 million in 1987, will grow at a CAGR of 19 percent by 1992, reaching \$1,067 million. The share of total revenue attributable to software was 34 percent in 1987, but it will jump to 47 percent by 1992.
- This shift in relative importance of the components of the total revenue for personal CAD is being driven by the continuing decline in hardware prices and by rapid progress in the development of easy-to-use software addressing a broad range of CAD applications.
- Service revenue will grow along with the rest of the components, jumping from \$75 million in 1987 to \$124 million by 1992, although its proportion of the total revenue will decline slightly from 6 percent to 5 percent.

Figure 1.4-8

Personal CAD Worldwide Revenue Sources



Source: Dataquest  
July 1988

1.4 Personal CAD Market Forecasts

Table 1.4-7

Personal CAD Revenue Sources  
(Millions of Dollars)

	1987	1988	1989	1990	1991	1992	CAGR
	****	****	****	****	****	****	****
Hardware	801	945	1,053	1,118	1,118	1,078	6.1%
Software	446	622	763	889	984	1,067	19.0%
Service	75	97	110	119	122	124	10.7%
Total	1,323	1,665	1,926	2,126	2,225	2,270	11.4%

Table 1.4-8

Personal CAD Revenue Sources  
(Percentage of Total)

	1987	1988	1989	1990	1991	1992
	****	****	****	****	****	****
Hardware	61%	57%	55%	53%	50%	48%
Software	34%	37%	40%	42%	44%	47%
Service	6%	6%	6%	6%	5%	5%
Total	100%	100%	100%	100%	100%	100%

Source: Dataquest  
July 1988



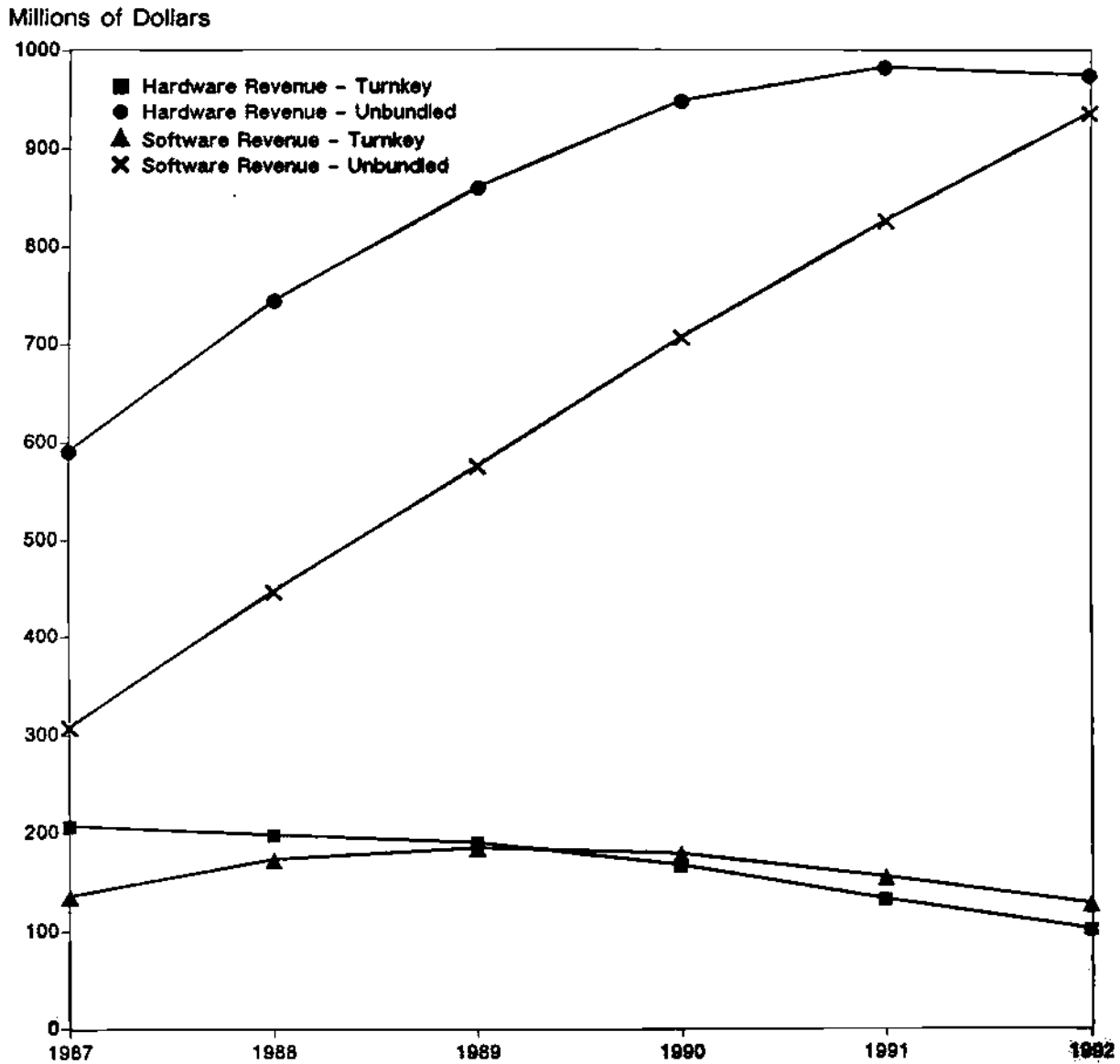
## PRODUCT PACKAGING

Figures 1.4-9 and 1.4-10 and Tables 1.4-9 and 1.4-10 present Dataquest's forecast and analysis of the personal CAD market segmented by product packaging into either turnkey or unbundled offerings, as follows:

- Sales of unbundled personal CAD systems in 1987 totaled \$903 million; they are forecast to grow at a 16.2 percent CAGR by 1992, reaching \$1,914 million. Proportionately, they account for 72 percent of the total revenue in 1987 and will account for 89 percent by 1992.
- Turnkey personal CAD system revenue will decline at a negative 7.7 percent CAGR during the 1987 to 1992 period, dropping from \$345 million to \$231 million. The market share of the revenue total will decline from 28 percent to 11 percent over that same time frame.
- Turnkey vendors will have their greatest decline in hardware revenue, which will drop from \$208 million in 1987 to \$103 million in 1992, reflecting a negative CAGR of 13.2 percent. That decrease will lower the share of hardware revenue from 26 percent in 1987 to 10 percent in 1992.
- On the software side, the turnkey software sales will decline only at a 1.2 percent CAGR from 1987 to 1992, dropping from \$137 million to \$129 million. In terms of share of the personal CAD software market, that translates into a 19 percent net loss, moving from 31 percent in 1987 downward to 12 percent in 1992.
- Unbundled hardware and unbundled software will continue to increase in popularity and, as a consequence, will account for 90 percent of the total hardware revenue and 88 percent of the total software dollars.
- In terms of workstation shipments, turnkey accounted for 18,312 units in 1987 and is forecast to tally 16,420 units in 1992, for a negative CAGR of 2.2 percent. Unbundled will grow from 149,683 to 398,620 units from 1987 to 1992, for a CAGR of 21.6 percent.

Figure 1.4-9

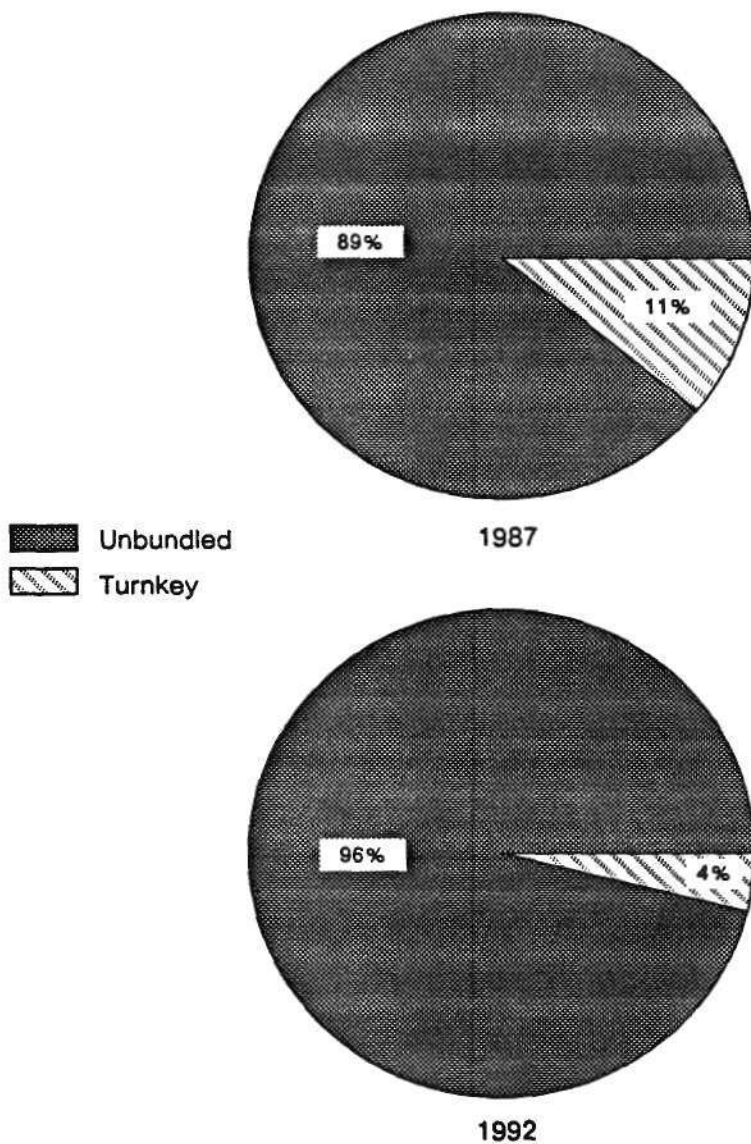
Personal CAD Worldwide Products  
Turnkey versus Unbundled  
(Millions of Dollars, Actual Units)



Source: Dataquest  
July 1988

Figure 1.4-10

Personal CAD Worldwide Workstation Units  
Turnkey versus Unbundled  
(Percentage of Shipments)



Source: Dataquest  
July 1988

Table 1.4-9

**Personal CAD Worldwide Products  
Turnkey versus Unbundled  
(Millions of Dollars, Actual Units)**

	1987	1988	1989	1990	1991	1992	CAGR
	====	====	====	====	====	====	====
<b>Total Hardware and Software Revenue</b>							
Turnkey	345	373	377	347	290	231	-7.7%
Unbundled	903	1,194	1,439	1,659	1,812	1,914	16.2%
Total	1,247	1,568	1,816	2,006	2,102	2,145	11.5%
<b>Hardware Revenue</b>							
Turnkey	208	199	191	168	134	103	-13.2%
Unbundled	593	746	862	950	984	976	10.5%
Total	801	945	1,053	1,118	1,118	1,078	6.1%
<b>Software Revenue</b>							
Turnkey	137	174	186	180	156	129	-1.2%
Unbundled	309	448	577	709	828	938	24.8%
Total	446	622	763	889	984	1,067	19.0%
<b>Workstation Shipments</b>							
Turnkey	18,312	21,244	22,930	22,303	19,478	16,420	-2.2%
Unbundled	149,683	204,990	258,010	311,940	360,190	398,620	21.6%
Total	167,995	226,240	280,940	334,240	379,670	415,040	19.8%

Source: Dataquest  
July 1988

Table 1.4-10

**Personal CAD Worldwide Products  
Turnkey versus Unbundled  
(Percentage of Total)**

	1987	1988	1989	1990	1991	1992
<b>Total Hardware and Software Revenue</b>	====	====	====	====	====	====
Turnkey	28%	24%	21%	17%	14%	11%
Unbundled	72%	76%	79%	83%	86%	89%
Total	100%	100%	100%	100%	100%	100%
<b>Hardware Revenue</b>						
Turnkey	26%	21%	18%	15%	12%	10%
Unbundled	74%	79%	82%	85%	88%	90%
Total	100%	100%	100%	100%	100%	100%
<b>Software Revenue</b>						
Turnkey	31%	28%	24%	20%	16%	12%
Unbundled	69%	72%	76%	80%	84%	88%
Total	100%	100%	100%	100%	100%	100%
<b>Workstation Shipments</b>						
Turnkey	11%	9%	8%	7%	5%	4%
Unbundled	89%	91%	92%	93%	95%	96%
Total	100%	100%	100%	100%	100%	100%

Source: Dataquest  
July 1988

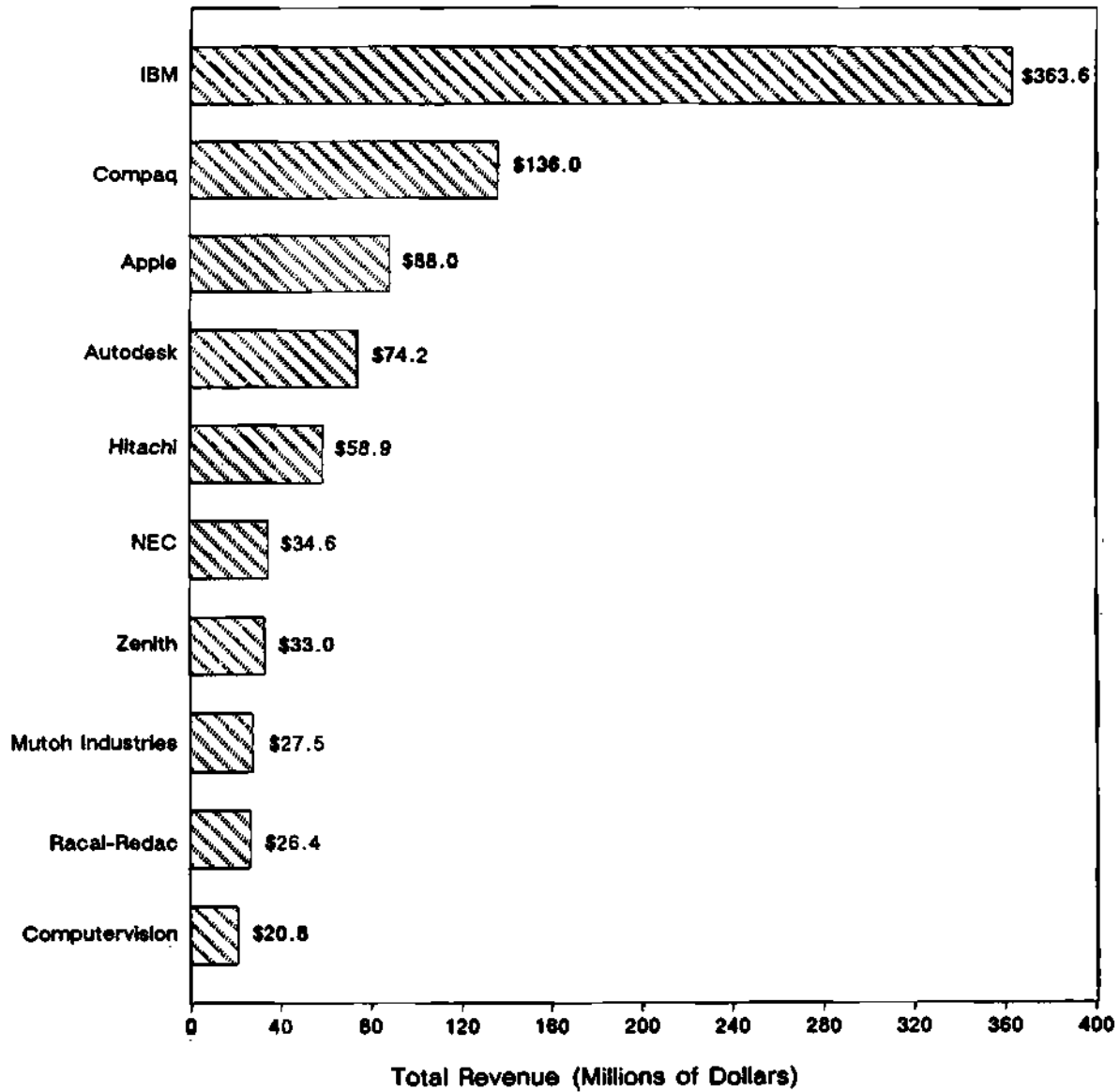
## 1.5 Personal CAD Market Shares

Figures 1.5-1 through 1.5-6 and Tables 1.5-1 and 1.5-4 present Dataquest's analysis of the personal CAD market shares measured in total revenue, hardware and software revenue, and workstation shipments, as well as software units distinguished by price category. Highlights include the following:

- IBM was the dominant vendor in personal CAD in 1987, rolling up the largest total revenue (27.5 percent), the top spot in hardware revenue (38.4 percent), and the greatest share of workstation shipments (33.6 percent). Dataquest attributes this strength to IBM's long-standing success in the personal computer market and to the willingness of software developers to develop DOS CAD packages.
- Compaq captured the number two spot in total revenue (10.3 percent), hardware revenue (17.0 percent), and workstation shipments (22.7 percent). Compaq's strong showing is a result of its delivery of high-performance IBM-compatible machines.
- Apple grabbed the third spot in the same three categories: total revenue (6.7 percent), hardware revenue (11.0 percent), and workstation shipments (18.8 percent). Its ranking is the direct result of the popularity of the Macintosh personal computer.
- These three vendors thoroughly dominated the hardware market, grabbing two-thirds of the revenue and three-fourths of the workstation shipments.
- Autodesk was 1987's software market share leader, with three leading positions: 16.6 percent of software revenue, 21.3 percent of total units, and 31.9 percent of units costing more than \$500. Autodesk has been successful because of its early entry into the PC CAD market and its strong distribution and dealer network worldwide.
- Autodesk's lead position in software is broadly based. The company holds a strong position across all applications and regions, both in terms of revenue and in terms of units.
- The battle for market share of those units costing less than \$500 is the most heated. Generic Software has the top share position with 34.3 percent of the units, trailed by American Small Business Computers (19.1 percent), Autodesk (13.9 percent), Evolution Computing (10.1 percent) and IDD (9.7 percent). These vendors account for a combined 87 percent of the total units in this price category.

Figure 1.5-1

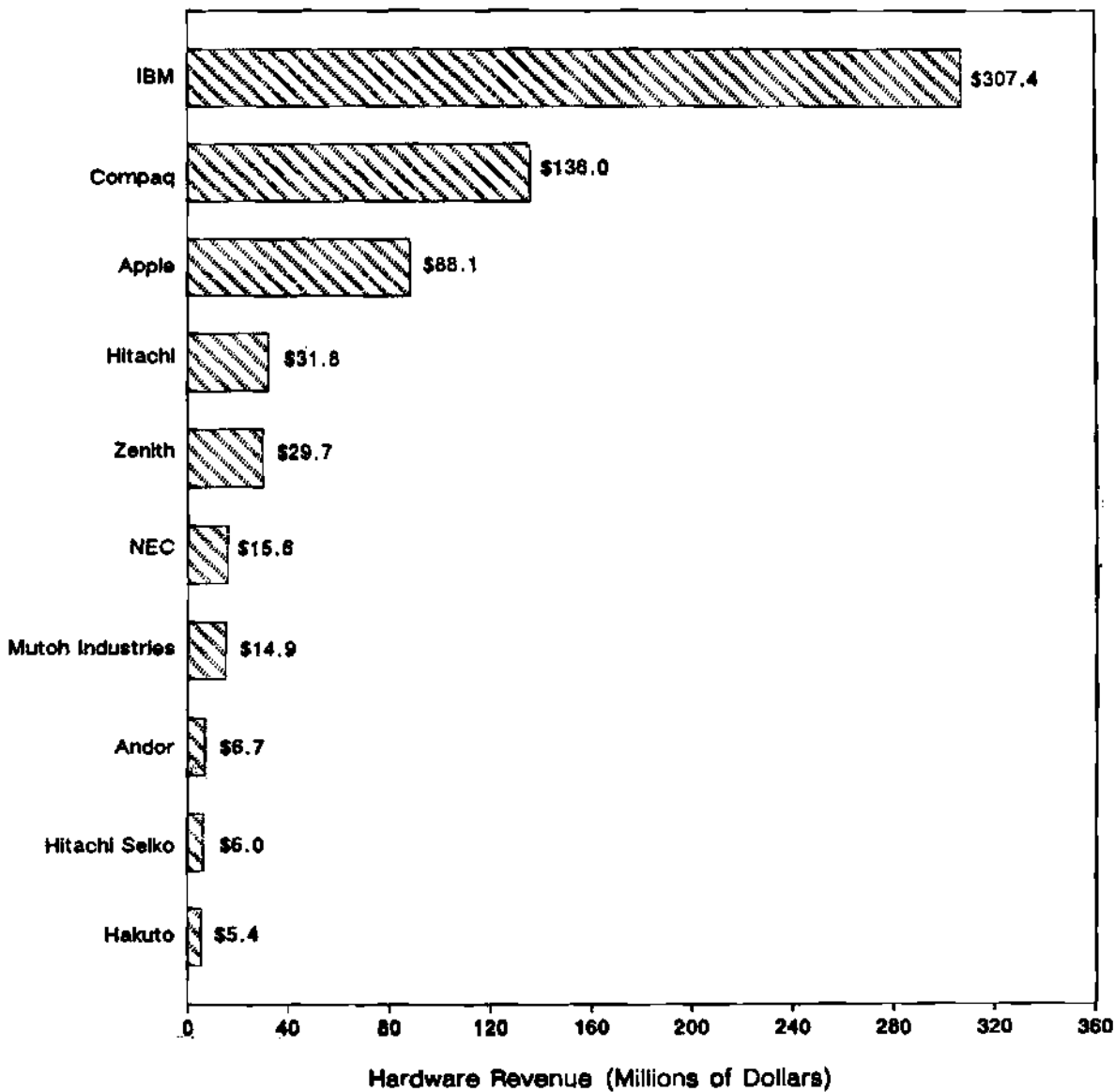
Personal CAD 1987 Worldwide Market Share  
Total Revenue



Source: Dataquest  
July 1988

Figure 1.5-2

Personal CAD 1987 Worldwide Market Share  
Hardware Revenue

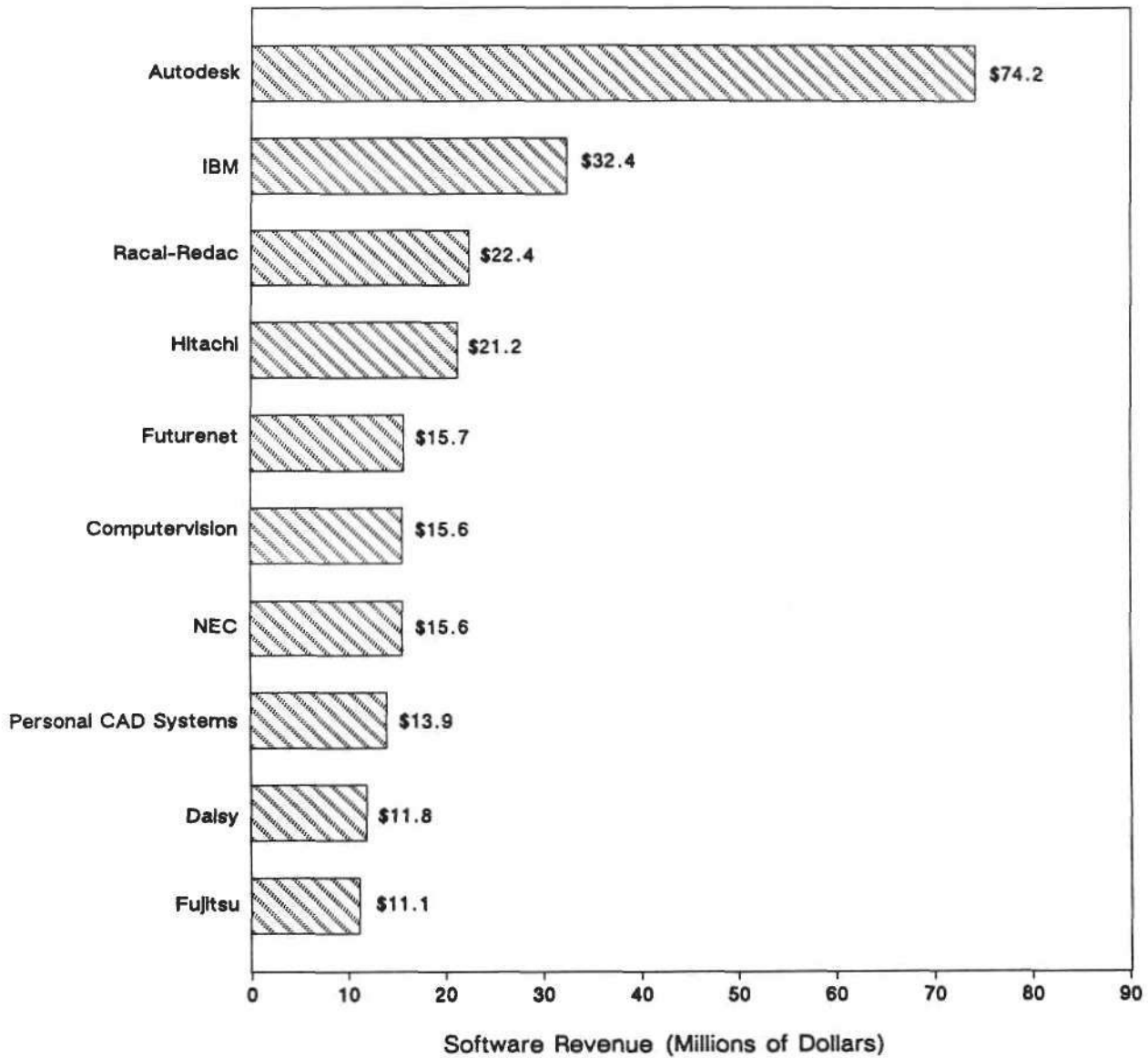


Source: Dataquest  
July 1988



Figure 1.5-3

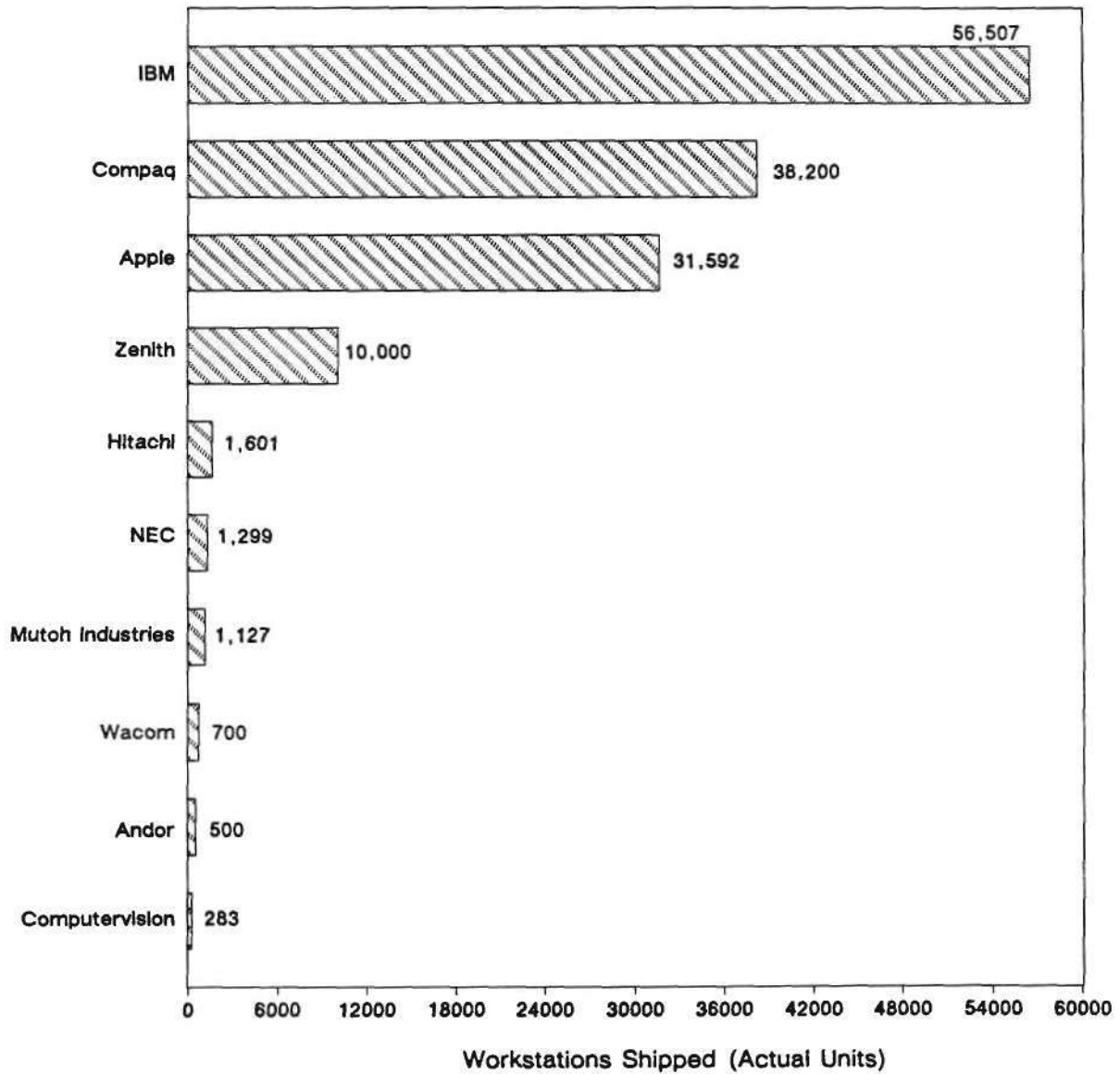
Personal CAD 1987 Worldwide Market Share  
Software Revenue



Source: Dataquest  
July 1988

Figure 1.5-4

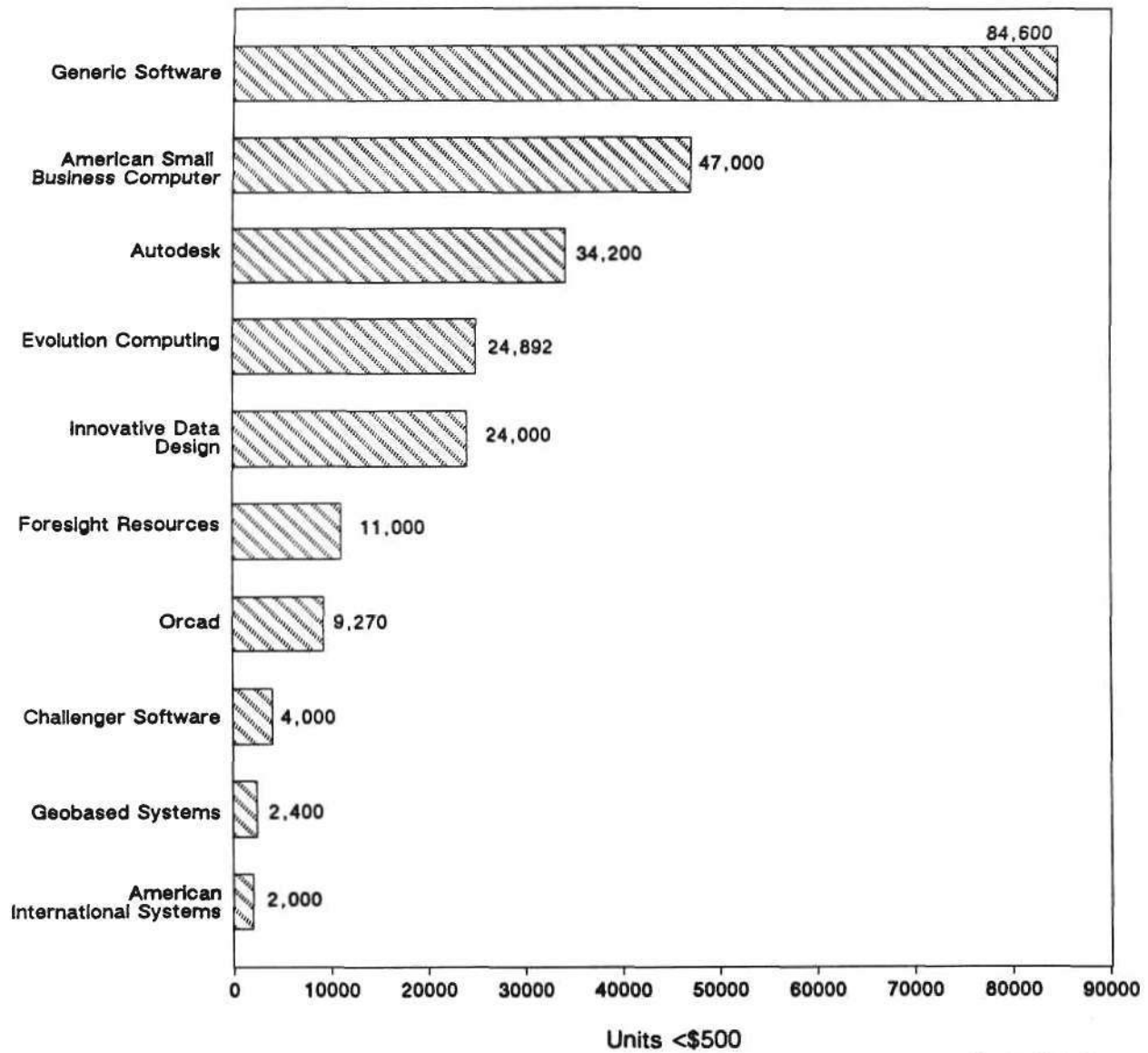
Personal CAD 1987 Worldwide Market Share  
Workstation Shipments



Source: Dataquest  
July 1988

Figure 1.5-5

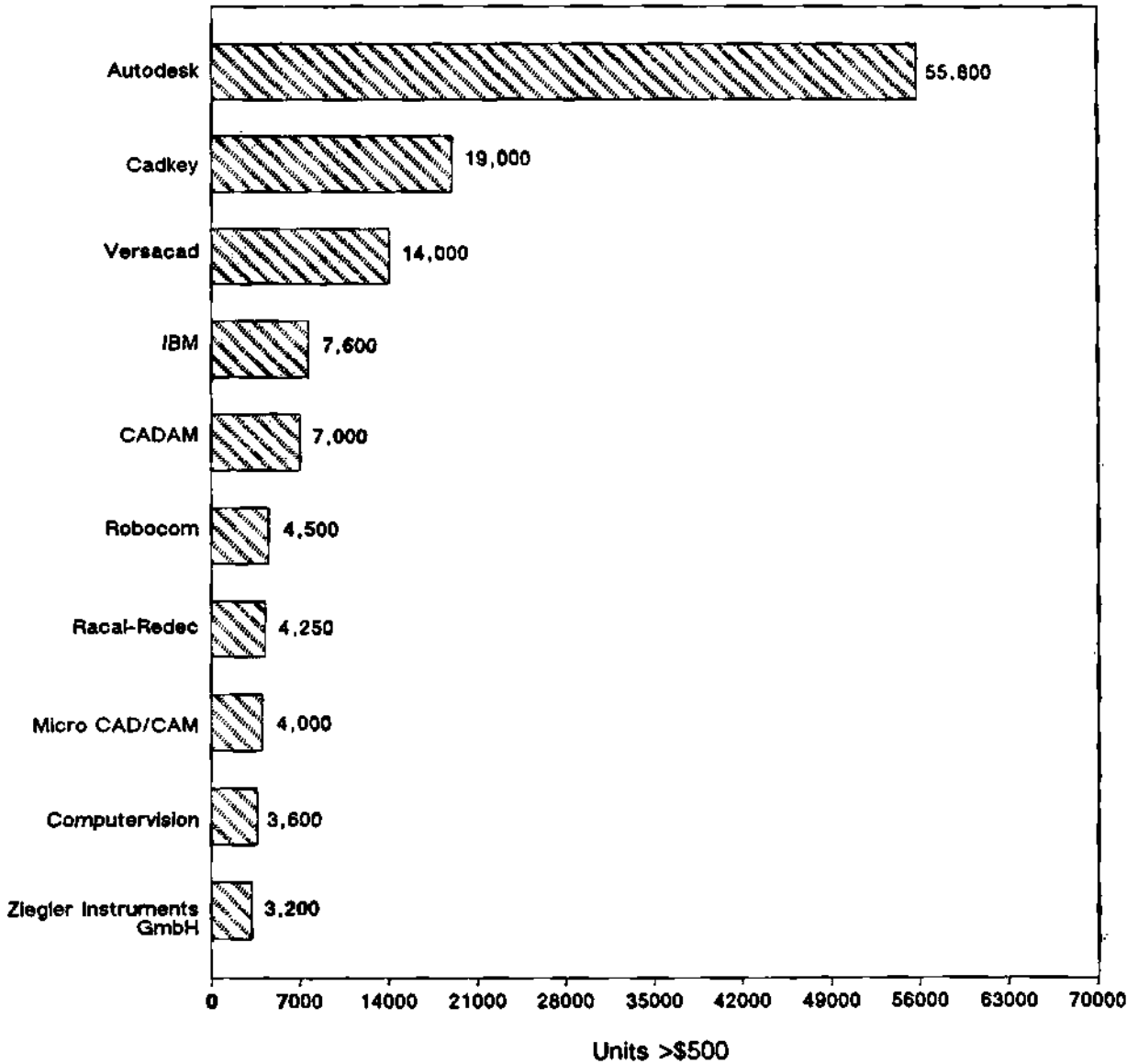
Personal CAD 1987 Worldwide Market Share  
Software Shipments—<\$500



Source: Dataquest  
July 1988

Figure 1.5-6

Personal CAD 1987 Worldwide Market Share  
Software Shipments—>\$500



Source: Dataquest  
July 1988

## 1.5 Personal CAD Market Shares

Table 1.5-1

### Personal CAD 1987 Worldwide Market Share (Million of Dollars, Actual Units)

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	363.6	307.4	32.4	56,507	27.5%	38.4%	7.3%	33.6%
Compaq	136.0	136.0	.0	38,200	10.3%	17.0%	.0%	22.7%
Apple Computer	88.0	88.1	.0	31,592	6.7%	11.0%	.0%	18.8%
Autodesk	74.2	.0	74.2	0	5.6%	.0%	16.6%	.0%
Hitachi	58.9	31.8	21.2	1,601	4.5%	4.0%	4.8%	1.0%
NEC	34.6	15.6	15.6	1,299	2.6%	1.9%	3.5%	.8%
Zenith	33.0	29.7	.0	10,000	2.5%	3.7%	.0%	6.0%
Mutoh Industries	27.5	14.9	9.9	1,127	2.1%	1.9%	2.2%	.7%
Racal-Redac	26.4	.1	22.4	0	2.0%	.0%	5.0%	.0%
Computervision	20.8	2.0	15.6	283	1.6%	.2%	3.5%	.2%
Daisy	19.8	3.1	11.8	253	1.5%	.4%	2.7%	.2%
Futurenet	17.9	.0	15.7	0	1.4%	.0%	3.5%	.0%
Personal CAD Systems	15.9	.0	13.9	0	1.2%	.0%	3.1%	.0%
Andor	14.0	6.7	6.6	500	1.1%	.8%	1.5%	.3%
Hakuto	12.7	5.4	6.7	376	1.0%	.7%	1.5%	.2%
Fujitsu	12.4	.0	11.1	0	.9%	.0%	2.5%	.0%
Toshiba	11.4	4.1	6.1	.0	.9%	.5%	1.4%	.0%
Hitachi Seiko	10.0	6.0	4.0	150	.8%	.7%	.9%	.1%
Wacom	9.0	4.3	4.3	700	.7%	.5%	1.0%	.4%
Ziegler Instruments GmbH	8.5	.0	8.5	0	.6%	.0%	1.9%	.0%
Intergraph	8.2	.0	6.4	0	.6%	.0%	1.4%	.0%
Cadnetix	8.0	.0	7.1	0	.6%	.0%	1.6%	.0%
View Logic	7.8	.0	7.2	0	.6%	.0%	1.6%	.0%
Versacad	6.8	.0	6.7	0	.5%	.0%	1.5%	.0%
Cadkey	6.8	.0	6.8	0	.5%	.0%	1.5%	.0%
Generic Software	6.3	.0	6.3	0	.5%	.0%	1.4%	.0%
Case Technology	6.1	.0	6.1	0	.5%	.0%	1.4%	.0%
EESOF	6.0	.0	6.0	0	.4%	.0%	1.3%	.0%
Uchida Yoko	5.9	4.0	1.3	125	.4%	.5%	.3%	.1%
American Small Business Comput	5.8	.0	5.8	0	.4%	.0%	1.3%	.0%
Altera	5.7	.0	5.0	0	.4%	.0%	1.1%	.0%
Aries Technology	5.2	1.7	3.1	150	.4%	.2%	.7%	.1%
Mitsubishi Electric	4.8	2.6	1.7	144	.4%	.3%	.4%	.1%

(Continued)

Table 1.5-1 (Continued)

**Personal CAD 1987 Worldwide Market Share  
(Million of Dollars, Actual Units)**

Company					Market Share			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Control Data	4.6	2.4	1.1	370	.3%	.3%	.2%	.2%
Datagraph	4.5	2.8	1.5	2,200	.3%	.3%	.3%	1.3%
Valid	4.0	.7	2.4	29	.3%	.1%	.5%	.0%
Graphtec	3.6	2.1	1.4	54	.3%	.3%	.3%	.0%
Robocom	3.5	.0	3.5	0	.3%	.0%	.8%	.0%
Info. Services Int'l Dentsu	3.0	.4	2.3	15	.2%	.0%	.5%	.0%
Orcad	2.9	.0	2.8	0	.2%	.0%	.6%	.0%
CADAM	2.7	1.4	1.1	39	.2%	.2%	.2%	.0%
Hitachi Zosen	2.6	1.0	1.6	131	.2%	.1%	.3%	.1%
Innovative Data Design	2.5	.0	2.5	0	.2%	.0%	.6%	.0%
Aptos	2.5	.0	2.5	0	.2%	.0%	.6%	.0%
Skok Systems	2.5	.0	1.8	0	.2%	.0%	.4%	.0%
CAD Software	2.5	.0	2.5	0	.2%	.0%	.6%	.0%
Manufacturing Consultants	2.3	.0	1.9	0	.2%	.0%	.4%	.0%
Foresight Resources	2.2	.0	2.2	0	.2%	.0%	.5%	.0%
Cascade Graphics	2.0	.0	1.6	0	.2%	.0%	.4%	.0%
CPU	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
ERDAS	2.0	1.0	1.0	50	.2%	.1%	.2%	.0%
Micro CAD/CAM	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
Terr-Mar	2.0	1.0	1.0	50	.2%	.1%	.2%	.0%
Visionics	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
Analog Design Tools	1.9	.1	1.8	24	.1%	.0%	.4%	.0%
ISICAD	1.9	.0	1.8	58	.1%	.0%	.4%	.0%
Microsim	1.9	.0	1.9	0	.1%	.0%	.4%	.0%
ESRI	1.8	.0	1.7	0	.1%	.0%	.4%	.0%
Challenger Software	1.8	.0	1.8	0	.1%	.0%	.4%	.0%
Calma	1.6	1.0	.5	78	.1%	.1%	.1%	.0%
Bentley	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Megacad	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Prime	1.5	.0	1.1	0	.1%	.0%	.2%	.0%
Geographic Data Technologies	1.4	.0	1.4	0	.1%	.0%	.3%	.0%
Swanson Analysis	1.4	.0	1.4	0	.1%	.0%	.3%	.0%
Accugraph	1.3	.3	.9	52	.1%	.0%	.2%	.0%

(Continued)

## 1.5 Personal CAD Market Shares

Table 1.5-1 (Continued)

### Personal CAD 1987 Worldwide Market Share (Million of Dollars, Actual Units)

Company					Market Share			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Algor Interactive Systems	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
CISI	1.2	.5	.6	39	.1%	.1%	.1%	.0%
Evolution Computing	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
MacNeal-Schwendler	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Geobased Systems	1.0	.3	.6	28	.1%	.0%	.1%	.0%
Mapinfo	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Point Line	1.0	.0	1.0	.0	.1%	.0%	.2%	.0%
The Great Softwestern Co.	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
American Int'l Systems	.9	.5	.4	57	.1%	.1%	.1%	.0%
Omaton	.8	.0	.8	0	.1%	.0%	.2%	.0%
CAD Lab	.7	.0	.5	0	.0%	.0%	.1%	.0%
Vamp	.6	.0	.6	.0	.0%	.0%	.1%	.0%
Zycor	.5	.0	.5	0	.0%	.0%	.1%	.0%
HHB Systems	.5	.0	.4	0	.0%	.0%	.1%	.0%
Strategic Locations Planning	.5	.0	.5	0	.0%	.0%	.1%	.0%
Ithaca Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Simucad	.4	.0	.4	0	.0%	.0%	.1%	.0%
MATC CAD	.4	.0	.4	0	.0%	.0%	.1%	.0%
Albert Westler	.4	.3	.1	25	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Dennis Klein & Associates	.4	.0	.4	0	.0%	.0%	.1%	.0%
DFI	.3	.2	.2	12	.0%	.0%	.0%	.0%
Marconi	.3	.2	.1	9	.0%	.0%	.0%	.0%
TT Solutions	.2	.1	.1	5	.0%	.0%	.0%	.0%
Geomath	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

Table 1.5-1 (Continued)

**Personal CAD 1987 Worldwide Market Share**  
(Million of Dollars, Actual Units)

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	150.3	121.4	23.9	21,661	11.4%	15.2%	5.4%	12.9%
All Companies	1,323.1	800.9	446.2	167,995	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,007.9	673.9	284.0	157,724	76.2%	84.1%	63.6%	93.9%
All Asian-Based Companies	266.2	121.3	123.7	7,878	20.1%	15.2%	27.7%	4.7%
All European-Based Companies	49.0	5.6	38.6	2,394	3.7%	.7%	8.6%	1.4%
All Hardware Companies	604.7	593.2	.0	149,683	45.7%	74.1%	.0%	89.1%
All Turnkey & SW Companies	718.4	207.7	446.2	18,312	54.3%	25.9%	100.0%	10.9%

Source: Dataquest  
July 1988



1.5 Personal CAD Market Shares

Table 1.5-2

Personal CAD 1987 Worldwide Market Share  
(Millions of Dollars, Actual Units)

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	74.2	90,000	34,200	55,800	16.6%	21.3%	13.9%	31.9%
IBM	32.4	7,600	0	7,600	7.3%	1.8%	.0%	4.4%
Racal-Redac	22.4	4,250	0	4,250	5.0%	1.0%	.0%	2.4%
Hitachi	21.2	1,600	0	1,600	4.8%	.4%	.0%	.9%
Futurenet	15.7	650	0	650	3.5%	.2%	.0%	.4%
Computervision	15.6	3,600	0	3,600	3.5%	.9%	.0%	2.1%
NEC	15.6	1,300	0	1,300	3.5%	.3%	.0%	.7%
Personal CAD Systems	13.9	1,600	0	1,600	3.1%	.4%	.0%	.9%
Daisy	11.8	750	0	750	2.7%	.2%	.0%	.4%
Fujitsu	11.1	2,760	0	2,760	2.5%	.7%	.0%	1.6%
Mutoh Industries	9.9	1,130	0	1,130	2.2%	.3%	.0%	.6%
Ziegler Instruments GmbH	8.5	3,200	0	3,200	1.9%	.8%	.0%	1.8%
View Logic	7.2	2,500	0	2,500	1.6%	.6%	.0%	1.4%
Cadnetix	7.1	990	0	990	1.6%	.2%	.0%	.6%
Cadkey	6.8	19,000	0	19,000	1.5%	4.5%	.0%	10.9%
Nakuto	6.7	750	0	750	1.5%	.2%	.0%	.4%
Versacad	6.7	14,000	0	14,000	1.5%	3.3%	.0%	8.0%
Andor	6.6	300	0	300	1.5%	.1%	.0%	.2%
Intergraph	6.4	2,800	0	2,800	1.4%	.7%	.0%	1.6%
Generic Software	6.3	84,600	84,600	0	1.4%	20.1%	34.3%	.0%
Toshiba	6.1	500	0	0	1.4%	.1%	.0%	.0%
Case Technology	6.1	2,200	0	2,200	1.4%	.5%	.0%	1.3%
EESDF	6.0	600	0	600	1.3%	.1%	.0%	.3%
American Small Business Comput	5.8	47,000	47,000	0	1.3%	11.1%	19.1%	.0%
Altera	5.0	1,000	0	1,000	1.1%	.2%	.0%	.6%
Wacom	4.3	700	0	700	1.0%	.2%	.0%	.4%
Hitachi Seiko	4.0	150	0	150	.9%	.0%	.0%	.1%
Robocom	3.5	4,500	0	4,500	.8%	1.1%	.0%	2.6%
Aries Technology	3.1	150	0	150	.7%	.0%	.0%	.1%
Orcad	2.8	9,270	9,270	0	.6%	2.2%	3.8%	.0%
Innovative Data Design	2.5	24,000	24,000	0	.6%	5.7%	9.7%	.0%
Aptos	2.5	900	99	801	.6%	.2%	.0%	.5%
CAD Software	2.5	1,300	0	1,300	.6%	.3%	.0%	.7%

(Continued)

Table 1.5-2 (Continued)

**Personal CAD 1987 Worldwide Market Share  
(Millions of Dollars, Actual Units)**

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
Valid	2.4	250	0	250	.5%	.1%	.0%	.1%
Info. Services Int'l Dentsu	2.3	115	0	115	.5%	.0%	.0%	.1%
Foresight Resources	2.2	11,000	11,000	0	.5%	2.6%	4.5%	.0%
CPU	2.0	1,000	0	1,000	.4%	.2%	.0%	.6%
Micro CAD/CAM	2.0	4,000	0	4,000	.4%	.9%	.0%	2.3%
Visionics	2.0	1,200	0	1,200	.4%	.3%	.0%	.7%
Manufacturing Consultants	1.9	950	0	950	.4%	.2%	.0%	.5%
Microsim	1.9	1,200	0	1,200	.4%	.3%	.0%	.7%
ISICAD	1.8	1,900	0	1,900	.4%	.5%	.0%	1.1%
Skok Systems	1.8	700	0	700	.4%	.2%	.0%	.4%
Analog Design Tools	1.8	300	0	300	.4%	.1%	.0%	.2%
Challenger Software	1.8	4,000	4,000	0	.4%	.9%	1.6%	.0%
ESRI	1.7	400	0	400	.4%	.1%	.0%	.2%
Mitsubishi Electric	1.7	145	0	145	.4%	.0%	.0%	.1%
Cascade Graphics	1.6	1,000	0	1,000	.4%	.2%	.0%	.6%
Kitachi Zosen	1.6	130	0	130	.3%	.0%	.0%	.1%
Bentley	1.5	1,000	0	1,000	.3%	.2%	.0%	.6%
Megacad	1.5	1,700	0	1,700	.3%	.4%	.0%	1.0%
Datagraph	1.5	2,200	0	2,200	.3%	.5%	.0%	1.3%
Graphtec	1.4	90	0	90	.3%	.0%	.0%	.1%
Geographic Data Technologies	1.4	280	0	280	.3%	.1%	.0%	.2%
Swanson Analysis	1.4	500	0	500	.3%	.1%	.0%	.3%
Uchida Yoko	1.3	125	0	125	.3%	.0%	.0%	.1%
Algor Interactive Systems	1.2	1,000	1,000	0	.3%	.2%	.4%	.0%
Evolution Computing	1.2	25,400	24,892	508	.3%	6.0%	10.1%	.3%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	.3%	.5%	.0%	1.3%
Prime	1.1	270	0	270	.2%	.1%	.0%	.2%
Control Data	1.1	225	0	225	.2%	.1%	.0%	.1%
CADAM	1.1	7,000	0	7,000	.2%	1.7%	.0%	4.0%
MacNeal-Schwendler	1.0	500	0	500	.2%	.1%	.0%	.3%
ERDAS	1.0	40	0	40	.2%	.0%	.0%	.0%
Mapinfo	1.0	100	0	100	.2%	.0%	.0%	.1%
Point Line	1.0	400	0	400	.2%	.1%	.0%	.2%

(Continued)

1.5 Personal CAD Market Shares

Table 1.5-2 (Continued)

Personal CAD 1987 Worldwide Market Share  
(Millions of Dollars, Actual Units)

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Terr-Mar	1.0	50	0	50	.2%	.0%	.0%	.0%
The Great Softwestern Co.	1.0	725	0	725	.2%	.2%	.0%	.4%
Accugraph	.9	900	0	900	.2%	.2%	.0%	.5%
Omaton	.8	1,600	0	1,600	.2%	.4%	.0%	.9%
Vamp	.6	2,400	2,400	0	.1%	.6%	1.0%	.0%
Geobased Systems	.6	35	0	35	.1%	.0%	.0%	.0%
CISI	.6	260	0	260	.1%	.1%	.0%	.1%
CAD Lab	.5	800	0	800	.1%	.2%	.0%	.5%
Strategic Locations Planning	.5	35	0	35	.1%	.0%	.0%	.0%
Calma	.5	200	0	200	.1%	.0%	.0%	.1%
Zycor	.5	50	0	50	.1%	.0%	.0%	.0%
Ithaca Software	.5	250	0	250	.1%	.1%	.0%	.1%
MHB Systems	.4	70	0	70	.1%	.0%	.0%	.0%
Simucad	.4	400	0	400	.1%	.1%	.0%	.2%
BV Engineering	.4	1,500	1,500	0	.1%	.4%	.6%	.0%
Dennis Klein & Associates	.4	125	0	125	.1%	.0%	.0%	.1%
American Int'l Systems	.4	2,000	2,000	0	.1%	.5%	.8%	.0%
MATC CAD	.4	555	555	0	.1%	.1%	.2%	.0%
DFI	.2	115	0	115	.0%	.0%	.0%	.1%
Marconi	.1	100	0	100	.0%	.0%	.0%	.1%
Albert Nestler	.1	25	0	25	.0%	.0%	.0%	.0%
TT Solutions	.1	10	0	10	.0%	.0%	.0%	.0%
Geomath	.1	10	0	10	.0%	.0%	.0%	.0%
Kork Systems	.0	15	0	15	.0%	.0%	.0%	.0%

(Continued)

Table 1.5-2 (Continued)

Personal CAD 1987 Worldwide Market Share  
(Millions of Dollars, Actual Units)

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Other Companies	23.9	2,400	0	2,400	5.4%	.6%	.0%	1.4%
All Companies	446.2	421,700	246,516	174,684	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

Table 1.5-3

Personal CAD 1987 Top Three Market Shares by Application

	Software Revenue (Percentage)	Software Units (Percentage)
<b>Mechanical Applications</b>		
Autodesk	16.3%	18.5%
IBM	15.5%	
Hitachi	8.1%	
American Small Business		19.9%
Generic Software		16.7%
<b>Facilities Design Applications</b>		
Autodesk	33.0%	22.7%
Fujitsu	7.1%	
NEC	5.7%	
Generic Software		30.5%
Innovative Data Design		12.4%
<b>Mapping Applications</b>		
Autodesk	22.7%	35.0%
ESRI	9.1%	23.4%
Intergraph	8.1%	8.7%
<b>Electronic Design Applications</b>		
Racal-Redac	13.3%	
Futurenet	9.3%	
Autodesk	8.8%	21.4%
Orcad		11.0%
Generic Software		10.2%

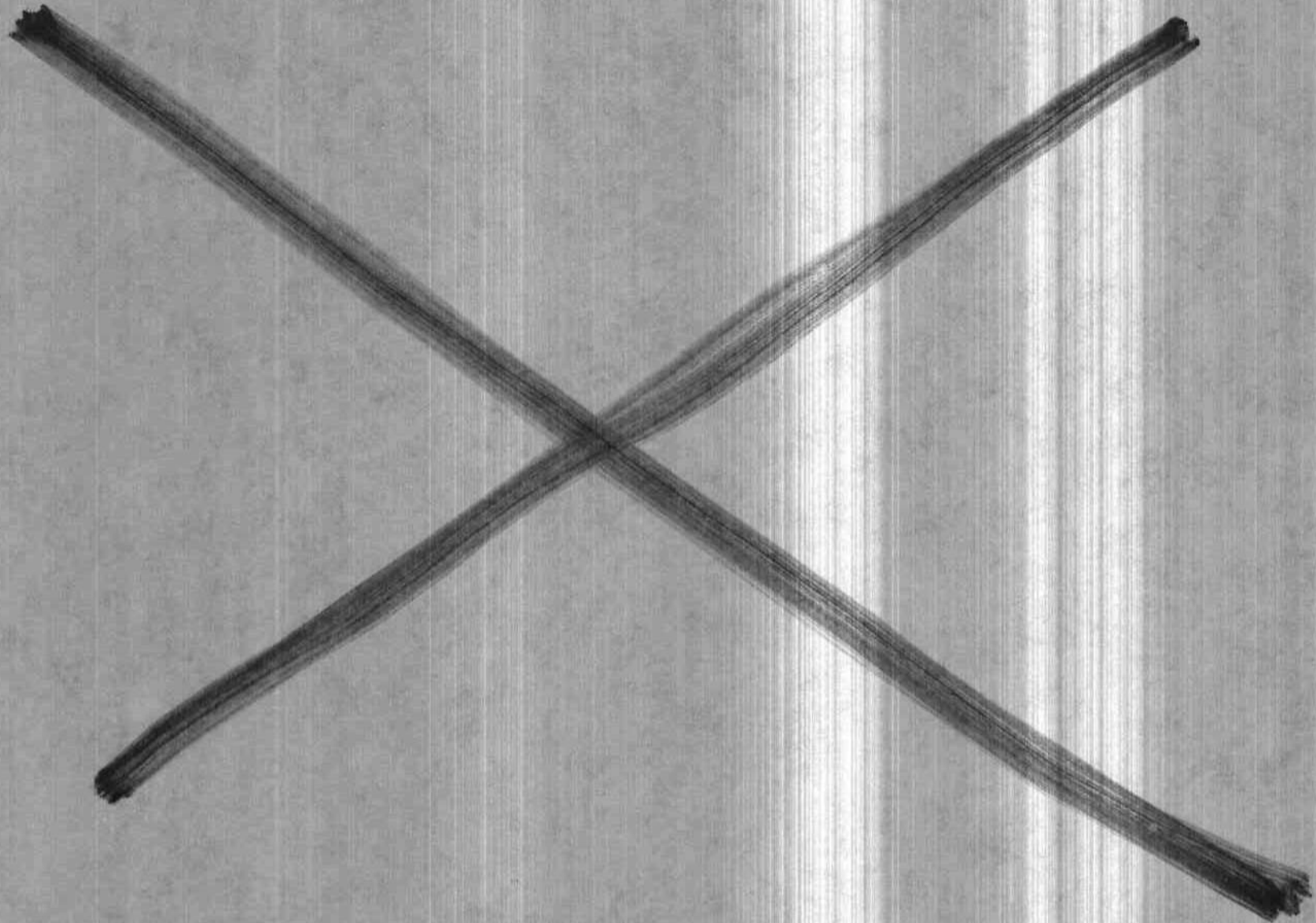
Source: Dataquest  
July 1988

Table 1.5-4

## Personal CAD 1987 Top Three Market Shares by Region

	Software Revenue (Percentage)	Software Units (Percentage)
<b>North America</b>		
Autodesk	23.9%	18.2%
IBM	7.1%	
Futurenet	5.9%	
Generic Software		25.7%
American Small Business		11.9%
<b>Europe</b>		
Autodesk	19.9%	34.1%
Racal-Recac	17.7%	
IBM	10.4%	
American Small Business		7.6%
Racal-Redac		4.7%
<b>Asia</b>		
Hitachi	15.2%	
NEC	11.2%	
Fujitsu	8.0%	7.5%
Autodesk		18.4%
American Small Business		11.6%

Source: Dataquest  
July 1988







## **2.1 Personal CAD Products—Hardware**

### **INTRODUCTION**

This section contains information on the various hardware components used in personal CAD systems. These hardware components include computers, graphics monitors and boards, and peripherals such as tablets, plotters, and local area networks (LANs).

The purpose of this section is to present an overview of hardware use and vendor trends as they affect the personal CAD market. Some of the data presented in this section were obtained in cooperation with several Dataquest research groups. For more detailed analysis within a specific hardware component area, please refer to the following Dataquest research services:

- Personal Computers—Personal Computer Industry Service (PCIS)
- Graphics Boards and Monitors—Graphics and Imaging Service (GIS)
- Printers and Plotters—Electronic Printer Industry Service (EPIS)
- Networks—Telecommunications Industry Service (TCIS)
- Storage—Computer Storage Industry Service (CSIS)

### **COMPUTERS**

The availability of inexpensive but powerful personal computers was the major technological breakthrough that launched the personal CAD revolution in 1984. Personal computer technology has advanced from simple devices with limited functionality (e.g., 8-bit IBM PC) to sophisticated systems capable of handling advanced applications like CAD (e.g., 32-bit IBM PS/2 Model 80).

Improvements in personal computer performance have significantly affected the market for personal CAD software. In the past, personal CAD applications required a user to first purchase add-on or upgrade hardware. Today, most personal computers sold are capable of running some CAD programs. Much of the rapid unit growth in very low cost CAD software (less than \$500) has been fueled by the fact that the typical PC can now use the software.

The most significant change in personal computers in CAD during the last year has been the widespread acceptance of manufacturers other than IBM. While the number of personal computer manufacturers has been continually growing, in past years all manufacturers other than IBM were disparagingly lumped in the "clone" category. Today, manufacturers such as Compaq and Wyse have created market awareness of and demand for their own brand names.

The proliferation of clone vendors has been possible because the PC market has been built on standards (principally the DOS operating system and the AT bus). As these standards become obsolete and the cost to maintain a viable market position in

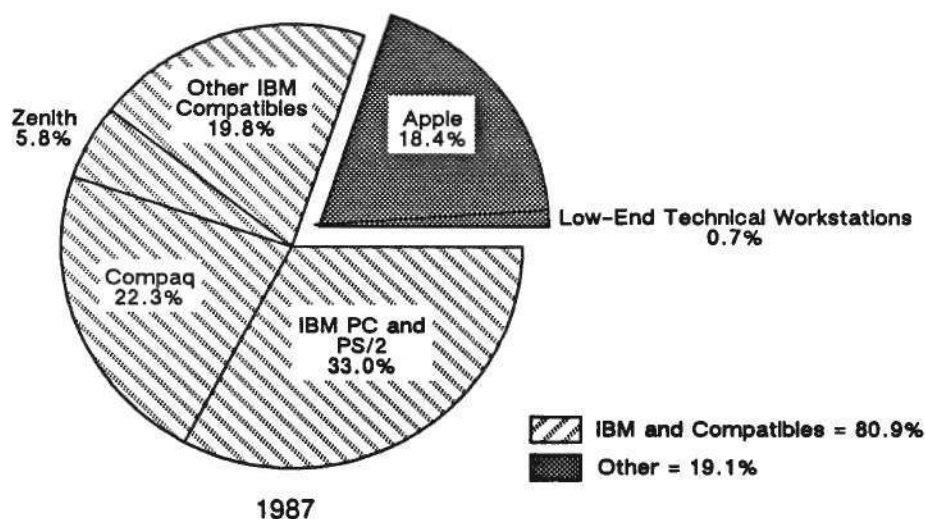
future personal computers grows, smaller computer manufacturers will be challenged to survive.

### Market Share by Platform

As Figure 2.1-1 indicates, the IBM PC and compatibles dominate the personal CAD market by platform with an 80.9 percent market share. Widespread distribution, an open bus structure, and the availability of a large number of CAD application packages are the key factors that have fueled the success of this computing platform in the personal CAD market.

Figure 2.1-1

Personal CAD Unit Market Share by Computing Platform  
1987



Source: Dataquest  
July 1988

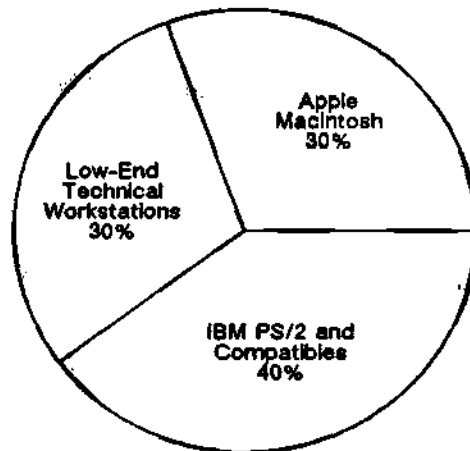
Dataquest believes, however, that the IBM and compatible share will decrease over the next several years, giving way to low-end technical workstations and the Apple Macintosh II platforms. As Figure 2.1-2 indicates, Dataquest estimates that the IBM and compatible share will fall to 40 percent, with the remaining 60 percent evenly split between low-end technical workstations and Apple platforms. Our reasoning regarding this trend stems from the following factors and assumptions:

- Technical workstations will continue to fall in price while offering increased performance relative to personal computers.
- UNIX will increase in user acceptance as the ease of use and UNIX literacy hurdles are cleared with products such as Sun Microsystems' Open Look user interface.

- Technical workstations will become more widespread within the traditional personal computer distribution channels.
- The Apple Mac II will increase in user acceptance as a result of its improved computing performance and open bus for attaching CAD peripherals.
- Most of the major CAD vendors will port their applications to the Apple Mac environment over the next several years.

Figure 2.1-2

Personal CAD Market Forecast by Platform  
1990



Source: Dataquest  
July 1988

### Personal Computers versus Technical Workstations

It is clear that the most dominant computing trend affecting the personal CAD market is the collision in price/performance occurring between personal computers and low-end technical workstations. In actuality, this collision might better be characterized as a blurring of the distinctions between or definitions of a personal computer and a low-end technical workstation. In the past, the performance distinctions were clear as shown in Table 2.1-1. Today, however, the increasing performance of personal computers combined with falling prices of technical workstations has created a high degree of overlap between these two systems. This overlap has the following two key implications for CAD/CAM vendors and users alike:

- Which architecture are CAD/CAM users likely to favor in the future?
- Which architecture should CAD/CAM vendors support?

The answer to these two questions we believe is—both. In other words, Dataquest believes that users are likely to continue buying both classes of systems and, therefore, that vendors should support both platforms.

Table 2.1-1

**Past Distinctions Between Personal Computers and Technical Workstations**

<b>Feature</b>	<b>Personal Computer</b>	<b>Technical Workstation</b>
Operating System	Single Tasking Nonvirtual	Multitasking Virtual
CPU	16-bit	32-bit
Memory	640KB	1MB to 16MB
Graphics	640 x 480 add-in	1K x 1K integrated
Networking	add-in	integrated
Peripherals and storage	Typically separate devices for each PC	Shared via network
Price	\$2,000 to \$5,000	\$10,000 to \$70,000

Source: Dataquest  
July 1988

**Distribution**

The only real distinction we see between personal computers and low-end technical workstations today is in the area of distribution. Personal computer manufacturers have a large, well-established, economically efficient network of dealers and distributors to support the distribution of these low-cost systems.

Although Apollo and Sun continue working to establish similar distribution channels, technical workstation manufacturers have not yet created an efficient mechanism to mass market low-end workstations. Technical workstations are sold primarily through direct sales and OEMs, with a smaller number now moving through value-added resellers. Dataquest believes that workstation vendors will develop an efficient dealer network in order to successfully compete against personal computer vendors in capturing the desks of technical professionals in the future.

## GRAPHICS

Because of the higher graphics performance required for most CAD/CAM applications in comparison with traditional office applications, along with the inability of the personal computer manufacturers to provide adequate graphics capabilities, the personal CAD market has created a vibrant add-on graphics board opportunity. Today there are more than 200 companies providing high-resolution (1,024 x 768 or greater) add-on graphics boards and monitors.

### Leading Suppliers

Table 2.1-2 illustrates the leading vendors of high-end IBM PC and compatible graphics boards. The IBM PC graphics add-on board market is going through a technology transition from the older CGA/EGA standard to the newer VGA and 8514/A standards. This change resulted from IBM's introduction of the newer PS/2 family.

Table 2.1-2

#### High-End IBM PC and Compatible Graphics Board Market Share

Vendor	Market Share
Wyse	14.3%
Truevision	9.0
Moniterm	8.2
IBM	8.2
Control Systems	7.5
Verticom	6.4
Matrox	6.3
MDS	5.9
Number Nine	5.8
Other	28.4
Total	100.0%

Source: Dataquest Graphics and  
Imaging Service  
July 1988

Table 2.1-3 shows the add-on graphics board market for the Apple Macintosh. This is a relatively new market that began with the introduction of the new open bus Mac products. Dataquest expects this market to experience rapid growth over the next several years as CAD/CAM vendors begin adopting the Mac as a standard computing platform.

Table 2.1-3

**High-Resolution Apple Mac  
Graphics Board Market Share**

Vendor	Market Share
Radius	36.4%
E-Machines	27.3
Supermac	11.4
Sigma Designs	9.1
Megagraphics	6.8
Others	9.0
Total	100.0%

Source: Dataquest Graphics and  
Imaging Service  
July 1988

### Major Product and Technology Trends

With respect to graphics capabilities related to the personal CAD market, Dataquest expects the following:

- High-speed, low-cost graphics VLSI chips will continue to fuel dramatic improvements in graphics performance over the next several years.
- The average price for high-resolution personal computer graphics boards is expected to fall an average of 13.3 percent per year from \$1,046 in 1987 to \$590 by 1991.
- We expect 1,024 x 768 color monitors to drop in price from \$1,000 in 1988 to \$750 during 1989.

### PERIPHERALS

Like the graphics board market, the market for peripherals such as tablets, printers, and plotters has mushroomed along with the rapid growth in personal CAD systems. Here we discuss the leading suppliers and trends affecting input devices, output devices, networks/servers, and memory/storage components.

#### Input Devices

Most personal CAD systems allow the connection of a graphics pointing device such as a digitizing tablet or mouse in order to improve user interaction and productivity. In the case of the tablet, macros or template overlays are often supplied to allow rapid execution of frequently used commands. Leading vendors for tablets include Calcomp, Summagraphics, and Kurta.

In the IBM PC environment, the leading suppliers of mice devices are Microsoft, Mouse Systems, and Logitech. These companies are also merchandising very low cost PC CAD software (e.g., EasyCAD, AutoSketch, Generic CADD) with their mouse systems.

We believe that mice will overtake tablets as the most common type of personal CAD input device. Tablets are generally used by the most dedicated CAD users, whose productivity requires immediate access to a program's entire menu structure. The evolving demand from all users for a window- and icon-based interface greatly reduces the need to have an entire menu displayed on one surface, particularly for the casual user. It is this casual user who will be the source of much of the future personal CAD unit growth. This user is less concerned with productivity and more concerned with successfully negotiating a program that may have sat untouched for days or weeks.

### Output Devices

Personal CAD systems use both plotters and printers capable of outputting graphics to generate hard copy. Some of the growth in both laser graphics printers and personal CAD software can be attributed to their use together. Together these products meet the widespread need for "quick and dirty" hard copy of design iterations. Because laser graphics printers emulate plotters and also are very effective printers, these devices provide a one-product solution to the nearly universal need in design environments for hard copy of files from all commonly used PC software, such as CAD, word processing, and spreadsheets.

Although many users can now afford B-size laser printers, Dataquest believes that there are many more potential buyers for an affordable C-size laser printer that, given the fine resolution of laser output, could hold a design of considerable complexity. Leading vendors supplying laser printers with plotter emulations include Hewlett-Packard, Digital Equipment Corporation, QMS, Texas Instruments, and Talaris.

Pen plotters are still the most widely used CAD output peripherals. They are characterized as electromechanical devices capable of translating commands from a computer into pen-and-paper movements to draw lines. Pen plotters are vector-based graphics devices that are designed to produce drawings, charts, and diagrams. They are usually available in several different widths ranging from narrow format, 8 1/2 x 11 inches (A size), to wide format, 34 x 44 inches (E size). Table 2.1-4 lists the leading market share vendors for North America.

Table 2.1-4

**Estimated North American  
Pen Plotter Market Shares**

Vendor	Market Share
Hewlett-Packard	64%
Calcomp	8
Houston Instruments	5
Benson	5
Gerber Scientific	4
Others	14
Total	100%

Source: Dataquest Electronic Printer  
Industry Service  
July 1988

Electrostatic plotters have long been a popular platform in the mainframe CAD/CAM market. Because of their rapidly declining prices and their inherent speed and imaging advantages, Dataquest believes that electrostatic plotters will gain in popularity among personal CAD users. Table 2.1-5 lists the leading vendors supplying electrostatic plotters.

Table 2.1-5

**Estimated North American  
Electrostatic Plotter Market Shares**

Vendor	Market Share
Versatec	73%
Calcomp	16
Benson	11
Total	100%

Source: Dataquest Electronic Printer  
Industry Service  
July 1988

Other types of graphics output devices that can be used with personal CAD systems include ink jet printers (e.g., Tektronix, Canon, Sharp, Hewlett-Packard), thermal transfer printers (e.g., Seiko, Calcomp, Tektronix, Versatec), dot matrix printers (e.g., NEC, Epson, Oki), and laser printers (e.g., Hewlett-Packard, Xerox). Most of these devices are used to create simple check prints or to provide a color output capability.



## Networking

Personal CAD, like many business applications, requires the sharing of data and peripherals. To accommodate this need, local area networks (LANs) and computer servers are commonly found in personal CAD environments. However, several problems are associated with networking in personal computer environments, limiting the use of networking in comparison with workstation-based CAD. These problems include the following:

- Networking is an add-in option as opposed to being standard equipment.
- Networking is difficult for first-time personal computer users to understand and implement.
- The proliferation of incompatible solutions has added to the users' confusion on which system to adopt.
- The sheer size of many personal CAD files has made networked file transfer more of a challenge than a solution.

Because of these factors, many personal CAD users use no networking at all (called "sneaker net"). When the occasion rises that these users have to share data or peripherals, floppy disk transfers serve as the most common exchange medium.

In spite of the current shortcomings associated with personal computer networking, Dataquest believes that many personal CAD users are currently either installing or planning a network facility, with the various offerings of Ethernet with TCP/IP dominant. Table 2.1-6 lists the leading U.S. suppliers of personal computer-based LAN connections.

Table 2.1-6

U.S. PC LAN Shipment Market Shares  
1987

Vendor	Market Share
3Com	17.3%
IBM	15.9
Apple	10.6
Novell	7.7
Micom-Interlan	7.2
Standard Microsystems	6.8
Western Digital	6.7
Others	27.8
Total	100.0%

Source: Dataquest Telecommunications  
Industry Service  
July 1988

### **Memory and Disk Storage**

The dominant trend in memory and disk storage is the rapid decline in prices for these components. The price per megabyte of memory and disk storage is falling at more than 20 percent per year while the capacity and speed of both are increasing.

In the past, CAD/CAM applications ported from mainframes to personal computers highlighted weaknesses in PC memory and I/O bandwidth. Most of this problem, however, was attributable to the lack of memory addressability (640KB) in the DOS operating system. With the introduction of OS/2, the restrictive memory limitations, for the most part, have been eliminated. As a result, Dataquest expects to see dramatic improvements in personal computer-based CAD functionality and speed.

Optical disks are also expected to play a more important role in the future personal CAD market. Even with its inherent read-only limitations, we expect optical disk technology to find near term acceptance in the personal CAD market in several application areas such as facilities design (e.g., storing architectural symbols and catalog components) and mapping (e.g., distributing large static mapping data bases to municipalities).

## 2.2 Personal CAD Products—Software

### INTRODUCTION

This section contains information on the various software components used with personal CAD systems. These software components include operating systems, application packages, symbol libraries, and data transfer packages. The purpose of this section is to present an overview of software technology and vendor trends as they affect the personal CAD market.

### OPERATING SYSTEMS

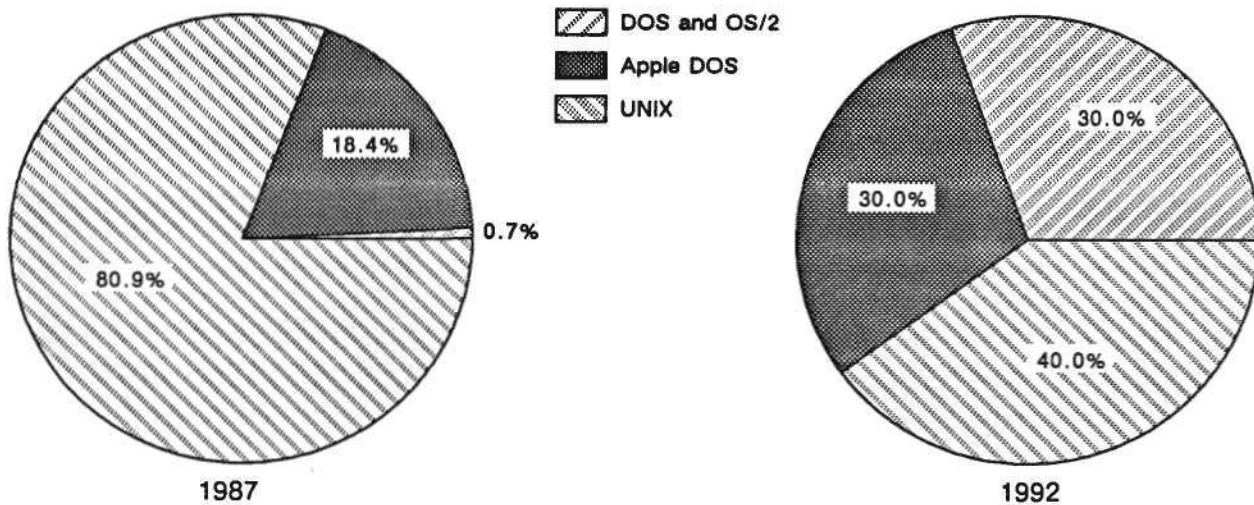
Operating systems are an important market factor because they essentially define the major personal CAD market segments. The following three basic operating systems environments are important within the personal CAD market:

- PC DOS and OS/2
- Apple DOS
- UNIX and Xenix

As Figure 2.2-1 illustrates, PC DOS and OS/2 dominated the market in 1987 with an 80.9 percent share. Although the increased capabilities of OS/2 (e.g., increased memory addressability and multitasking) will greatly benefit the personal CAD market, Dataquest believes that Apple DOS and UNIX-based personal CAD systems will grow much faster. The rapid rise in popularity of Apple's new Macintosh II and Sun's 386i with the open look user interface are two major reasons for our bullish projections on Apple DOS and UNIX, respectively. In any case, we believe that software vendors in the personal CAD business must support all three operating systems in order to be successful.

Figure 2.2-1

Personal CAD Market by Operating System



Source: Dataquest  
July 1988

APPLICATION SOFTWARE

Price/Performance Ratio

Although just a year or two ago personal CAD software was sold under the claim of “80 percent of the function for 20 percent of the cost,” that distinction is fuzzy today. In 1985, vendors such as Autodesk, Versacad, and Cadkey offered products at approximately \$2,000. Today, the functionality of these products has increased significantly, and their list prices have each grown to about \$3,000. Full-function personal CAD products now approach, both in function and in cost, core software offered unbundled by many workstation-based CAD/CAM vendors.

Drafting software, the original PC offering, has evolved into a product priced at \$100 to \$500. Based on reports that software companies receive as little as \$5 per unit for vector-based drawing packages bundled with mice, we must conclude that PC CAD software pricing has bottomed out.

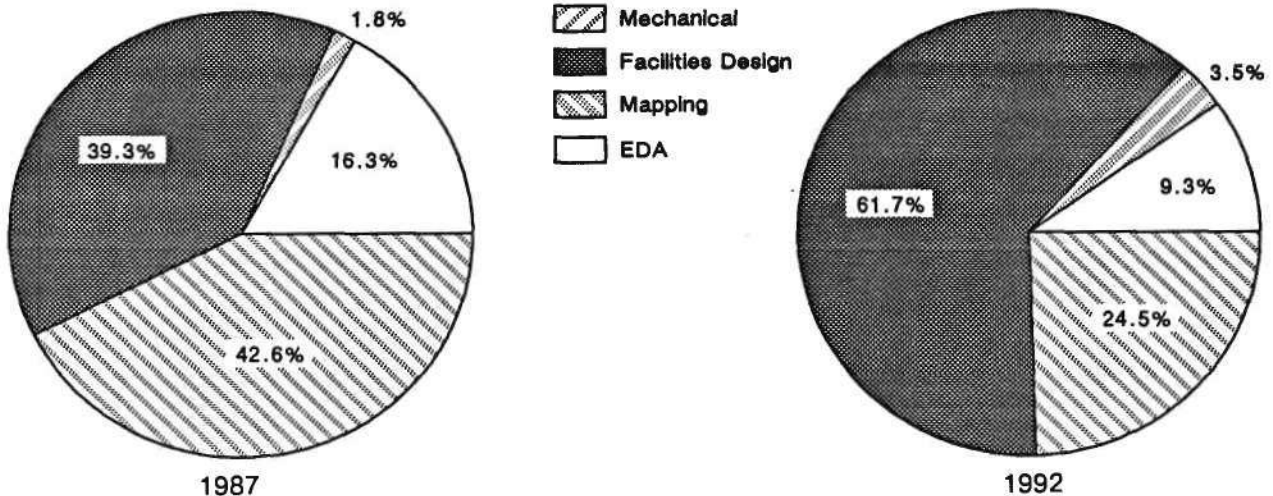
Emerging Applications

Higher-end CAD applications continue to trickle down to PCs. Today, some version of almost any CAD software is available on a PC, and we expect this migration to continue. We also project that software developers, attracted by the tremendously large installed base of PC hardware, will write new CAD applications directly for PCs.

Figure 2.2-2, comparing present and future personal CAD applications, illuminates the most likely areas for these new applications. While cutting-edge simulation and analysis in mechanical applications will be best suited to higher-end computers for any foreseeable future, facilities design and mapping applications are fertile ground for new approaches to PC CAD. It is these applications that also offer the best opportunities for capturing essentially new, nontraditional CAD users (such as a farmer developing a crop rotation scheme, or a fire station roughly locating all registered hazardous materials in its jurisdiction).

Figure 2.2-2

## PC-Based Workstations by Application



Source: Dataquest  
July 1988

## Shelfware

Many personal CAD users report that they have more than one software package that performs essentially the same functions. Personal CAD software is beginning to accumulate on users' shelves, confounding conventional notions of market penetration. PC users in all but the most impoverished design environments always represent opportunities for new sales, if a new product can better satisfy them. We believe that the principal requirements for reselling to these users are as follows:

- A product that appears to both do the job better and be easy to learn
- A product with a low price that does not require capitalization or even management approval

As windows and icons become the norm in a personal computer interface, users should be able to more easily master new software. As the PC interface improves, we expect users to increase the sheer number of software packages they know how to use. This eventuality should also increase the number of personal CAD software units sold.

### **SYMBOL LIBRARIES**

Personal CAD suppliers generally sell symbol library modules as additional products, with architectural symbols being the most universal offering. Some suppliers, such as Generic Software, continue to develop their own libraries, reaping any revenue to be gained from add-on software. Other suppliers, such as Autodesk, encourage third parties to develop new libraries. The hope is that users in new applications will develop new libraries, then sell these libraries, and ultimately increase demand for the core product. We believe that as optical disks reach personal CAD users, opportunities for suppliers of symbols and catalog components should increase considerably, particularly in facilities design applications.

### **CAD DATA AND DATA TRANSFER**

Relational data base management systems (RDBMSs) are currently being integrated into many technical workstation-based environments. However, data bases are not an important market driver in PC-based CAD at present. We believe that as RDMSs establish their value in higher-end systems, the need for these products will become more evident to personal CAD users.

Users report significant need to transfer CAD data to other systems. Autodesk's DXF file format is an absolute standard in the industry. Almost all personal computer- and workstation-based vendors offer a program to translate files to DXF, providing a viable file transfer solution for mechanical and facilities design applications.

However, the DXF standard offers little in EDA applications except as a path to technical documentation. Users of very low end EDA CAD software are likely to find themselves somewhat marooned within larger design environments. The EDIF standard does offer EDA users the promise of a bridge between personal CAD and the closed systems of workstation-based vendors. Alternatively, it is possible that user pressure could force workstation-based EDA vendors to open access to their systems. However, neither of these eventualities is within the control of vendors of personal computer-based EDA software.

## 2.3 Service, Support, and Training

### **HARDWARE SERVICE**

Personal computer hardware service has evolved considerably from its starting point of spotty assistance for somewhat unreliable hardware. Today, the hardware is far more reliable, and a number of service sources are available to PC users—from local repair shops to service agreements through value-added resellers (VARs), third-party maintenance companies, or computer manufacturers. As the installed base of personal CAD computers grows and pressure on hardware margins intensifies, hardware service is beginning to emerge as an important revenue source. Dataquest believes that competition among the various suppliers of hardware service is likely to intensify in the future.

### **SOFTWARE SUPPORT**

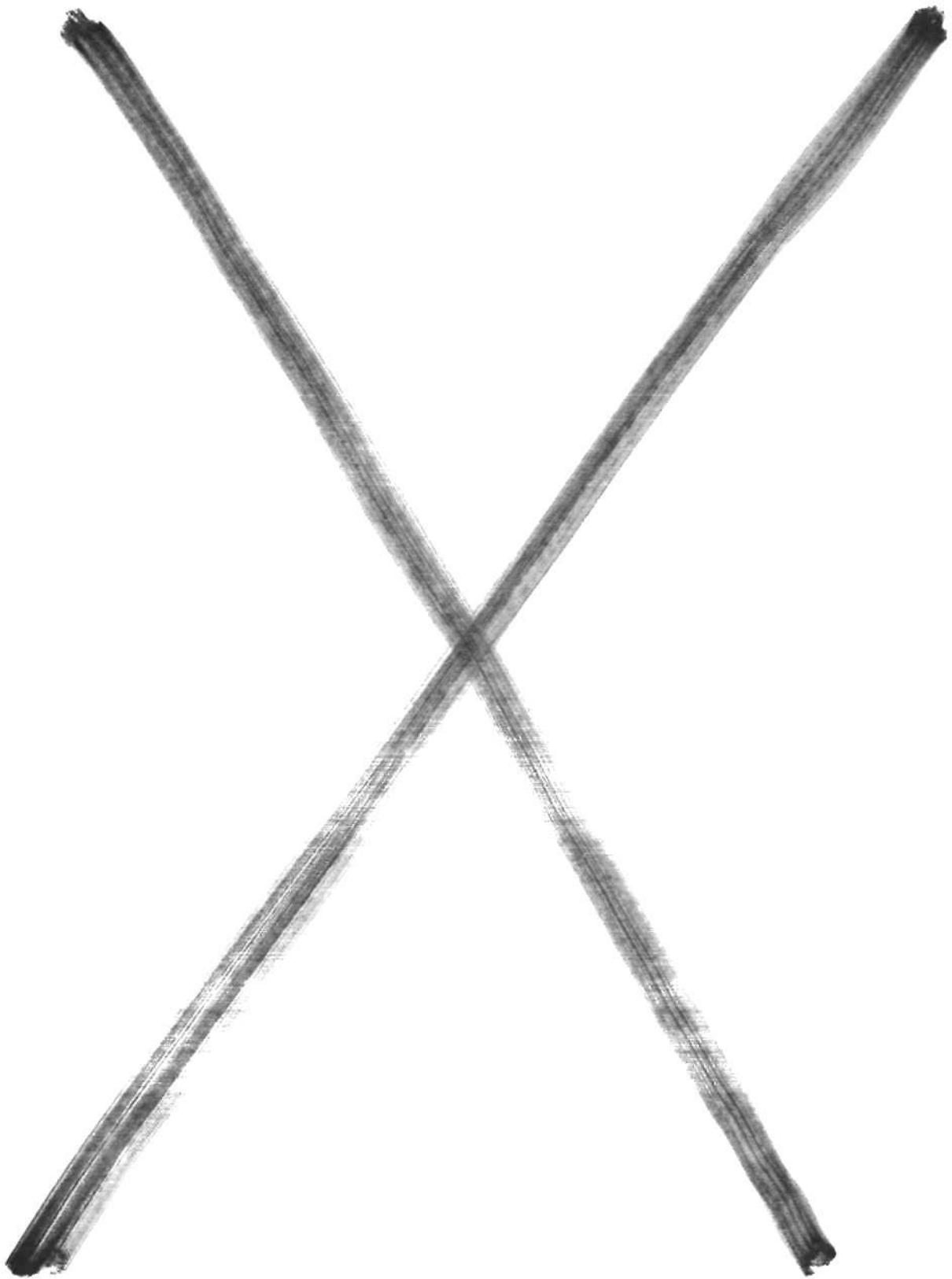
A fundamental problem with software support is that user demand can be unlimited. Needs can range from hand-holding the user through what were thought to be obvious installation procedures, to verifying a software bug that has emerged in an unusual application, to help with networking issues, to requests for yet another printer driver. As personal CAD moved from the hardy early users to the mainstream buyers, expectations of software support also evolved. Users expect that support will be included in what is already a low-priced product. Dealers repeatedly describe vendor support as the distinguishing characteristic of a desirable supplier, and they report that they are considering dropping suppliers who don't measure up.

We believe that controversy over vendor support is an indication that personal computer CAD software has evolved to the above earlier stage of PC hardware—i.e., it needs to be more predictable and better understood in actual use. We believe that successful low-cost vendors in the future will provide products that make support as unnecessary as possible—products that are intuitive, self-teaching, and user proof.

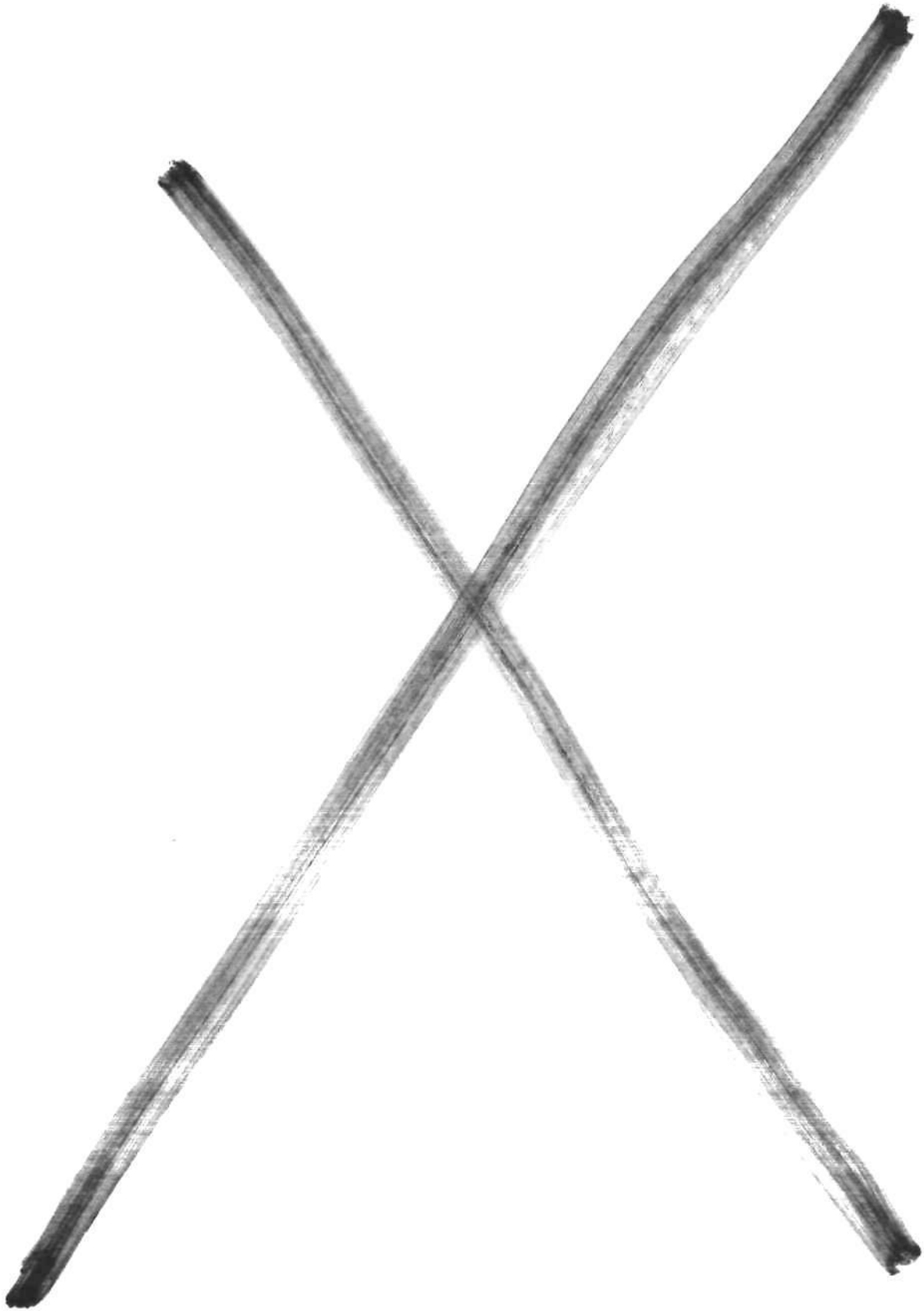
### **TRAINING**

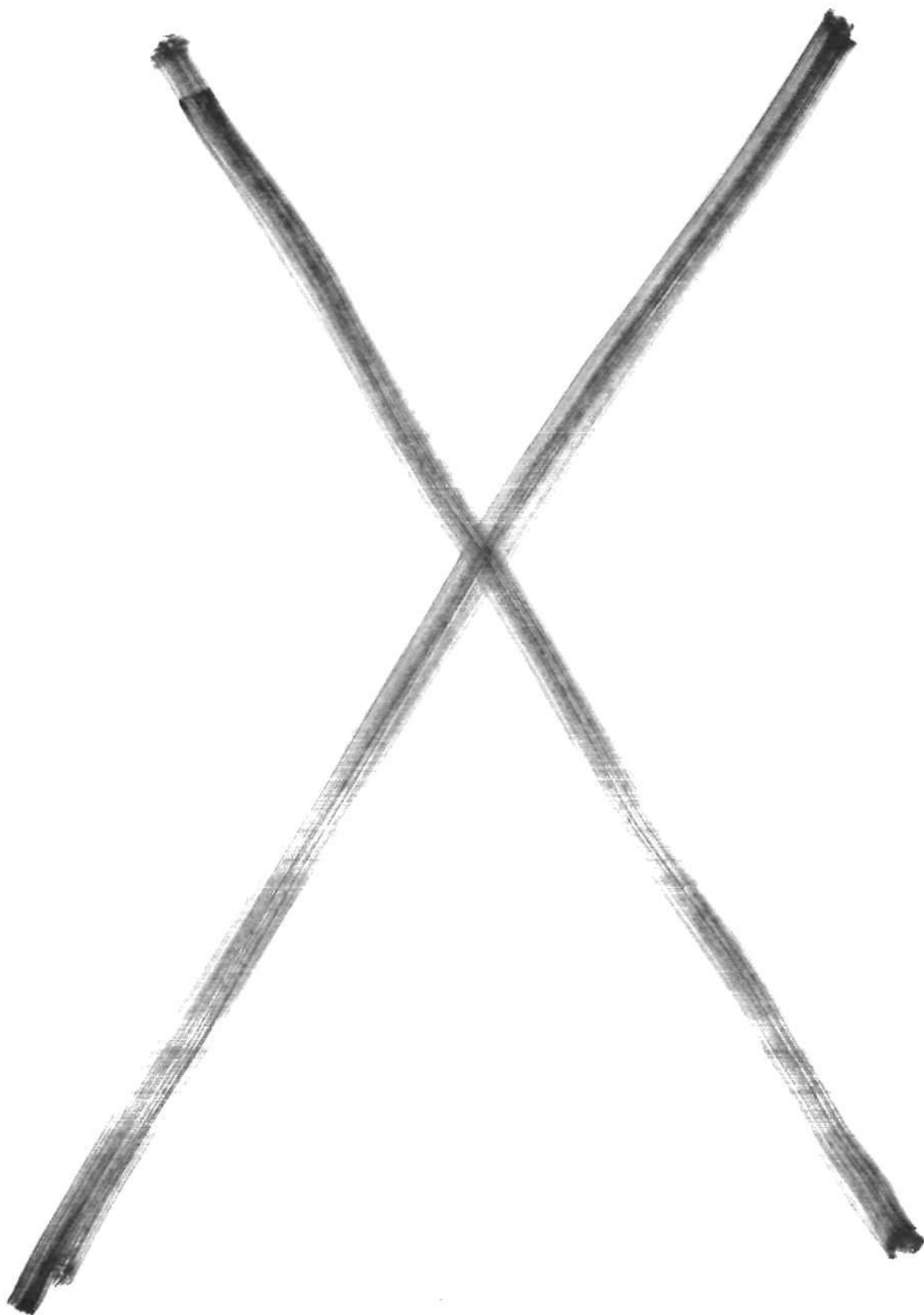
Personal CAD training was nonexistent a few years ago. Today, Autodesk alone has 80 training centers, mostly at colleges and universities. Although VARs, dealers, and vendors report that they provide training on many sales, a number of colleges also offer training for a wide variety of CAD products. These institutions report that training courses can be profitable operations.

Users expect low-cost CAD software providers to somehow also provide low-cost training. Whereas buyers of traditional CAD systems have always anticipated that a dedicated user will need approximately a week of training and two to three months of practice before becoming fully productive, the buyer of a \$3,000 product may expect to need two days of training and two weeks of work to become fully productive. The buyer of a product priced less than \$500 expects it to turn on and work. We believe that training in the future will be handled far more often through self-teaching techniques using emerging technologies such as CD-ROM, videotapes, Hypertext, and expert or intelligent systems software.









## 5.1 Personal CAD Vendor Overview

### HISTORY

The personal CAD market, while providing hundreds of thousands of users with low-cost products, has generated tremendous numbers of products and financial opportunities for the vendor community. To a large extent, these opportunities are the result of significant alterations in the CAD/CAM market, which took place in the early 1980s when the mystery of CAD system integration was dispelled. As reliable and appropriately configured PC hardware appeared, users learned that they could assemble their own CAD systems, provided they could find a source of unbundled CAD software. The software community responded to the challenge by developing scaled-down versions of the turnkey CAD vendor's software capabilities.

The marketplace for personal CAD products grew rapidly in the mid-1980s. Low price transformed CAD from an esoteric application into a commodity product. This growth has provided a very strong incentive for developers of new CAD products, both hardware and software. Dataquest believes that more than 500 new products are created and brought to the personal CAD market each year, with no drop-off in sight. As we discovered in our survey of users, nearly half of all users had more than one personal CAD software package. This is a market that forces market analysts and researchers to rethink the concept and definition of saturation. For most CAD vendors, personal CAD will be a critical market focus.

### CHALLENGES

Despite the fact that the personal CAD market is already very large and growing rapidly, vendors face a number of significant challenges to success. Suppliers and developers of personal CAD products stand to gain market share if they can overcome the specific challenges of:

- Market identification
- Product definition
- Distribution/delivery

The market identification challenge for vendors is the ability to define and identify a specific and economically viable segment of the personal CAD market. There is a limit to the number of core CAD packages, solid modeling products, and architectural detailing templates that the market can absorb. This situation poses an interesting "good news, bad news" marketing dilemma where the economic barriers to entry are minimal (the good news) but the likelihood of success is also minimal (the bad news).

If a vendor picks the right market segment, the next challenge becomes the development of a product based on the best and most appropriate technology for market

acceptance. It is difficult to succeed with either old technology or technology that is ahead of its time. Simply stated, technology is a moving target.

However, the most significant challenge facing the vendor community applies equally to start-ups, giant corporations, and current market leaders. The challenge is this: How do they deliver their products to the marketplace? As the previous chapter indicated, a number of forces in the dealer/distributor arena appear to be reshaping the emerging CAD distribution channels. Dataquest believes that finding the right formula for delivering product to market is the single most reliable predictor of success in the personal CAD marketplace. Vendors who currently are successful, as well as those who hope to be, must be agile and able to adapt to a highly volatile distribution environment.

## 5.2 Personal CAD Hardware Vendors

### OVERVIEW

This section will review the market share and shipment data for the largest hardware vendors in the personal CAD marketplace. In addition, we will briefly discuss how and why these vendors have been successful, focusing on both technical and distribution issues.

The personal CAD hardware market is dominated by three vendors: IBM, Compaq, and Apple. In 1987, IBM garnered nearly 40 percent of the hardware revenue, while Compaq and Apple combined for almost 30 percent more. These market shares are especially significant because 60.5 percent of the total 1987 personal CAD revenue is derived from the hardware segment.

### IBM: THE VIEW FROM THE TOP

Table 5.2-1 presents IBM's workstation shipments for the personal CAD market from 1984 through 1987. Despite steep slips in market share, IBM has managed to grab the top spot in each of the last four years. This dominance in the personal CAD market parallels IBM's dominance in the overall personal computer market. The drop in market share reflects the continuing challenges to IBM from the following:

- Compaq at the high end of the PC market
- The onslaught of clones at the low end
- The emergence of Apple as a viable competitor

Table 5.2-1

#### IBM PC CAD Performance 1984-1987

	Workstations (Units)	Market Share (Percentage)
1984	26,005	96.9%
1985	29,127	66.7%
1986	37,809	39.2%
1987	56,507	33.6%

Source: Dataquest  
July 1988

IBM's pioneering role in the PC arena placed it at the forefront of acceptance, starting in 1984. Both its product's open architecture and the accessible DOS operating system certainly helped IBM sell more PCs. The door was also opened to clone manufacturers, however, leading to a declining market share for IBM. The personal CAD market began its most important growth period with the availability of low-cost PC clones, coupled with a growing set of unbundled software.

The success that IBM has had thus far is a function of sales of its PC AT and XT lines and of the DOS capabilities of the PS/2 line. At this time, OS/2 and IBM's microchannel architecture have had no material effect on IBM's personal CAD market share. Dataquest believes that IBM's future hardware shipments in this market will be largely dependent on the degree of acceptance of OS/2 as a target operating environment for personal CAD software developers. As of mid-1988, there is still much room on the bandwagon.

IBM has built a large and comprehensive dealer/distributor channel for personal computers. The company's commanding market position and legendary marketing acumen have helped it to achieve considerable control of both the resellers and the desirable accounts. As part of IBM's overall marketing programs, policies and programs for PC resellers develop regular evolutionary twists, providing a subject of considerable controversy within the reseller community.

### COMPAQ: PERFORMANCE PAYS

The second leading hardware vendor, Compaq Computer, has taken a unique approach to the personal computer market. The company's strategy has been to develop and deliver IBM-compatible computers that emphasize system performance. This has paid off in the personal CAD arena, as shown in Table 5.2-2, because CAD users are often "power users." Compaq's greatest success has come with its line of 80386-based computers, which are among the top performing machines. Dataquest believes that Compaq's future success lies in its ability to continue to provide a price/performance alternative to the product offerings of IBM.

Table 5.2-2

#### Compaq PC CAD Performance 1986 and 1987

	Workstations (Units)	Market Share (Percentage)
1986	10,000	10.4%
1987	38,200	22.7%

Source: Dataquest  
July 1988

On the software side, Compaq, as a supplier of IBM-compatible machines, is able to leverage a ready-made supply of DOS-based software. In addition, the company will ship machines with a variety of operating systems in a variety of flavors. Although this does not necessarily increase Compaq's attractiveness as a supplier of personal CAD platforms, it does not detract from it either.

Compaq's dealer network is one of its key strengths. Compaq avoids channel conflict by selling only through its dealers—an approach that has earned the company considerable dealer loyalty. Compaq's current "dealer-only" policies contrast with both IBM, which sells in volume to corporate accounts, and Apple, which downplays a modest corporate account program.

Both IBM and Compaq maintain stiff volume quotas and/or capital requirements for authorized dealers. To meet quotas, many dealers operate informally as distributors, reselling to authorized DAVARs (dealer-assisted value-added resellers) or to unauthorized, or "gray market," dealers. Both IBM and Compaq maintain high product quality; their computers are very likely to perform during the warranty period. This means that unauthorized resellers can avoid warranty issues.

#### APPLE: MORE THAN JUST A COMPUTER

Like Compaq, Apple is a somewhat late entrant to the personal CAD hardware market. The company has managed to carve out a growing market share due exclusively to the successful Macintosh personal computer. With its distinctive user interface, Apple has broadened the overall personal computer market by delivering an easy-to-use machine. Software is easy to learn because nearly all applications offer a similar presentation to the user. The success of the Macintosh as a personal CAD platform is shown in Table 5.2-3.

Table 5.2-3

#### Apple PC CAD Performance 1985-1987

	Workstations (Units)	Market Share (Percentage)
1985	0	0
1986	15,796	16.4%
1987	31,592	18.8%

Source: Dataquest  
July 1988

Dataquest believes that the future success of Apple in the personal CAD market is dependent upon the following three factors:

- The number of new personal CAD applications developed for the Macintosh (and accepted by the market)
- The willingness of Apple to support and deliver standard operating systems with its platforms
- The number of established personal CAD products that get ported to or rewritten for the Macintosh operating system

Apple's sales of approximately 700,000 Macintoshes in 1987 certainly offer visible proof to personal CAD software developers of the machine's popularity. Several of the leading personal CAD vendors, including Autodesk, Generic Software, and VersaCAD, have recently announced Macintosh versions of their software. Though total sales of Macintosh personal CAD software packages in 1987 were far lower than DOS-based software packages, Dataquest believes that as more products become available, the Macintosh-based market share will increase significantly.

Apple faces a different distribution problem in CAD than either of the other leading vendors. Very few established CAD resellers sell Apple products, and very few Apple dealers sell CAD products. Popular CAD products priced at more than \$500 were not even available for the Macintosh until well into 1987. Although user demand will lure established PC CAD dealers to the Macintosh in 1988, high quota demands from competing hardware vendors could dilute this demand. Existing PC CAD products can likely be sold by Apple's existing dealers, by software vendors directly, and occasionally by CAD resellers with a wide product offering. As more sophisticated CAD products appear on the Macintosh, Apple will require the services of more sophisticated resellers.

### **OTHER PLATFORMS: WORKSTATION, ASIAN, AND EUROPEAN SUPPLIERS**

Although the three vendors discussed above dominate the workstation market for personal CAD, because of the declines in technical workstation prices, a number of workstation vendors now also are supplying platforms that fall within the price definition for personal CAD. In addition, there are other significant suppliers both in the Far East and in Europe.

Workstation suppliers, specifically Apollo Computer, Digital Equipment Corporation, and Sun Microsystems, have been quick to recognize the size of the opportunity in the low-end workstation market. Sun has moved aggressively into that market with the introduction of the Sun 386i. Sun has begun authorizing dealers, but many successful CAD VARs are still too small to meet the company's dollar volume requirements while still maintaining a multivendor product offering. If Sun can solve the distribution dilemma, it has a strong shot at picking up some significant share of the personal CAD hardware market.



Apollo appears to have a lesser interest in the low end, although that could change in response to the performance of its competitors. Digital, on the other hand, demonstrates through its alliances with Apple and Compaq that it is interested in providing a broad range of user solutions. The company has not, however, discovered a cost-effective way to sell to the low end of the market.

In Europe, total hardware revenue for personal CAD in 1987 was \$15.9 million. Olivetti was the dominant supplier in Europe, and rolled up worldwide revenue of \$12.0 million. The top three also grabbed parts of the European market, as did several PC clone suppliers.

Vendors in the Far East were able to protect their market from U.S. companies far more effectively than the Europeans. Hitachi, NEC, and Mutoh Industries combined for more than \$60 million in hardware revenue, most of that coming from domestic sales. Dataquest believes that the Japanese vendors will continue to fight for an increased share in their domestic and regional markets and that they will succeed in reaching that goal.

#### THE CLONE COMMUNITY

A large number of manufacturers of PC AT-compatible computers sell into the PC CAD market. These vendors compete on price and now capitalize on the void left by IBM when it stopped manufacturing the PC AT. One representative company of interest is Dell Computer Corporation, which has established a unique distribution strategy. This company sells made-to-order computers through a direct sales force, completely bypassing distributors and dealers. Dell sells through heavy advertising targeted at corporate buyers, emphasizing price/performance. A third party provides on-site service. This strategy may pay off in the next three years, as we believe that PC CAD software vendors will begin emphasizing both direct sales to corporate accounts and mail order business.

## 5.3 Personal CAD Software Vendors

### OVERVIEW

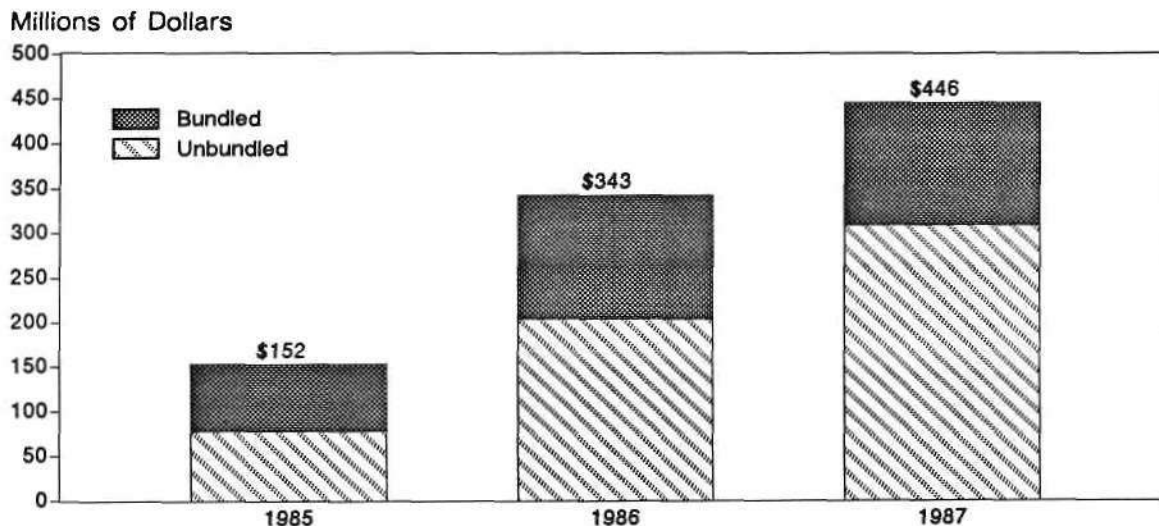
The vendors making up the personal CAD software market are the subject of this section. A review of the market leaders is followed by a discussion of the opportunities and challenges that these suppliers face as they look to the future.

Personal CAD software accounted for a total of \$446.2 million in 1987. This total is for all applications, including bundled and unbundled software, on a worldwide basis. The striking aspect of the market value is that it has virtually tripled from a value of \$152 million in 1985. The split between the bundled and unbundled software components of those totals over that time period, shown in Figure 5.3-1, indicates a shift in users' expectations and requirements.

Dataquest believes that the trend toward the purchase of unbundled personal CAD software will continue, resulting in long-term declines in the turnkey personal CAD business. Turnkey vendors are wrestling with tight margins, high costs of sales, and the reality that personal CAD hardware platforms have become a commodity product. Dataquest's 1987 survey of personal CAD users found that users are very comfortable with the process of configuring their own CAD systems. Roughly one-third of them purchased software for an existing computer, while the remaining two-thirds were about evenly divided between either purchasing hardware and software from a single source to make a system or purchasing the hardware and software from different sources. This willingness to make independent software purchase decisions is clearly a good sign for vendors in the personal CAD software business.

Figure 5.3-1

Worldwide PC CAD Software Revenue  
Bundled versus Unbundled  
(1985-1987)



Source: Dataquest  
July 1988

**MARKET SHARE LEADERS: AUTODESK AND .....**

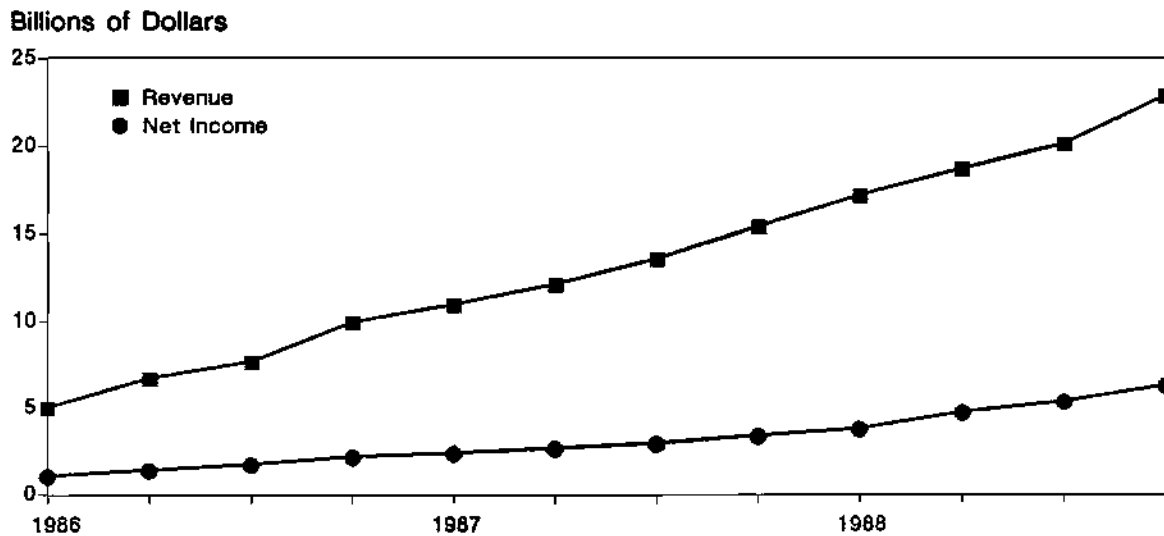
In an effort to bring some order to the highly fragmented personal CAD software market, we have divided the market, according to retail price of the products, into low-end products costing less than \$500 and high-end products costing more than \$500. This portion of the discussion will focus on the high-end products.

In a market with hundreds of vendors, one stands out—Autodesk. Although this company's share of the total software revenue market is only 16.6 percent, that number is more than twice as large as the nearest competitor's share. Autodesk has earned a market position in which its AutoCAD product is viewed by many as a standard of sorts. AutoCAD's dominance of the market is such that the company has attracted hundreds of software developers to design, build, and sell add-ons from third parties, thus enhancing the productivity of the core software offering. This ability to leverage the efforts of other developers has permitted AutoCAD to be used in nearly all CAD applications.

Autodesk's growth has been impressive, as illustrated by Figure 5.3-2. Autodesk has managed a great deal of this growth with one basic product—AutoCAD, a full-featured CAD drafting product. Over the years, however, Autodesk also has released a series of related products that have had the effect of extending AutoCAD's usefulness. AutoSketch, first released late in 1986, marked the company's entry into the very low end of the CAD market. Priced at less than \$100, it has been very successful without cutting into the sales of the AutoCAD offering.

Figure 5.3-2

Autodesk Revenue/Income Growth  
(1986-1988)



Source: Autodesk, Inc.  
Dataquest  
July 1988

Autodesk has driven the expansion of design automation into PC-based markets. A substantial portion of the company's success can be attributed to having the right product at the right time. However, Autodesk's particular contribution to CAD/CAM is in the area of distribution. The company pioneered the concept of indirect sales and now owns an unrivaled distribution structure for PC-based CAD.

Autodesk's product direction at present appears to focus on continuing to expand the capabilities of both the AutoCAD product and the list of computers it runs on, while moving into the higher end of the unbundled personal CAD market with AutoSolid, a solid modeling product. Dataquest believes that this strategy of upgrading the product line will contribute to the success of the company over the near term. For the longer term, we expect Autodesk to move to a strategy of alliances and acquisitions to further expand the product lines.

At the high end of the software market, Cadkey and VersaCad hold the second and third place 1987 market share positions in terms of unit shipments. Following AutoCAD's 55,800 total, Cadkey shipped 19,000 units while VersaCad tallied 14,000 units sold. One fact to note at this point is that our survey of end users found that nearly 40 percent of respondents had more than one vendor's core personal CAD product. Therefore, a dominant market position doesn't guarantee that any of the vendors has a "lock" on its users. Given the modest prices of most of the products, we expect this pattern of buying and trying to continue.

#### **LOW-COST SUPPLIERS: IT'S NOT THE REVENUE THAT COUNTS, BUT THE UNITS**

The less than \$500 market is dominated by vendors whose products are closer to the \$100 to \$200 price range. Interestingly, they keep score less by revenue than by product shipments. The undisputed leader is Generic Software. The company's product, Generic CADD, shipped 84,600 units in 1987, accounting for a full 20 percent of the total personal CAD software units. Through a marketing strategy that called for a low price of \$99 for the core product, coupled with a lengthy list of optional modules, users can configure and buy just as much CAD as they need—or can afford. Dataquest expects Generic to continue to push the limits of the low end of the market, essentially a market segment that they helped create.

Other low-end suppliers and their estimated 1987 unit shipments include:

- American Small Business Computers—47,000
- Autodesk—34,200
- Evolution Computing—24,892
- Innovative Data Design—24,000

Because of the low barriers to entry, we expect to see new participants continue to enter the market at a very strong rate. The costs of attempting to compete in this market are such that many of the smaller suppliers can survive for several years, waiting for their products to catch on in the market. The low end of the personal CAD software market accounted for a total of 246,516 units in 1987. With totals running that high, it is easy to understand, from a marketing perspective, why counting revenue dollars simply doesn't have as much excitement attached to it as does counting units.

#### **CHALLENGES FOR VENDORS: TECHNOLOGY AND DISTRIBUTION**

The lure of taking a useful piece of software and building a successful business around it is very strong. Unfortunately, there are a number of obstacles to challenge those who pursue this strategy. The three most imposing obstacles are the following:

- Identifying a commercially viable—and defensible—niche
- Choosing appropriate and viable technologies
- Successfully delivering the product to end users

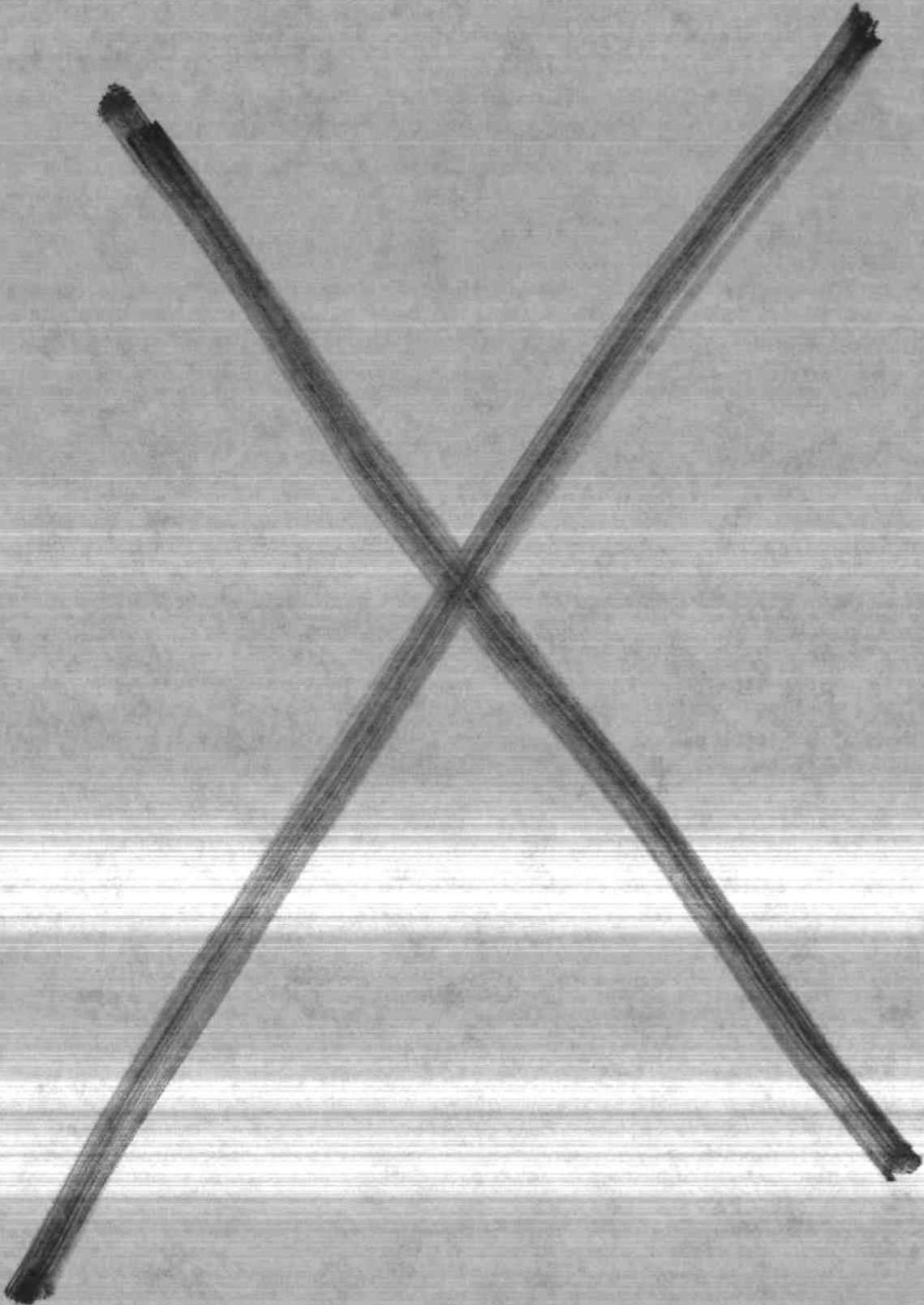
There is a nearly limitless range of applications and software design automation tools that can and will be developed. However, the economic issue confronting developers is whether or not there is a financially viable market for the product. If not, software for that use will be developed only for personal or internal company use.

If a viable market can be identified, the remaining issue is defensibility. Successful products in financially viable markets generally draw more competitors into the market, thereby fragmenting the market's finite potential revenue among an increasing number of competitors. In order to offset this challenge, a vendor must quickly achieve a dominance within the niche and meet or beat the challengers on issues of price, performance, reputation, and reliability.

The technology issue requires software developers to target an operating environment that will showcase and enhance their products. Selecting an operating environment includes making decisions on the operating system, language, data base linkages, translators, security, upgradability, user interface, and many other considerations. Choosing the "wrong" platform or operating environment can have a significant impact on the success and growth of personal CAD software companies. One excellent example from years past was VersaCad's early decision to target the Apple II, while Autodesk chose the IBM PC.

The greatest challenge for personal CAD market vendors lies in distribution. The former norm in CAD/CAM—direct employees selling face-to-face to end users—isn't economically viable at the low end of the market. Although CAD software ranging in price from \$1,000 to \$5,000 has been sold profitably through resellers, reports from these resellers suggest that profits are painfully squeezed. It is not even clear that one can profitably distribute low-cost products priced around \$100. As the total margin

dollars available within the suggested retail price of a product decline, the number of levels of distribution that can profitably handle the product decline as well. Dataquest believes that as prices continue to drop for personal CAD products, direct sales by developers to end users will gain in popularity.









# Forecast Data Base Introduction

## STRUCTURE OF THE FORECAST DATA BASE

For these research notebooks, the forecast data base is structured in three parts. Each part is found in one of the following appendices:

- History and Forecast—Five years each of history and forecasts, segmented by application, region, and platform
- Market Share—Data for all companies with total company CAD/CAM revenue of \$15 million or more, segmented by application, region, and platform
- Company History—Five years of history for all companies with CAD/CAM revenue of \$15 million or more, segmented by application

Information in the forecast data base appendices is presented in table format only. These data are intended to cover all possible market segmentation. Please refer to the applications modules, *Industry Overview*, and each relevant segment for Dataquest's analysis and interpretation of the data.

Definitions of forecasting terms can be found in the glossary located behind the Glossary tab. A list of companies and countries contained in the data base and a description of forecasting methodology can be found in the section entitled "Introduction to the Service" that appears in each binder.

The forecast data base hierarchy is reflected in each of the reports. The History and Forecast and Market Share appendices are organized as follows:

- Application—All, mechanical, facilities design, mapping, electronic design automation, electronic CAE, IC layout, and PCB layout by
  - Region—Worldwide, North America, Europe, Far East, and Rest of World

## DOUBLE COUNTING

Dataquest takes great care to avoid double counting company revenue and shipment data in our estimates for the total market. To avoid this, we collect information on vendors' total CAD/CAM revenue as well as OEM revenue, or revenue derived from sales to another CAD/CAM company for its resale. OEM revenue is then subtracted from total company revenue to count just end-user sales.

We do, however, distinguish between distributors such as those companies that provide a sales service for a CAD/CAM vendor's product and true OEMs. In most cases, the distributors in our data base are Japanese companies that sell, install, and/or service CAD/CAM products for a vendor based outside of Japan. The following guideline and examples illustrate our definitions and how we avoid double counting.

- **Computer manufacturers**—We collect and count only revenue direct to end users, either turnkey or hardware only. For example, we report \$110 million for Sun Microsystems, which is 50 percent of that company's total CAD/CAM revenue. The unreported \$110 million is from sales to OEM customers.
- **Software vendors**—We collect total CAD/CAM sales, then subtract any reported OEM revenue. For example, CADAM reported \$53 million in total CAD/CAM revenue, of which \$17 million was through OEM channels. To arrive at CADAM's end-user sales of \$36 million, the amount we use to calculate market share, we subtracted \$17 million from \$53 million.
- **Distributors**—Seiko Instruments, based in Japan, reported \$89.5 million in CAD/CAM sales. Seiko is a distributor for Daisy Systems and McDonnell Douglas, as well as a vendor of its own proprietary products. Only the portion of Seiko's revenue that is derived from its own products is included in the total market calculation, even though we show all of Seiko's revenue in the Asian segment market share tables.

## **REPORTING CHANGES FROM 1986 TO 1987**

In order to best serve our clients' needs, we continue to expand the scope of how we report on the CAD/CAM market. For the current reports, dated July 1988, the changes noted in the following subsections have been made.

### **Integrated Worldwide Data Base**

Since 1985, Dataquest has been collecting sales information on seven European regions and Japan. In addition, in 1988, we have collected information on five other Asian regions for the first time. We included all regional data in the CAD/CAM data base, thus achieving a truly integrated, worldwide data base. Data on individual European and Asian countries are available in the respective CCIS segments.

### **Turnkey and Unbundled Forecasts**

Because of the pronounced trend toward users purchasing CAD/CAM products directly from the original suppliers, thus bypassing the turnkey channel, we expanded the level at which we forecast. Dataquest now forecasts the unbundled and turnkey channels individually, giving more clarification and analysis to each.

### **PC-Based CAD/CAM Software Companies**

To best analyze and report on the trends of the personal CAD market, we have expanded our data collection to include revenue information from 35 additional companies participating in this segment. Most of these companies have revenue of significantly less than \$15 million; for the CCIS application and regional segments, they are included in the "Other" category. Refer to the personal CAD segment binder for complete information on all of the companies participating in the PC market.

### **PC Software Units**

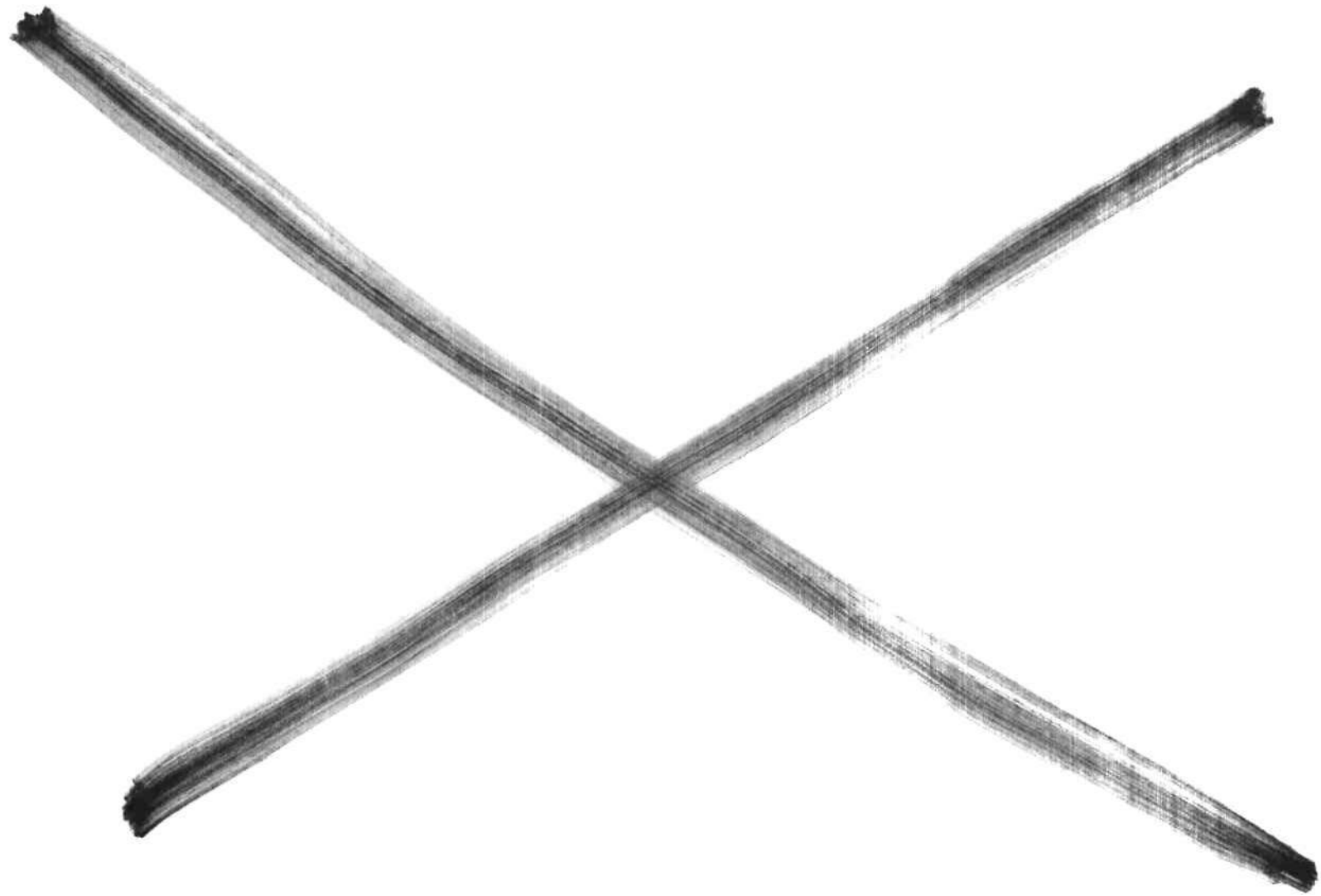
For the first time, Dataquest's CCIS is reporting software units sold; we include this measure in our market share estimates. Because of the high need for unit information in the PC CAD segment, this information is available first and only in our personal CAD segment binder.

### **Installed Base Versus Workstations Shipped to Date**

We have developed a retirement model that takes into account platform and year sold to calculate installed base. The retirement model, in tandem with our forecast by platform, provides clients with product life cycle analysis and data. We differentiate between installed base and workstations shipped to date in such a way that the latter is shown only on a company basis and installed base is calculated only at the aggregate market level.

### **More Information in the History and Forecast Tables**

Three new line items are included in the History and Forecast Appendix: Turnkey versus hardware-only average system price, total hardware revenue, and bundled versus unbundled software revenue. So that clients can better understand the turnkey versus unbundled channels, and because we now forecast at this level, we distinguish system pricing and software revenue based on point of sale. For convenience, the sum of CPU, workstation, and peripheral revenue is shown in the hardware revenue line.



# Appendix A—Forecast

## INTRODUCTION

The following history and forecast tables present Dataquest's 10-year CAD/CAM market window. The tables contained in this section represent our estimates for the years 1983 through 1987 and our forecasts for 1988 through 1992. Each table is a consolidation of all the companies contained in our data base model for each applicable segment.

Please refer to the section entitled "Introduction to the Service" for a complete list of companies, forecasting methodologies, and caveats. Forecasting terms and definitions can be found behind the Glossary tab.

This chapter is structured as follows:

- Application by
  - Region

TABLE NUMBER: 1  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	26,831	43,637	96,407	167,995	226,240	280,940	334,240	379,670	415,040	NA	20%
Workstation Shipments	0	26,831	43,637	96,407	167,995	226,240	280,940	334,240	379,670	415,040	NA	20%
CPU Installed Base	0	26,831	70,468	166,876	332,456	549,400	803,810	1,082,110	1,361,440	1,620,100	NA	37%
Workstation Installed Base	0	26,831	70,468	166,876	332,456	549,400	803,810	1,082,110	1,361,440	1,620,100	NA	37%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	34.1	27.6	23.6	18.8	17.6	16.5	15.6	14.9	14.1	NA	-6%
Hardware-Only ASP	.0	10.4	6.2	4.2	4.0	3.6	3.3	3.0	2.7	2.4	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	336.7	556.1	800.9	945.4	1,053.2	1,117.8	1,118.0	1,078.4	NA	6%
CPU Revenue	NA	NA	156.5	246.4	364.8	447.2	501.1	535.2	538.7	522.5	NA	7%
Workstation Revenue	NA	NA	156.5	246.4	364.7	447.2	501.1	535.2	538.7	522.5	NA	7%
Peripheral Revenue	NA	NA	23.8	63.3	71.5	51.0	51.0	47.3	40.6	33.4	NA	-14%
Software Revenue	NA	NA	152.5	342.8	446.2	622.3	762.9	888.6	984.4	1,067.0	NA	19%
Bundled	NA	NA	74.7	138.6	136.8	174.2	186.2	179.8	156.5	128.7	NA	-1%
Unbundled	NA	NA	77.7	204.2	309.4	448.1	576.6	708.8	827.9	938.3	NA	25%
Service Revenue	.0	3.7	6.9	56.0	74.6	96.7	110.4	119.4	122.1	124.2	NA	11%
Total Revenue	.0	283.3	499.1	976.0	1,322.8	1,664.5	1,926.5	2,125.8	2,224.8	2,269.9	NA	11%
Increase over Prior Year	NA	NA	76%	96%	36%	26%	16%	10%	5%	2%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 2  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	19,252	26,522	54,892	98,418	132,470	163,760	195,140	222,560	243,200	NA	20%
Workstation Shipments	0	19,252	26,522	54,892	98,418	132,470	163,760	195,140	222,560	243,200	NA	20%
CPU Installed Base	0	19,252	45,774	100,666	197,351	323,590	470,560	632,030	795,770	947,700	NA	37%
Workstation Installed Base	0	19,252	45,774	100,666	197,351	323,590	470,560	632,030	795,770	947,700	NA	37%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	34.1	25.2	19.8	17.1	15.4	13.6	12.5	11.5	10.7	NA	-9%
Hardware-Only ASP	.0	8.7	6.4	3.9	3.8	3.5	3.2	3.0	2.7	2.4	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	182.1	250.2	397.8	482.5	542.0	586.4	596.1	579.9	NA	8%
CPU Revenue	NA	NA	89.0	117.7	191.2	234.0	264.4	287.1	292.6	285.3	NA	8%
Workstation Revenue	NA	NA	89.0	117.7	191.2	234.0	264.4	287.1	292.6	285.3	NA	8%
Peripheral Revenue	NA	NA	4.2	14.7	15.4	14.6	13.2	12.1	10.9	9.4	NA	-9%
Software Revenue	NA	NA	78.6	158.4	197.0	265.7	332.6	411.6	480.2	540.0	NA	22%
Bundled	NA	NA	22.1	29.8	24.5	23.6	20.3	18.4	15.3	11.7	NA	-14%
Unbundled	NA	NA	56.5	128.7	172.4	242.1	312.3	393.1	464.9	528.3	NA	25%
Service Revenue	.0	1.3	3.9	21.3	22.7	28.1	31.9	36.2	38.3	39.6	NA	12%
Total Revenue	.0	169.2	264.7	429.9	617.4	776.3	906.5	1,034.1	1,114.5	1,159.5	NA	13%
Increase over Prior Year	NA	NA	56%	62%	44%	26%	17%	14%	8%	4%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 3  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	3,553	11,223	21,930	38,305	51,430	63,310	75,000	84,210	90,980	NA	19%
Workstation Shipments	0	3,553	11,223	21,930	38,305	51,430	63,310	75,000	84,210	90,980	NA	19%
CPU Installed Base	0	3,553	14,776	36,707	74,691	124,400	182,290	244,760	306,060	361,390	NA	37%
Workstation Installed Base	0	3,553	14,776	36,707	74,691	124,400	182,290	244,760	306,060	361,390	NA	37%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	38.5	20.5	8.9	8.2	7.8	7.3	7.0	6.5	NA	-6%
Hardware-Only ASP	.0	14.2	5.6	4.7	4.2	3.8	3.5	3.2	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	77.8	107.3	167.2	200.7	224.2	240.6	242.2	234.1	NA	7%
CPU Revenue	NA	NA	34.4	49.9	81.1	96.3	108.1	116.7	118.1	114.7	NA	7%
Workstation Revenue	NA	NA	34.4	49.9	81.0	96.3	108.1	116.7	118.1	114.7	NA	7%
Peripheral Revenue	NA	NA	9.1	7.5	5.1	8.1	7.9	7.1	5.9	4.7	NA	-2%
Software Revenue	NA	NA	25.9	69.6	105.2	156.9	193.6	219.5	236.1	247.9	NA	19%
Bundled	NA	NA	10.0	25.9	16.6	22.7	24.4	22.6	18.3	14.0	NA	-3%
Unbundled	NA	NA	15.9	43.7	88.6	134.3	169.2	196.9	217.7	234.0	NA	21%
Service Revenue	.0	.9	1.8	7.9	16.1	25.5	29.7	32.1	32.5	32.6	NA	15%
Total Revenue	.0	51.5	105.5	206.3	289.6	383.2	447.5	492.2	510.9	514.7	NA	12%
Increase over Prior Year	NA	NA	105%	96%	40%	32%	17%	10%	4%	1%		

Source: Dataquest  
 July 1988

Forecasts



TABLE NUMBER: 4  
 TITLE: History and Forecast  
 APPLICATION: All Applications  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	3,446	5,187	18,249	25,951	34,670	43,400	51,340	58,310	64,600	NA	20%
Workstation Shipments	0	3,446	5,187	18,249	25,951	34,670	43,400	51,340	58,310	64,600	NA	20%
CPU Installed Base	0	3,446	8,632	26,881	52,522	86,040	125,580	168,320	210,470	250,300	NA	37%
Workstation Installed Base	0	3,446	8,632	26,881	52,522	86,040	125,580	168,320	210,470	250,300	NA	37%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	26.7	26.6	24.5	22.8	21.3	19.9	18.7	17.5	NA	-7%
Hardware-Only ASP	.0	15.4	8.9	4.7	4.0	3.7	3.4	3.1	2.8	2.5	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	72.9	191.7	211.8	231.0	247.9	248.0	236.2	221.2	NA	1%
CPU Revenue	NA	NA	31.2	75.4	80.8	102.0	109.8	110.8	106.9	101.6	NA	5%
Workstation Revenue	NA	NA	31.2	75.4	80.7	102.0	109.8	110.8	106.9	101.6	NA	5%
Peripheral Revenue	NA	NA	10.5	40.9	50.3	27.0	28.3	26.5	22.3	17.9	NA	-19%
Software Revenue	NA	NA	46.2	109.7	139.3	192.2	225.5	240.7	241.7	237.4	NA	11%
Bundled	NA	NA	42.3	82.3	94.5	125.8	138.5	135.2	119.3	99.5	NA	1%
Unbundled	NA	NA	3.9	27.3	44.8	66.4	87.0	105.5	122.4	137.8	NA	25%
Service Revenue	.0	.9	1.2	26.4	35.1	42.1	47.3	49.0	48.1	46.5	NA	6%
Total Revenue	.0	53.9	123.3	327.8	386.8	465.4	520.8	537.9	526.0	505.1	NA	5%
Increase over Prior Year	NA	NA	129%	166%	18%	20%	12%	3%	-2%	-4%		

Source: Dataquest  
 July 1988

TABLE NUMBER: 5  
 TITLE: History and forecast  
 APPLICATION: All Applications  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	579	706	1,336	5,322	7,660	10,470	12,760	14,580	16,270	NA	25%
Workstation Shipments	0	579	706	1,336	5,322	7,660	10,470	12,760	14,580	16,270	NA	25%
CPU Installed Base	0	579	1,285	2,622	7,891	15,370	25,380	37,010	49,150	60,720	NA	50%
Workstation Installed Base	0	579	1,285	2,622	7,891	15,370	25,380	37,010	49,150	60,720	NA	50%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	36.0	19.9	14.9	13.3	11.9	10.8	9.8	8.9	NA	-10%
Hardware-Only ASP	.0	14.0	5.3	4.2	4.2	3.9	3.6	3.3	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	3.9	7.0	24.1	31.2	39.0	42.8	43.6	43.3	NA	12%
CPU Revenue	NA	NA	1.9	3.4	11.7	14.9	18.8	20.6	21.0	21.0	NA	12%
Workstation Revenue	NA	NA	1.9	3.4	11.7	14.9	18.8	20.6	21.0	21.0	NA	12%
Peripheral Revenue	NA	NA	.1	.2	.6	1.3	1.5	1.6	1.5	1.4	NA	19%
Software Revenue	NA	NA	1.7	5.1	4.8	7.5	11.2	16.8	26.5	41.7	NA	54%
Bundled	NA	NA	.3	.6	1.2	2.1	3.0	3.5	3.6	3.5	NA	23%
Unbundled	NA	NA	1.5	4.5	3.6	5.4	8.2	13.2	22.9	38.3	NA	61%
Service Revenue	.0	.6	.0	.4	.7	1.1	1.5	2.1	3.3	5.6	NA	50%
Total Revenue	.0	8.7	5.7	12.0	29.0	39.7	51.7	61.6	73.4	90.6	NA	26%
Increase over Prior Year	NA	NA	-35%	112%	142%	37%	30%	19%	19%	23%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 6  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	11,526	20,013	48,405	71,556	86,280	97,880	106,470	107,740	105,810	NA	8%
Workstation Shipments	0	11,526	20,013	48,405	71,556	86,280	97,880	106,470	107,740	105,810	NA	8%
CPU Installed Base	0	11,526	31,539	79,944	150,462	232,640	318,240	398,900	461,950	503,150	NA	27%
Workstation Installed Base	0	11,526	31,539	79,944	150,462	232,640	318,240	398,900	461,950	503,150	NA	27%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	25.4	22.6	19.6	18.2	16.9	15.7	14.6	13.6	NA	-7%
Hardware-Only ASP	.0	10.7	4.7	4.2	3.9	3.6	3.3	3.0	2.7	2.4	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	142.6	302.7	380.5	392.5	397.0	379.5	333.6	285.0	NA	-6%
CPU Revenue	NA	NA	66.0	130.4	165.5	178.0	179.7	172.2	152.1	130.9	NA	-5%
Workstation Revenue	NA	NA	66.0	130.4	165.4	178.0	179.7	172.2	152.1	130.9	NA	-5%
Peripheral Revenue	NA	NA	10.6	42.0	49.5	36.6	37.7	35.1	29.3	23.2	NA	-14%
Software Revenue	NA	NA	55.0	143.0	187.8	284.5	351.0	388.4	393.9	391.5	NA	16%
Bundled	NA	NA	34.7	82.0	94.5	131.0	145.5	141.5	123.3	100.5	NA	1%
Unbundled	NA	NA	20.3	61.0	93.3	153.5	205.5	246.8	270.6	291.0	NA	26%
Service Revenue	.0	1.3	2.6	31.0	39.9	53.2	60.6	63.5	60.9	58.3	NA	8%
Total Revenue	.0	124.0	201.1	485.7	608.3	730.2	808.5	831.3	788.4	734.8	NA	4%
Increase over Prior Year	NA	NA	62%	141%	25%	20%	11%	3%	-5%	-7%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 7  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	7,964	10,143	26,291	39,550	46,630	52,160	57,130	58,810	58,790	NA	8%
Workstation Shipments	0	7,964	10,143	26,291	39,550	46,630	52,160	57,130	58,810	58,790	NA	8%
CPU Installed Base	0	7,964	18,108	44,399	83,232	127,350	172,410	215,280	249,710	273,360	NA	27%
Workstation Installed Base	0	7,964	18,108	44,399	83,232	127,350	172,410	215,280	249,710	273,360	NA	27%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	20.7	19.5	15.8	14.5	13.4	12.3	11.3	10.3	NA	-8%
Hardware-Only ASP	.0	7.7	4.6	3.8	3.7	3.4	3.1	2.9	2.6	2.3	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	57.1	123.1	160.8	168.3	170.8	169.7	155.2	137.7	NA	-3%
CPU Revenue	NA	NA	27.7	56.7	75.0	79.1	80.7	80.6	74.1	66.1	NA	-3%
Workstation Revenue	NA	NA	27.7	56.7	75.0	79.1	80.7	80.6	74.1	66.1	NA	-3%
Peripheral Revenue	NA	NA	1.7	9.8	10.7	10.1	9.4	8.5	7.1	5.6	NA	-12%
Software Revenue	NA	NA	16.9	55.9	66.2	94.1	119.1	138.2	146.5	153.6	NA	18%
Bundled	NA	NA	3.9	15.9	16.5	17.1	16.7	15.7	13.5	10.8	NA	-8%
Unbundled	NA	NA	13.0	40.0	49.7	77.0	102.4	122.5	133.0	142.8	NA	24%
Service Revenue	.0	.7	1.1	9.7	10.5	13.6	16.0	17.9	18.1	18.6	NA	12%
Total Revenue	.0	61.6	75.0	188.8	237.4	276.0	305.8	325.7	319.9	309.8	NA	5%
Increase over Prior Year	NA	NA	22%	152%	26%	16%	11%	6%	-2%	-3%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 8  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	1,446	6,494	11,164	14,760	17,180	18,710	19,680	18,340	16,160	NA	2%
Workstation Shipments	0	1,446	6,494	11,164	14,760	17,180	18,710	19,680	18,340	16,160	NA	2%
CPU Installed Base	0	1,446	7,940	19,104	33,733	50,040	65,960	79,510	87,780	90,350	NA	22%
Workstation Installed Base	0	1,446	7,940	19,104	33,733	50,040	65,960	79,510	87,780	90,350	NA	22%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	24.2	15.7	10.6	9.7	8.9	8.3	7.6	7.0	NA	-8%
Hardware-Only ASP	.0	17.3	4.6	4.9	4.4	4.0	3.6	3.2	2.9	2.6	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	36.9	59.4	71.3	71.8	69.5	64.7	53.3	41.6	NA	-10%
CPU Revenue	NA	NA	17.6	28.3	33.8	32.9	31.8	29.6	24.5	19.2	NA	-11%
Workstation Revenue	NA	NA	17.6	28.3	33.7	32.9	31.8	29.6	24.5	19.2	NA	-11%
Peripheral Revenue	NA	NA	1.7	2.9	3.8	5.9	5.9	5.4	4.3	3.2	NA	-3%
Software Revenue	NA	NA	7.4	22.3	38.0	60.8	77.9	88.5	91.8	93.5	NA	20%
Bundled	NA	NA	2.2	11.1	12.8	18.5	21.0	20.2	17.0	13.3	NA	1%
Unbundled	NA	NA	5.1	11.3	25.2	42.4	56.8	68.4	74.8	80.2	NA	26%
Service Revenue	.0	.3	.9	3.8	6.9	11.7	13.9	15.1	14.9	14.8	NA	17%
Total Revenue	.0	25.4	45.1	95.0	116.5	144.3	161.3	168.3	160.0	149.9	NA	5%
Increase over Prior Year	NA	NA	77%	111%	23%	24%	12%	4%	-5%	-6%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 9  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	1,845	3,127	10,306	13,606	17,540	20,580	21,880	21,880	21,260	NA	9%
Workstation Shipments	0	1,845	3,127	10,306	13,606	17,540	20,580	21,880	21,880	21,260	NA	9%
CPU Installed Base	0	1,845	4,972	15,278	28,718	45,610	64,010	81,080	94,190	102,560	NA	29%
Workstation Installed Base	0	1,845	4,972	15,278	28,718	45,610	64,010	81,080	94,190	102,560	NA	29%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	27.2	26.9	25.5	23.6	21.9	20.5	19.2	18.0	NA	-7%
Hardware-Only ASP	.0	17.5	9.0	4.7	4.1	3.8	3.5	3.2	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	47.4	116.5	132.0	132.7	133.1	119.6	99.6	80.8	NA	-9%
CPU Revenue	NA	NA	20.1	43.7	48.7	56.6	56.1	49.9	41.5	33.8	NA	-7%
Workstation Revenue	NA	NA	20.1	43.7	48.7	56.6	56.1	49.9	41.5	33.8	NA	-7%
Peripheral Revenue	NA	NA	7.2	29.2	34.7	19.4	21.0	19.8	16.6	13.2	NA	-18%
Software Revenue	NA	NA	30.1	63.0	81.7	126.1	149.2	155.9	149.1	137.8	NA	11%
Bundled	NA	NA	28.5	54.7	64.3	93.7	105.1	102.4	89.4	73.0	NA	3%
Unbundled	NA	NA	1.6	8.3	17.4	32.4	44.1	53.4	59.7	64.8	NA	30%
Service Revenue	.0	.0	.6	17.3	22.2	27.3	29.9	29.5	26.8	23.9	NA	2%
Total Revenue	.0	32.3	79.1	196.9	236.1	286.1	312.1	304.9	275.6	242.5	NA	1%
Increase over Prior Year	NA	NA	145%	149%	20%	21%	9%	-2%	-10%	-12%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 10  
 TITLE: History and Forecast  
 APPLICATION: Mechanical  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	270	249	645	3,640	4,930	6,430	7,790	8,710	9,600	NA	21%
Workstation Shipments	0	270	249	645	3,640	4,930	6,430	7,790	8,710	9,600	NA	21%
CPU Installed Base	0	270	518	1,163	4,779	9,630	15,860	23,040	30,270	36,880	NA	50%
Workstation Installed Base	0	270	518	1,163	4,779	9,630	15,860	23,040	30,270	36,880	NA	50%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	31.6	18.9	13.3	12.2	11.3	10.3	9.5	8.7	NA	-8%
Hardware-Only ASP	.0	16.6	4.8	4.0	4.2	3.9	3.6	3.2	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	1.3	3.7	16.4	19.8	23.6	25.6	25.4	24.9	NA	9%
CPU Revenue	NA	NA	.6	1.8	8.0	9.3	11.1	12.1	12.0	11.8	NA	8%
Workstation Revenue	NA	NA	.6	1.8	8.0	9.3	11.1	12.1	12.0	11.8	NA	8%
Peripheral Revenue	NA	NA	.0	.1	.4	1.2	1.4	1.4	1.3	1.2	NA	25%
Software Revenue	NA	NA	.6	1.8	1.9	3.4	4.8	5.8	6.5	6.6	NA	28%
Bundled	NA	NA	.0	.4	.9	1.8	2.7	3.3	3.4	3.4	NA	30%
Unbundled	NA	NA	.6	1.4	1.0	1.7	2.1	2.5	3.1	3.3	NA	26%
Service Revenue	.0	.3	.0	.1	.4	.6	.9	1.0	1.0	1.0	NA	21%
Total Revenue	.0	4.8	1.9	5.1	18.2	23.8	29.3	32.4	32.9	32.6	NA	12%
Increase over Prior Year	NA	NA	-61%	170%	258%	31%	23%	11%	2%	-1%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 11  
 TITLE: History and Forecast  
 APPLICATION: Facilities Design  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	9,787	11,696	25,997	66,109	102,090	138,720	179,230	220,580	256,410	NA	31%
Workstation Shipments	0	9,787	11,696	25,997	66,109	102,090	138,720	179,230	220,580	256,410	NA	31%
CPU Installed Base	0	9,787	21,483	47,481	112,709	211,790	342,500	504,150	689,580	882,850	NA	51%
Workstation Installed Base	0	9,787	21,483	47,481	112,709	211,790	342,500	504,150	689,580	882,850	NA	51%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	21.5	17.9	22.2	20.8	19.6	18.6	17.6	16.5	NA	-6%
Hardware-Only ASP	.0	10.2	5.9	4.1	3.9	3.6	3.3	3.0	2.7	2.4	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	75.7	109.9	276.8	391.0	485.0	570.8	627.0	650.0	NA	19%
CPU Revenue	NA	NA	36.8	52.5	132.9	191.8	238.8	281.9	310.4	322.4	NA	19%
Workstation Revenue	NA	NA	36.8	52.5	133.0	191.8	238.8	281.9	310.4	322.4	NA	19%
Peripheral Revenue	NA	NA	2.2	5.0	10.9	7.4	7.4	7.0	6.2	5.2	NA	-14%
Software Revenue	NA	NA	26.8	52.5	70.6	97.2	132.4	177.8	237.2	306.4	NA	34%
Bundled	NA	NA	7.6	11.8	18.9	19.6	21.2	21.8	20.6	18.6	NA	-0%
Unbundled	NA	NA	19.2	40.8	51.6	77.6	111.3	156.0	216.6	287.8	NA	41%
Service Revenue	.0	1.0	1.1	4.4	9.4	13.2	16.9	21.2	26.3	32.3	NA	28%
Total Revenue	.0	100.6	103.6	177.3	357.3	501.4	634.3	769.9	890.6	988.7	NA	23%
Increase over Prior Year	NA	NA	3%	71%	102%	40%	27%	21%	16%	11%		

Source: Dataquest  
 July 1988

Forecasts



TABLE NUMBER: 12  
 TITLE: History and forecast  
 APPLICATION: Facilities Design  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	6,980	7,525	15,480	40,604	62,820	84,750	108,430	132,260	152,070	NA	30%
Workstation Shipments	0	6,980	7,525	15,480	40,604	62,820	84,750	108,430	132,260	152,070	NA	30%
CPU Installed Base	0	6,980	14,504	29,985	69,961	130,710	210,180	307,560	418,200	531,580	NA	50%
Workstation Installed Base	0	6,980	14,504	29,985	69,961	130,710	210,180	307,560	418,200	531,580	NA	50%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	21.5	21.2	16.6	15.3	14.1	12.9	11.9	10.9	NA	-8%
Hardware-Only ASP	.0	9.3	5.7	3.9	3.8	3.5	3.2	3.0	2.6	2.4	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	44.8	64.2	154.6	220.3	273.1	320.4	350.1	359.8	NA	18%
CPU Revenue	NA	NA	22.1	31.5	76.3	109.1	135.5	159.2	174.1	179.1	NA	19%
Workstation Revenue	NA	NA	22.1	31.5	76.3	109.1	135.5	159.2	174.1	179.1	NA	19%
Peripheral Revenue	NA	NA	.6	1.2	2.0	2.2	2.2	2.0	1.9	1.5	NA	-5%
Software Revenue	NA	NA	16.0	27.3	31.0	44.3	61.7	84.5	113.8	145.6	NA	36%
Bundled	NA	NA	2.8	2.0	.9	.6	.5	.3	.3	.2	NA	-27%
Unbundled	NA	NA	13.3	25.3	30.1	43.7	61.2	84.1	113.6	145.4	NA	37%
Service Revenue	.0	.3	.5	1.3	1.6	2.2	3.0	4.0	5.2	6.5	NA	33%
Total Revenue	.0	65.4	61.4	92.9	187.1	266.8	337.7	408.9	469.0	511.8	NA	22%
Increase over Prior Year	NA	NA	-6%	51%	101%	43%	27%	21%	15%	9%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 13  
 TITLE: History and Forecast  
 APPLICATION: Facilities Design  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	1,474	2,860	6,238	16,671	25,940	35,170	45,170	55,300	64,220	NA	31%
Workstation Shipments	0	1,474	2,860	6,238	16,671	25,940	35,170	45,170	55,300	64,220	NA	31%
CPU Installed Base	0	1,474	4,334	10,572	27,110	52,500	86,040	127,120	173,770	222,110	NA	52%
Workstation Installed Base	0	1,474	4,334	10,572	27,110	52,500	86,040	127,120	173,770	222,110	NA	52%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	33.4	16.3	5.7	5.1	4.6	4.2	3.9	3.6	NA	-9%
Hardware-Only ASP	.0	12.4	5.8	4.4	4.1	3.8	3.5	3.2	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	18.2	18.5	67.9	97.6	121.8	143.6	158.3	165.2	NA	19%
CPU Revenue	NA	NA	8.8	9.1	33.9	48.3	60.4	71.3	78.7	82.2	NA	19%
Workstation Revenue	NA	NA	8.8	9.1	33.9	48.3	60.4	71.3	78.7	82.2	NA	19%
Peripheral Revenue	NA	NA	.5	.2	.2	1.1	1.1	1.0	.9	.7	NA	36%
Software Revenue	NA	NA	4.6	10.1	13.5	19.5	26.7	35.8	47.3	59.7	NA	35%
Bundled	NA	NA	.6	1.0	.7	.8	.8	.6	.4	.3	NA	-15%
Unbundled	NA	NA	4.1	9.1	12.9	18.6	25.9	35.2	46.8	59.4	NA	36%
Service Revenue	.0	.3	.2	.4	1.0	2.0	2.6	3.3	4.2	5.1	NA	38%
Total Revenue	.0	18.6	23.1	39.3	82.9	119.1	151.0	182.8	209.8	230.0	NA	23%
Increase over Prior Year	NA	NA	24%	71%	111%	44%	27%	21%	15%	10%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 14  
 TITLE: History and Forecast  
 APPLICATION: Facilities Design  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	1,112	992	3,847	7,644	11,420	16,160	22,160	28,720	35,100	NA	36%
Workstation Shipments	0	1,112	992	3,847	7,644	11,420	16,160	22,160	28,720	35,100	NA	36%
CPU Installed Base	0	1,112	2,105	5,952	13,496	24,600	39,840	59,930	84,430	112,120	NA	53%
Workstation Installed Base	0	1,112	2,105	5,952	13,496	24,600	39,840	59,930	84,430	112,120	NA	53%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	19.7	17.3	26.8	24.7	22.8	20.9	19.2	17.6	NA	-8%
Hardware-Only ASP	.0	12.3	9.0	4.5	4.0	3.7	3.4	3.0	2.7	2.5	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	10.7	25.1	49.0	65.3	80.3	95.0	105.5	111.3	NA	18%
CPU Revenue	NA	NA	4.8	10.8	20.2	30.6	38.1	45.5	51.0	54.2	NA	22%
Workstation Revenue	NA	NA	4.8	10.8	20.2	30.6	38.1	45.5	51.0	54.2	NA	22%
Peripheral Revenue	NA	NA	1.0	3.6	8.7	4.1	4.1	3.9	3.4	2.8	NA	-20%
Software Revenue	NA	NA	5.2	13.3	25.3	31.8	40.4	49.5	59.1	69.1	NA	22%
Bundled	NA	NA	4.1	8.6	17.4	18.1	19.9	20.9	20.0	18.1	NA	1%
Unbundled	NA	NA	1.2	4.7	8.0	13.7	20.6	28.7	39.2	51.0	NA	45%
Service Revenue	.0	.0	.4	2.6	6.8	8.9	11.0	13.2	15.1	16.6	NA	20%
Total Revenue	.0	13.7	16.3	41.1	81.3	106.0	131.8	157.7	179.7	197.0	NA	19%
Increase over Prior Year	NA	NA	19%	152%	98%	30%	24%	20%	14%	10%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 15  
 TITLE: History and Forecast  
 APPLICATION: Facilities Design  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	221	319	432	1,190	1,910	2,640	3,460	4,300	5,010	NA	33%
Workstation Shipments	0	221	319	432	1,190	1,910	2,640	3,460	4,300	5,010	NA	33%
CPU Installed Base	0	221	540	972	2,142	3,980	6,440	9,540	13,180	17,030	NA	51%
Workstation Installed Base	0	221	540	972	2,142	3,980	6,440	9,540	13,180	17,030	NA	51%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	24.7	21.6	15.9	14.6	13.5	12.4	11.4	10.4	NA	-8%
Hardware-Only ASP	.0	11.9	5.9	4.5	4.4	4.0	3.7	3.4	3.1	2.7	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	1.9	2.1	5.2	7.8	9.9	11.8	13.2	13.7	NA	21%
CPU Revenue	NA	NA	1.0	1.0	2.6	3.8	4.9	5.9	6.5	6.8	NA	22%
Workstation Revenue	NA	NA	1.0	1.0	2.6	3.8	4.9	5.9	6.5	6.8	NA	22%
Peripheral Revenue	NA	NA	.0	.0	.1	.1	.1	.1	.1	.1	NA	0%
Software Revenue	NA	NA	.9	1.8	.7	1.6	3.7	8.0	17.0	32.1	NA	116%
Bundled	NA	NA	.1	.1	.0	.0	.0	.0	.0	.0	NA	-100%
Unbundled	NA	NA	.7	1.7	.7	1.6	3.7	8.0	17.0	32.1	NA	117%
Service Revenue	.0	.3	.0	.1	.0	.1	.3	.7	1.9	4.2	NA	153%
Total Revenue	.0	3.0	2.8	4.0	6.0	9.5	13.8	20.6	32.0	50.0	NA	53%
Increase over Prior Year	NA	NA	-5%	41%	51%	59%	45%	49%	55%	56%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 16  
 TITLE: History and Forecast  
 APPLICATION: Mapping  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	102	1,575	2,956	4,510	6,500	8,780	11,540	14,330	NA	37%
Workstation Shipments	0	0	102	1,575	2,956	4,510	6,500	8,780	11,540	14,330	NA	37%
CPU Installed Base	0	0	102	1,676	4,632	9,130	15,480	23,640	33,620	45,050	NA	58%
Workstation Installed Base	0	0	102	1,676	4,632	9,130	15,480	23,640	33,620	45,050	NA	58%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	33.7	24.6	14.5	12.4	11.0	10.1	9.4	8.7	NA	-10%
Hardware-Only ASP	.0	.0	5.0	3.6	4.0	3.7	3.3	3.0	2.7	2.4	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.8	9.6	14.6	18.7	23.6	28.0	32.6	35.8	NA	20%
CPU Revenue	NA	NA	.4	4.2	6.2	8.2	10.8	13.1	15.6	17.4	NA	23%
Workstation Revenue	NA	NA	.4	4.2	6.2	8.2	10.8	13.1	15.6	17.4	NA	23%
Peripheral Revenue	NA	NA	.1	1.1	2.1	2.3	2.1	1.7	1.4	1.0	NA	-14%
Software Revenue	NA	NA	2.2	9.1	19.1	36.4	61.3	98.4	138.7	177.5	NA	56%
Bundled	NA	NA	.3	2.6	4.0	4.6	4.4	3.7	2.9	2.1	NA	-12%
Unbundled	NA	NA	1.9	6.5	15.2	31.8	56.9	94.7	135.7	175.4	NA	63%
Service Revenue	.0	.0	.0	.7	1.4	2.5	3.8	5.5	7.2	8.9	NA	44%
Total Revenue	.0	.0	3.0	19.7	35.3	57.6	88.6	131.9	178.5	222.3	NA	44%
Increase over Prior Year	NA	NA	NA	559%	79%	63%	54%	49%	35%	25%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 17  
 TITLE: History and Forecast  
 APPLICATION: Mapping  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	51	992	1,521	2,330	3,400	4,690	6,260	7,780	NA	39%
Workstation Shipments	0	0	51	992	1,521	2,330	3,400	4,690	6,260	7,780	NA	39%
CPU Installed Base	0	0	51	1,042	2,564	4,890	8,190	12,530	17,920	24,160	NA	57%
Workstation Installed Base	0	0	51	1,042	2,564	4,890	8,190	12,530	17,920	24,160	NA	57%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	16.5	19.1	28.2	25.9	23.9	21.9	20.1	18.5	NA	-8%
Hardware-Only ASP	.0	.0	4.9	3.4	3.9	3.5	3.2	2.8	2.5	2.3	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.3	5.4	7.9	9.9	12.1	14.4	16.8	18.3	NA	18%
CPU Revenue	NA	NA	.1	2.5	3.3	4.4	5.6	6.9	8.1	9.0	NA	22%
Workstation Revenue	NA	NA	.1	2.5	3.3	4.4	5.6	6.9	8.1	9.0	NA	22%
Peripheral Revenue	NA	NA	.0	.5	1.3	1.0	.9	.7	.5	.4	NA	-22%
Software Revenue	NA	NA	1.8	5.8	13.8	27.5	48.6	81.1	116.7	151.1	NA	61%
Bundled	NA	NA	.0	1.2	2.5	2.1	1.7	1.3	1.0	.7	NA	-22%
Unbundled	NA	NA	1.8	4.6	11.3	25.4	46.9	79.8	115.6	150.3	NA	68%
Service Revenue	.0	.0	.0	.5	.5	.9	1.6	2.6	3.7	4.7	NA	56%
Total Revenue	.0	.0	2.1	11.7	22.2	38.2	62.3	98.0	137.0	174.1	NA	51%
Increase over Prior Year	NA	NA	NA	463%	90%	72%	63%	57%	40%	27%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 18  
 TITLE: History and Forecast  
 APPLICATION: Mapping  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	5	352	833	1,240	1,730	2,230	2,840	3,360	NA	32%
Workstation Shipments	0	0	5	352	833	1,240	1,730	2,230	2,840	3,360	NA	32%
CPU Installed Base	0	0	5	357	1,190	2,430	4,120	6,210	8,650	11,240	NA	57%
Workstation Installed Base	0	0	5	357	1,190	2,430	4,120	6,210	8,650	11,240	NA	57%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	29.6	19.1	4.3	3.9	3.5	3.3	3.1	2.9	NA	-8%
Hardware-Only ASP	.0	.0	.0	4.1	4.3	4.0	3.6	3.3	2.9	2.6	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.1	1.8	3.0	4.1	5.4	6.6	7.9	8.5	NA	24%
CPU Revenue	NA	NA	.1	.8	1.4	1.9	2.5	3.2	3.8	4.2	NA	24%
Workstation Revenue	NA	NA	.1	.8	1.4	1.9	2.5	3.2	3.8	4.2	NA	24%
Peripheral Revenue	NA	NA	.0	.1	.2	.4	.4	.3	.3	.2	NA	4%
Software Revenue	NA	NA	.0	2.1	4.2	6.9	10.4	15.2	20.1	25.0	NA	43%
Bundled	NA	NA	.0	.3	.5	.8	.8	.7	.5	.4	NA	-6%
Unbundled	NA	NA	.0	1.8	3.6	6.1	9.6	14.5	19.6	24.6	NA	47%
Service Revenue	.0	.0	.0	.2	.4	.7	1.0	1.4	1.8	2.2	NA	42%
Total Revenue	.0	.0	.2	4.3	7.6	11.7	16.8	23.3	29.8	35.7	NA	36%
Increase over Prior Year	NA	NA	NA	2773%	77%	54%	43%	38%	28%	20%		

Forecasts

Source: Dataquest  
 July 1988

TABLE NUMBER: 19  
 TITLE: History and Forecast  
 APPLICATION: Mapping  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	45	193	528	840	1,240	1,700	2,250	2,980	NA	41%
Workstation Shipments	0	0	45	193	528	840	1,240	1,700	2,250	2,980	NA	41%
CPU Installed Base	0	0	45	238	766	1,610	2,820	4,420	6,410	8,870	NA	63%
Workstation Installed Base	0	0	45	238	766	1,610	2,820	4,420	6,410	8,870	NA	63%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	42.3	60.2	20.1	18.6	17.1	15.7	14.4	13.2	NA	-8%
Hardware-Only ASP	.0	.0	5.1	4.2	4.2	3.9	3.5	3.2	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.4	2.1	3.3	4.3	5.6	6.5	7.4	8.4	NA	20%
CPU Revenue	NA	NA	.2	.8	1.3	1.8	2.4	2.9	3.4	4.0	NA	24%
Workstation Revenue	NA	NA	.2	.8	1.3	1.8	2.4	2.9	3.4	4.0	NA	25%
Peripheral Revenue	NA	NA	.0	.5	.7	.8	.9	.7	.6	.4	NA	-8%
Software Revenue	NA	NA	.3	1.0	.8	1.6	1.8	1.6	1.3	.9	NA	3%
Bundled	NA	NA	.2	1.0	.8	1.6	1.8	1.6	1.3	.9	NA	3%
Unbundled	NA	NA	.0	.0	.0	.0	.0	.0	.0	.0	NA	NA
Service Revenue	.0	.0	.0	.0	.5	.8	1.1	1.5	1.7	1.9	NA	29%
Total Revenue	.0	.0	.7	3.1	4.7	6.8	8.5	9.6	10.4	11.3	NA	19%
Increase over Prior Year	NA	NA	NA	356%	52%	43%	26%	12%	9%	9%		

Forecasts

Source: Dataquest  
 July 1988



TABLE NUMBER: 20  
 TITLE: History and Forecast  
 APPLICATION: Mapping  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	1	37	73	100	130	160	190	220	NA	25%
Workstation Shipments	0	0	1	37	73	100	130	160	190	220	NA	25%
CPU Installed Base	0	0	1	38	112	210	330	480	630	790	NA	48%
Workstation Installed Base	0	0	1	38	112	210	330	480	630	790	NA	48%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	.0	29.3	29.1	27.4	25.7	24.1	22.6	21.2	NA	-6%
Hardware-Only ASP	.0	.0	10.3	3.2	4.0	3.6	3.2	2.9	2.7	2.4	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.0	.3	.4	.5	.5	.5	.6	.6	NA	7%
CPU Revenue	NA	NA	.0	.1	.2	.2	.2	.3	.3	.3	NA	9%
Workstation Revenue	NA	NA	.0	.1	.2	.2	.2	.3	.3	.3	NA	9%
Peripheral Revenue	NA	NA	.0	.0	.1	.1	.1	.0	.0	.0	NA	-13%
Software Revenue	NA	NA	.1	.3	.4	.4	.5	.5	.6	.6	NA	9%
Bundled	NA	NA	.0	.1	.1	.1	.1	.1	.1	.1	NA	-10%
Unbundled	NA	NA	.1	.2	.3	.3	.4	.4	.5	.5	NA	14%
Service Revenue	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	NA	8%
Total Revenue	.0	.0	.1	.6	.8	.9	1.0	1.1	1.2	1.2	NA	8%
Increase over Prior Year	NA	NA	NA	638%	36%	14%	10%	9%	7%	3%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 21  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	5,518	11,826	20,430	27,375	33,350	37,840	39,770	39,810	38,490	NA	7%
Workstation Shipments	0	5,518	11,826	20,430	27,375	33,350	37,840	39,770	39,810	38,490	NA	7%
CPU Installed Base	0	5,518	17,344	37,775	64,653	95,840	127,600	155,420	176,290	189,060	NA	24%
Workstation Installed Base	0	5,518	17,344	37,775	64,653	95,840	127,600	155,420	176,290	189,060	NA	24%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	34.1	36.3	29.6	14.4	13.6	12.6	12.7	14.2	14.8	NA	1%
Hardware-Only ASP	.0	10.3	8.9	4.4	4.3	3.9	3.6	3.3	2.9	2.6	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	117.6	133.9	129.1	143.2	147.6	139.5	124.9	107.7	NA	-4%
CPU Revenue	NA	NA	53.3	59.3	60.1	69.2	71.9	68.0	60.6	51.8	NA	-3%
Workstation Revenue	NA	NA	53.3	59.3	60.1	69.2	71.9	68.0	60.6	51.8	NA	-3%
Peripheral Revenue	NA	NA	11.0	15.3	8.9	4.7	3.8	3.5	3.7	4.0	NA	-15%
Software Revenue	NA	NA	68.6	138.1	168.7	204.2	218.2	224.0	214.6	191.6	NA	3%
Bundled	NA	NA	32.3	42.2	19.4	18.9	15.2	12.7	9.6	7.5	NA	-17%
Unbundled	NA	NA	36.3	95.9	149.3	185.3	203.0	211.3	205.0	184.1	NA	4%
Service Revenue	.0	1.5	3.2	19.9	23.9	27.8	29.2	29.1	27.7	24.7	NA	1%
Total Revenue	.0	58.7	191.3	293.3	321.9	375.3	395.0	392.7	367.3	324.1	NA	0%
Increase over Prior Year	NA	NA	226%	53%	10%	17%	5%	-1%	-6%	-12%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 22  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	4,308	8,802	12,130	16,742	20,700	23,450	24,890	25,230	24,560	NA	8%
Workstation Shipments	0	4,308	8,802	12,130	16,742	20,700	23,450	24,890	25,230	24,560	NA	8%
CPU Installed Base	0	4,308	13,111	25,240	41,595	60,640	79,780	96,670	109,930	118,590	NA	23%
Workstation Installed Base	0	4,308	13,111	25,240	41,595	60,640	79,780	96,670	109,930	118,590	NA	23%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	34.1	32.7	20.6	19.8	16.3	10.4	9.4	8.5	.0	NA	-100%
Hardware-Only ASP	.0	9.5	9.0	4.3	4.3	3.9	3.6	3.3	2.9	2.6	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	80.0	57.4	74.6	84.1	86.1	81.9	74.1	64.2	NA	-3%
CPU Revenue	NA	NA	39.0	27.1	36.5	41.4	42.7	40.5	36.3	31.1	NA	-3%
Workstation Revenue	NA	NA	39.0	27.1	36.5	41.4	42.7	40.5	36.3	31.1	NA	-3%
Peripheral Revenue	NA	NA	1.9	3.2	1.5	1.3	.8	.9	1.5	1.9	NA	5%
Software Revenue	NA	NA	43.9	69.4	86.0	99.8	103.2	107.9	103.2	89.8	NA	1%
Bundled	NA	NA	15.5	10.6	4.6	3.7	1.5	1.1	.5	.0	NA	-100%
Unbundled	NA	NA	28.4	58.8	81.3	96.0	101.7	106.8	102.7	89.8	NA	2%
Service Revenue	.0	.3	2.3	9.8	10.1	11.4	11.4	11.8	11.3	9.9	NA	-0%
Total Revenue	.0	42.2	126.1	136.5	170.6	195.2	200.6	201.5	188.5	163.9	NA	-1%
Increase over Prior Year	NA	NA	199%	8%	25%	14%	3%	0%	-6%	-13%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 23  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	633	1,864	4,176	6,041	7,060	7,700	7,920	7,720	7,240	NA	4%
Workstation Shipments	0	633	1,864	4,176	6,041	7,060	7,700	7,920	7,720	7,240	NA	4%
CPU Installed Base	0	633	2,497	6,674	12,658	19,430	26,170	31,920	35,850	37,690	NA	24%
Workstation Installed Base	0	633	2,497	6,674	12,658	19,430	26,170	31,920	35,850	37,690	NA	24%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	73.8	37.7	6.2	6.0	5.5	5.4	8.8	.0	NA	-100%
Hardware-Only ASP	.0	11.5	9.0	4.7	4.3	3.9	3.6	3.2	2.9	2.6	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	22.6	27.7	25.0	27.2	27.5	25.7	22.7	18.8	NA	-6%
CPU Revenue	NA	NA	7.9	11.6	12.0	13.3	13.5	12.6	11.1	9.1	NA	-5%
Workstation Revenue	NA	NA	7.9	11.6	12.0	13.3	13.5	12.6	11.1	9.1	NA	-5%
Peripheral Revenue	NA	NA	6.8	4.4	1.1	.7	.5	.4	.5	.6	NA	-11%
Software Revenue	NA	NA	13.9	35.1	49.5	69.8	78.7	80.0	76.9	69.8	NA	7%
Bundled	NA	NA	7.2	13.5	2.6	2.6	1.8	1.1	.4	.0	NA	-100%
Unbundled	NA	NA	6.7	21.6	46.9	67.2	76.9	78.9	76.5	69.8	NA	8%
Service Revenue	.0	.3	.7	3.5	7.9	11.0	12.2	12.2	11.6	10.4	NA	6%
Total Revenue	.0	7.6	37.2	67.6	82.6	108.0	118.4	117.9	111.2	99.1	NA	4%
Increase over Prior Year	NA	NA	391%	82%	22%	31%	10%	-0%	-6%	-11%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 24  
 TITLE: History and Forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	488	1,023	3,902	4,173	4,870	5,410	5,600	5,460	5,260	NA	5%
Workstation Shipments	0	488	1,023	3,902	4,173	4,870	5,410	5,600	5,460	5,260	NA	5%
CPU Installed Base	0	488	1,511	5,413	9,542	14,220	18,910	22,890	25,440	26,740	NA	23%
Workstation Installed Base	0	488	1,511	5,413	9,542	14,220	18,910	22,890	25,440	26,740	NA	23%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	29.7	31.4	18.2	17.3	16.4	15.6	15.3	14.9	NA	-4%
Hardware-Only ASP	.0	14.6	9.0	4.7	4.1	3.8	3.5	3.1	2.8	2.5	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	14.3	47.9	27.4	28.7	29.0	27.0	23.7	20.7	NA	-5%
CPU Revenue	NA	NA	6.1	20.2	10.6	13.0	13.3	12.5	11.0	9.6	NA	-2%
Workstation Revenue	NA	NA	6.1	20.2	10.6	13.0	13.3	12.5	11.0	9.6	NA	-2%
Peripheral Revenue	NA	NA	2.2	7.6	6.3	2.7	2.4	2.1	1.7	1.4	NA	-26%
Software Revenue	NA	NA	10.6	32.4	31.5	32.6	34.1	33.8	32.1	29.5	NA	-1%
Bundled	NA	NA	9.5	18.0	12.0	12.4	11.7	10.4	8.6	7.5	NA	-9%
Unbundled	NA	NA	1.1	14.3	19.5	20.2	22.3	23.4	23.5	22.1	NA	2%
Service Revenue	.0	.9	.3	6.4	5.6	5.2	5.3	4.9	4.5	4.0	NA	-6%
Total Revenue	.0	8.0	27.1	86.8	64.6	66.6	68.4	65.7	60.3	54.3	NA	-3%
Increase over Prior Year	NA	NA	240%	220%	-26%	3%	3%	-4%	-8%	-10%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 25  
 TITLE: History and forecast  
 APPLICATION: Electronic Design Automation  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	88	138	222	419	720	1,270	1,350	1,390	1,430	NA	28%
Workstation Shipments	0	88	138	222	419	720	1,270	1,350	1,390	1,430	NA	28%
CPU Installed Base	0	88	226	448	858	1,550	2,740	3,940	5,070	6,030	NA	48%
Workstation Installed Base	0	88	226	448	858	1,550	2,740	3,940	5,070	6,030	NA	48%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	.0	14.9	24.5	24.4	22.6	19.5	16.7	12.3	NA	-13%
Hardware-Only ASP	.0	11.2	5.0	4.0	4.6	4.2	3.9	3.5	3.2	2.8	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.7	.9	2.0	3.2	5.1	4.9	4.4	4.1	NA	15%
CPU Revenue	NA	NA	.3	.5	1.0	1.6	2.5	2.4	2.2	2.0	NA	15%
Workstation Revenue	NA	NA	.3	.5	1.0	1.6	2.5	2.4	2.2	2.0	NA	15%
Peripheral Revenue	NA	NA	.0	.0	.1	.1	.1	.1	.1	.1	NA	6%
Software Revenue	NA	NA	.2	1.3	1.8	2.0	2.2	2.4	2.5	2.5	NA	7%
Bundled	NA	NA	.1	.1	.2	.2	.2	.1	.1	.1	NA	-20%
Unbundled	NA	NA	.1	1.2	1.6	1.8	2.0	2.2	2.4	2.4	NA	8%
Service Revenue	.0	.0	.0	.2	.3	.3	.3	.3	.3	.3	NA	6%
Total Revenue	.0	1.0	.9	2.4	4.1	5.5	7.6	7.5	7.3	6.9	NA	11%
Increase over Prior Year	NA	NA	-10%	169%	71%	35%	38%	-1%	-3%	-5%		

Forecasts

Source: Dataquest  
 July 1988

TABLE NUMBER: 26  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	4,727	10,023	14,774	17,550	21,180	24,110	25,680	25,860	24,810	NA	7%
Workstation Shipments	0	4,727	10,023	14,774	17,550	21,180	24,110	25,680	25,860	24,810	NA	7%
CPU Installed Base	0	4,727	14,750	29,525	46,650	65,980	85,150	101,710	114,150	121,840	NA	21%
Workstation Installed Base	0	4,727	14,750	29,525	46,650	65,980	85,150	101,710	114,150	121,840	NA	21%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	34.1	32.0	30.5	13.1	11.8	9.3	9.2	10.5	23.9	NA	13%
Hardware-Only ASP	.0	9.6	9.0	4.5	4.5	4.1	3.8	3.4	3.0	2.7	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	95.2	101.9	81.7	89.1	91.6	87.7	78.9	67.4	NA	-4%
CPU Revenue	NA	NA	45.4	45.4	39.0	43.2	44.9	43.0	38.3	32.3	NA	-4%
Workstation Revenue	NA	NA	45.4	45.4	39.0	43.2	44.9	43.0	38.3	32.3	NA	-4%
Peripheral Revenue	NA	NA	4.4	11.1	3.7	2.8	1.9	1.8	2.3	2.8	NA	-6%
Software Revenue	NA	NA	45.7	91.5	79.6	91.3	94.5	93.7	88.7	77.6	NA	-1%
Bundled	NA	NA	19.6	36.2	9.5	7.9	4.1	2.6	.9	.0	NA	-66%
Unbundled	NA	NA	26.1	55.3	70.1	83.5	90.4	91.1	87.8	77.6	NA	2%
Service Revenue	.0	.7	2.7	15.5	12.5	13.5	13.5	13.0	12.1	10.5	NA	-3%
Total Revenue	.0	46.7	145.6	209.9	173.9	194.0	199.8	194.4	179.7	155.6	NA	-2%
Increase over Prior Year	NA	NA	212%	44%	-17%	12%	3%	-3%	-8%	-13%		

Source: Dataquest  
 July 1988

TABLE NUMBER: 27  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	3,710	7,862	9,071	10,878	13,180	15,240	16,460	16,790	16,290	NA	8%
Workstation Shipments	0	3,710	7,862	9,071	10,878	13,180	15,240	16,460	16,790	16,290	NA	8%
CPU Installed Base	0	3,710	11,572	20,644	31,187	42,920	54,510	64,580	72,590	78,080	NA	20%
Workstation Installed Base	0	3,710	11,572	20,644	31,187	42,920	54,510	64,580	72,590	78,080	NA	20%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	34.1	25.9	21.1	30.6	28.2	25.9	23.8	21.9	20.0	NA	-8%
Hardware-Only ASP	.0	9.4	9.0	4.5	4.5	4.1	3.8	3.4	3.1	2.7	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	70.4	44.4	51.0	56.0	58.1	56.3	51.4	44.6	NA	-3%
CPU Revenue	NA	NA	34.5	20.8	25.0	27.6	28.8	27.8	25.1	21.4	NA	-3%
Workstation Revenue	NA	NA	34.5	20.8	25.0	27.6	28.8	27.8	25.1	21.4	NA	-3%
Peripheral Revenue	NA	NA	1.3	2.9	1.1	.9	.4	.6	1.3	1.9	NA	11%
Software Revenue	NA	NA	30.3	46.8	40.1	41.0	38.8	38.8	36.9	31.4	NA	-5%
Bundled	NA	NA	11.0	9.6	3.1	2.1	.0	.0	.0	.0	NA	-100%
Unbundled	NA	NA	19.3	37.3	37.0	38.8	38.8	38.8	36.9	31.4	NA	-3%
Service Revenue	.0	.3	2.0	7.4	5.7	5.7	5.1	5.1	4.9	4.2	NA	-6%
Total Revenue	.0	35.8	102.7	98.6	96.7	102.6	102.0	100.3	93.2	80.1	NA	-4%
Increase over Prior Year	NA	NA	187%	-4%	-2%	6%	-1%	-2%	-7%	-14%		

Source: Dataquest  
 July 1988

Forecasts



TABLE NUMBER: 28  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	585	1,483	2,525	3,739	4,640	5,240	5,570	5,700	5,470	NA	8%
Workstation Shipments	0	585	1,483	2,525	3,739	4,640	5,240	5,570	5,700	5,470	NA	8%
CPU Installed Base	0	585	2,068	4,594	8,280	12,670	17,190	21,260	24,510	26,520	NA	26%
Workstation Installed Base	0	585	2,068	4,594	8,280	12,670	17,190	21,260	24,510	26,520	NA	26%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	26.6	40.2	5.8	5.0	3.9	2.9	.0	.0	NA	-100%
Hardware-Only ASP	.0	10.2	9.0	4.7	4.5	4.1	3.8	3.4	3.0	2.7	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	14.1	19.1	15.7	18.3	19.2	18.7	17.3	14.8	NA	-1%
CPU Revenue	NA	NA	6.2	7.5	7.6	8.9	9.4	9.2	8.4	7.1	NA	-1%
Workstation Revenue	NA	NA	6.2	7.5	7.6	8.9	9.4	9.2	8.4	7.1	NA	-1%
Peripheral Revenue	NA	NA	1.7	4.2	.5	.5	.3	.3	.5	.6	NA	2%
Software Revenue	NA	NA	8.5	19.8	19.3	29.3	34.2	33.8	32.2	29.0	NA	9%
Bundled	NA	NA	1.9	12.9	1.6	1.3	.6	.2	.0	.0	NA	-100%
Unbundled	NA	NA	6.5	6.8	17.7	28.1	33.6	33.6	32.2	29.0	NA	10%
Service Revenue	.0	.0	.5	2.7	3.2	4.8	5.4	5.3	5.0	4.5	NA	7%
Total Revenue	.0	6.0	23.1	42.6	38.3	52.4	58.8	57.7	54.6	48.4	NA	5%
Increase over Prior Year	NA	NA	287%	84%	-10%	37%	12%	-2%	-5%	-11%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 29  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	344	609	3,026	2,650	2,930	3,080	3,050	2,770	2,450	NA	-2%
Workstation Shipments	0	344	609	3,026	2,650	2,930	3,080	3,050	2,770	2,450	NA	-2%
CPU Installed Base	0	344	953	3,979	6,598	9,410	11,980	13,890	14,650	14,520	NA	17%
Workstation Installed Base	0	344	953	3,979	6,598	9,410	11,980	13,890	14,650	14,520	NA	17%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	44.0	31.9	13.9	12.8	11.8	10.8	9.9	.0	NA	-100%
Hardware-Only ASP	.0	10.6	9.0	4.8	4.2	3.8	3.5	3.2	2.9	2.6	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	10.3	37.7	13.5	12.9	12.1	10.6	8.3	6.3	NA	-14%
CPU Revenue	NA	NA	4.4	16.8	5.8	5.7	5.5	4.9	3.9	3.0	NA	-12%
Workstation Revenue	NA	NA	4.4	16.8	5.8	5.7	5.5	4.9	3.9	3.0	NA	-12%
Peripheral Revenue	NA	NA	1.5	4.0	2.0	1.4	1.1	.8	.5	.3	NA	-34%
Software Revenue	NA	NA	7.0	24.5	19.4	20.1	20.3	19.7	18.1	15.8	NA	-4%
Bundled	NA	NA	6.7	13.7	4.7	4.3	3.4	2.3	.9	.0	NA	-100%
Unbundled	NA	NA	.2	10.8	14.8	15.7	17.0	17.4	17.2	15.8	NA	1%
Service Revenue	.0	.3	.2	5.4	3.5	2.8	2.8	2.4	2.0	1.6	NA	-14%
Total Revenue	.0	4.0	19.5	67.6	36.5	35.8	35.3	32.7	28.3	23.7	NA	-8%
Increase over Prior Year	NA	NA	389%	247%	-46%	-2%	-1%	-8%	-13%	-16%		

Source: Dataquest  
 July 1988

TABLE NUMBER: 30  
 TITLE: History and Forecast  
 APPLICATION: Electronic CAE  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	88	69	151	284	430	550	600	600	600	NA	16%
Workstation Shipments	0	88	69	151	284	430	550	600	600	600	NA	16%
CPU Installed Base	0	88	157	308	585	990	1,480	1,980	2,410	2,730	NA	36%
Workstation Installed Base	0	88	157	308	585	990	1,480	1,980	2,410	2,730	NA	36%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	.0	10.9	36.8	33.9	31.1	28.6	26.3	24.1	NA	-8%
Hardware-Only ASP	.0	11.2	4.9	4.1	4.8	4.3	3.9	3.5	3.1	2.8	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.3	.6	1.4	2.0	2.2	2.2	1.9	1.7	NA	4%
CPU Revenue	NA	NA	.2	.3	.7	1.0	1.1	1.1	.9	.8	NA	3%
Workstation Revenue	NA	NA	.2	.3	.7	1.0	1.1	1.1	.9	.8	NA	3%
Peripheral Revenue	NA	NA	.0	.0	.1	.1	.1	.1	.1	.1	NA	10%
Software Revenue	NA	NA	.0	.4	.8	1.0	1.2	1.4	1.5	1.5	NA	13%
Bundled	NA	NA	.0	.0	.2	.2	.2	.1	.1	.0	NA	-23%
Unbundled	NA	NA	.0	.4	.6	.8	1.0	1.2	1.4	1.4	NA	17%
Service Revenue	.0	.0	.0	.1	.1	.2	.2	.2	.2	.2	NA	9%
Total Revenue	.0	1.0	.3	1.1	2.4	3.1	3.7	3.7	3.7	3.4	NA	7%
Increase over Prior Year	NA	NA	-66%	229%	112%	32%	16%	2%	-2%	-7%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 31  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	47	356	1,049	1,200	1,600	1,490	1,250	1,150	NA	2%
Workstation Shipments	0	0	47	356	1,049	1,200	1,600	1,490	1,250	1,150	NA	2%
CPU Installed Base	0	0	47	403	1,452	2,650	4,210	5,520	6,320	6,640	NA	36%
Workstation Installed Base	0	0	47	403	1,452	2,650	4,210	5,520	6,320	6,640	NA	36%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	30.7	.0	5.6	5.5	5.1	5.7	11.9	.0	NA	-100%
Hardware-Only ASP	.0	.0	.0	5.0	5.0	4.6	4.1	3.8	3.4	3.1	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.8	1.8	4.5	5.8	7.0	6.1	4.6	3.6	NA	-4%
CPU Revenue	NA	NA	.1	.9	2.1	2.9	3.5	3.0	2.3	1.8	NA	-3%
Workstation Revenue	NA	NA	.1	.9	2.1	2.9	3.5	3.0	2.3	1.8	NA	-3%
Peripheral Revenue	NA	NA	.5	.0	.3	.0	.0	.0	.0	.0	NA	-100%
Software Revenue	NA	NA	1.6	3.4	13.4	15.0	16.8	16.8	12.0	6.5	NA	-13%
Bundled	NA	NA	.7	.0	.9	.0	.0	.0	.0	.0	NA	-100%
Unbundled	NA	NA	.9	3.4	12.5	15.0	16.8	16.8	12.0	6.5	NA	-12%
Service Revenue	.0	.0	.2	.3	1.1	1.4	1.5	1.5	1.0	.5	NA	-13%
Total Revenue	.0	.0	2.6	5.5	19.1	22.2	25.2	24.4	17.6	10.7	NA	-11%
Increase over Prior Year	NA	NA	NA	116%	247%	16%	14%	-3%	-28%	-39%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 32  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	8	340	442	490	510	510	510	480	NA	2%
Workstation Shipments	0	0	8	340	442	490	510	510	510	480	NA	2%
CPU Installed Base	0	0	8	348	791	1,280	1,750	2,150	2,410	2,510	NA	26%
Workstation Installed Base	0	0	8	348	791	1,280	1,750	2,150	2,410	2,510	NA	26%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	25.9	.0	43.2	40.5	38.0	35.6	33.3	31.1	NA	-6%
Hardware-Only ASP	.0	.0	.0	5.0	5.0	4.6	4.2	3.8	3.5	3.2	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.1	1.7	2.3	2.4	2.3	2.0	1.8	1.5	NA	-8%
CPU Revenue	NA	NA	.0	.9	1.1	1.2	1.1	1.0	.9	.8	NA	-7%
Workstation Revenue	NA	NA	.0	.9	1.1	1.2	1.1	1.0	.9	.8	NA	-7%
Peripheral Revenue	NA	NA	.0	.0	.0	.0	.0	.0	.0	.0	NA	-100%
Software Revenue	NA	NA	.7	2.2	9.4	11.6	12.7	12.7	8.9	4.5	NA	-14%
Bundled	NA	NA	.1	.0	.1	.0	.0	.0	.0	.0	NA	-100%
Unbundled	NA	NA	.6	2.2	9.3	11.6	12.7	12.7	8.9	4.5	NA	-14%
Service Revenue	.0	.0	.1	.3	.6	.8	.8	.8	.6	.3	NA	-14%
Total Revenue	.0	.0	.9	4.2	12.3	14.7	15.8	15.5	11.2	6.3	NA	-13%
Increase over Prior Year	NA	NA	NA	353%	191%	20%	7%	-2%	-28%	-44%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 33  
 TITLE: History and forecast  
 APPLICATION: IC Layout  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	35	16	497	480	450	340	150	120	NA	-25%
Workstation Shipments	0	0	35	16	497	480	450	340	150	120	NA	-25%
CPU Installed Base	0	0	35	50	547	1,020	1,460	1,750	1,740	1,550	NA	23%
Workstation Installed Base	0	0	35	50	547	1,020	1,460	1,750	1,740	1,550	NA	23%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	29.2	.0	2.0	1.9	1.7	1.5	.0	.0	NA	-100%
Hardware-Only ASP	.0	.0	.0	5.1	5.0	4.6	4.1	3.7	3.5	3.3	NA	-8%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.5	.1	1.4	1.5	1.3	.9	.5	.3	NA	-25%
CPU Revenue	NA	NA	.0	.0	.7	.7	.7	.5	.3	.2	NA	-24%
Workstation Revenue	NA	NA	.0	.0	.7	.7	.7	.5	.3	.2	NA	-24%
Peripheral Revenue	NA	NA	.5	.0	.1	.0	.0	.0	.0	.0	NA	-100%
Software Revenue	NA	NA	.7	.9	1.8	2.9	3.5	3.5	2.5	1.5	NA	-4%
Bundled	NA	NA	.5	.0	.2	.0	.0	.0	.0	.0	NA	-100%
Unbundled	NA	NA	.2	.9	1.6	2.9	3.5	3.5	2.5	1.5	NA	-2%
Service Revenue	.0	.0	.1	.0	.3	.5	.6	.6	.4	.2	NA	-8%
Total Revenue	.0	.0	1.3	.9	3.6	5.0	5.4	5.1	3.4	2.1	NA	-10%
Increase over Prior Year	NA	NA	NA	-28%	283%	38%	9%	-7%	-33%	-38%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 34  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	4	0	84	80	80	80	40	0	NA	-100%
Workstation Shipments	0	0	4	0	84	80	80	80	40	0	NA	-100%
CPU Installed Base	0	0	4	4	88	170	260	330	350	290	NA	27%
Workstation Installed Base	0	0	4	4	88	170	260	330	350	290	NA	27%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	51.5	.0	15.3	14.4	13.4	12.6	11.9	.0	NA	-100%
Hardware-Only ASP	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	NA	NA
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.1	.0	.7	1.2	1.1	1.1	.5	.0	NA	-100%
CPU Revenue	NA	NA	.1	.0	.2	.6	.6	.5	.3	.0	NA	-100%
Workstation Revenue	NA	NA	.1	.0	.2	.6	.6	.5	.3	.0	NA	-100%
Peripheral Revenue	NA	NA	.0	.0	.3	.0	.0	.0	.0	.0	NA	-100%
Software Revenue	NA	NA	.2	.3	2.2	.4	.4	.5	.5	.5	NA	-26%
Bundled	NA	NA	.1	.0	.6	.0	.0	.0	.0	.0	NA	-100%
Unbundled	NA	NA	.1	.3	1.6	.4	.4	.5	.5	.5	NA	-21%
Service Revenue	.0	.0	.0	.0	.2	.1	.1	.1	.1	.0	NA	-29%
Total Revenue	.0	.0	.3	.4	3.0	1.7	1.7	1.6	1.1	.5	NA	-30%
Increase over Prior Year	NA	NA	NA	9%	760%	-44%	-2%	-2%	-35%	-50%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 35  
 TITLE: History and Forecast  
 APPLICATION: IC Layout  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	0	0	26	160	550	550	550	550	NA	84%
Workstation Shipments	0	0	0	0	26	160	550	550	550	550	NA	84%
CPU Installed Base	0	0	0	0	26	180	740	1,290	1,830	2,290	NA	144%
Workstation Installed Base	0	0	0	0	26	180	740	1,290	1,830	2,290	NA	144%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	NA	NA
Hardware-Only ASP	.0	.0	.0	.0	5.0	4.5	4.1	3.7	3.4	3.1	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.0	.0	.1	.7	2.2	2.1	1.9	1.7	NA	65%
CPU Revenue	NA	NA	.0	.0	.1	.4	1.1	1.0	.9	.9	NA	65%
Workstation Revenue	NA	NA	.0	.0	.1	.4	1.1	1.0	.9	.9	NA	65%
Peripheral Revenue	NA	NA	.0	.0	.0	.0	.0	.0	.0	.0	NA	NA
Software Revenue	NA	NA	.0	.0	.1	.1	.1	.1	.1	.1	NA	0%
Bundled	NA	NA	.0	.0	.0	.0	.0	.0	.0	.0	NA	NA
Unbundled	NA	NA	.0	.0	.1	.1	.1	.1	.1	.1	NA	0%
Service Revenue	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	NA	NA
Total Revenue	.0	.0	.0	.0	.2	.8	2.3	2.2	2.0	1.8	NA	52%
Increase over Prior Year	NA	NA	NA	NA	NA	264%	192%	-8%	-8%	-8%		

Source: Dataquest  
 July 1988

Forecasts



TABLE NUMBER: 36  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Worldwide  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	791	1,756	5,300	8,775	10,970	12,130	12,600	12,690	12,530	NA	7%
Workstation Shipments	0	791	1,756	5,300	8,775	10,970	12,130	12,600	12,690	12,530	NA	7%
CPU Installed Base	0	791	2,548	7,847	16,551	27,200	38,230	48,190	55,820	60,580	NA	30%
Workstation Installed Base	0	791	2,548	7,847	16,551	27,200	38,230	48,190	55,820	60,580	NA	30%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	47.6	25.9	18.3	16.9	15.8	15.0	14.8	14.8	NA	-4%
Hardware-Only ASP	.0	14.1	8.8	4.1	3.8	3.5	3.2	2.9	2.6	2.3	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	21.6	30.3	42.9	48.3	49.0	45.7	41.3	36.7	NA	-3%
CPU Revenue	NA	NA	7.8	13.1	19.0	23.2	23.5	22.0	20.0	17.7	NA	-1%
Workstation Revenue	NA	NA	7.8	13.1	19.0	23.2	23.5	22.0	20.0	17.7	NA	-1%
Peripheral Revenue	NA	NA	6.0	4.1	4.9	1.9	1.9	1.7	1.4	1.2	NA	-24%
Software Revenue	NA	NA	21.3	43.3	75.8	97.9	106.9	113.5	114.0	107.5	NA	7%
Bundled	NA	NA	12.0	6.1	9.0	11.1	11.1	10.1	8.7	7.5	NA	-4%
Unbundled	NA	NA	9.3	37.2	66.7	86.8	95.8	103.4	105.3	100.0	NA	8%
Service Revenue	.0	.8	.3	4.0	10.3	13.0	14.1	14.7	14.6	13.6	NA	6%
Total Revenue	.0	12.0	43.2	77.9	128.9	159.2	170.0	174.0	169.9	157.9	NA	4%
Increase over Prior Year	NA	NA	260%	81%	65%	24%	7%	2%	-2%	-7%		

Source: Dataquest  
 July 1988

TABLE NUMBER: 37  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: North America  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	****	****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	598	932	2,718	5,422	7,030	7,700	7,920	7,930	7,790	NA	8%
Workstation Shipments	0	598	932	2,718	5,422	7,030	7,700	7,920	7,930	7,790	NA	8%
CPU Installed Base	0	598	1,530	4,249	9,617	16,450	23,520	29,940	34,940	38,010	NA	32%
Workstation Installed Base	0	598	1,530	4,249	9,617	16,450	23,520	29,940	34,940	38,010	NA	32%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	126.2	17.9	11.9	10.9	10.1	9.3	8.5	7.8	NA	-8%
Hardware-Only ASP	.0	10.7	9.0	3.7	3.8	3.5	3.2	2.9	2.6	2.3	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	9.4	11.3	21.3	25.6	25.7	23.6	20.9	18.0	NA	-3%
CPU Revenue	NA	NA	4.4	5.5	10.5	12.6	12.7	11.7	10.4	9.0	NA	-3%
Workstation Revenue	NA	NA	4.4	5.5	10.5	12.6	12.7	11.7	10.4	9.0	NA	-3%
Peripheral Revenue	NA	NA	.6	.4	.4	.4	.4	.3	.1	.1	NA	-33%
Software Revenue	NA	NA	12.9	20.4	36.5	47.3	51.7	56.3	57.4	54.0	NA	8%
Bundled	NA	NA	4.4	1.1	1.4	1.6	1.5	1.1	.5	.0	NA	-100%
Unbundled	NA	NA	8.5	19.3	35.1	45.6	50.2	55.2	56.9	54.0	NA	9%
Service Revenue	.0	.0	.2	2.1	3.9	5.0	5.4	5.8	5.9	5.5	NA	7%
Total Revenue	.0	6.4	22.5	33.7	61.6	77.9	82.8	85.7	84.1	77.5	NA	5%
Increase over Prior Year	NA	NA	253%	50%	83%	26%	6%	4%	-2%	-8%		

Source: Dataquest  
 July 1988

TABLE NUMBER: 38  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Europe  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	48	346	1,635	1,806	1,950	2,020	2,010	1,870	1,650	NA	-2%
Workstation Shipments	0	48	346	1,635	1,806	1,950	2,020	2,010	1,870	1,650	NA	-2%
CPU Installed Base	0	48	394	2,029	3,831	5,740	7,520	8,910	9,600	9,630	NA	20%
Workstation Installed Base	0	48	394	2,029	3,831	5,740	7,520	8,910	9,600	9,630	NA	20%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	849.7	22.3	12.3	11.3	10.4	9.5	8.8	.0	NA	-100%
Hardware-Only ASP	.0	27.9	9.0	4.7	3.8	3.4	3.0	2.7	2.4	2.2	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	8.0	8.4	7.9	7.5	7.0	6.1	4.8	3.6	NA	-15%
CPU Revenue	NA	NA	1.6	4.2	3.7	3.6	3.4	3.0	2.4	1.8	NA	-14%
Workstation Revenue	NA	NA	1.6	4.2	3.7	3.6	3.4	3.0	2.4	1.8	NA	-14%
Peripheral Revenue	NA	NA	4.7	.1	.5	.3	.2	.2	.1	.0	NA	-100%
Software Revenue	NA	NA	4.8	14.5	28.4	37.5	41.0	42.7	42.2	39.3	NA	7%
Bundled	NA	NA	4.8	.6	.9	1.3	1.2	.9	.4	.0	NA	-100%
Unbundled	NA	NA	.0	13.9	27.6	36.2	39.8	41.8	41.8	39.3	NA	7%
Service Revenue	.0	.3	.1	.8	4.4	5.7	6.1	6.3	6.1	5.7	NA	5%
Total Revenue	.0	1.6	12.8	24.1	40.7	50.7	54.2	55.1	53.2	48.6	NA	4%
Increase over Prior Year	NA	NA	694%	89%	69%	25%	7%	2%	-3%	-9%		

Source: Dataquest  
 July 1988

Forecasts

TABLE NUMBER: 39  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Asia  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	----	----	----	----	----	----	----	----	----	----	-----	-----
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	145	409	876	1,439	1,850	2,250	2,470	2,650	2,810	NA	14%
Workstation Shipments	0	145	409	876	1,439	1,850	2,250	2,470	2,650	2,810	NA	14%
CPU Installed Base	0	145	554	1,431	2,856	4,640	6,680	8,660	10,450	11,930	NA	33%
Workstation Installed Base	0	145	554	1,431	2,856	4,640	6,680	8,660	10,450	11,930	NA	33%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	16.0	29.7	22.6	20.9	19.2	17.6	16.2	14.9	NA	-8%
Hardware-Only ASP	.0	23.9	.0	4.4	4.0	3.6	3.3	3.0	2.7	2.4	NA	-10%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	3.9	10.3	13.2	14.6	15.7	15.4	14.9	14.4	NA	2%
CPU Revenue	NA	NA	1.6	3.3	4.6	6.7	7.2	7.1	6.9	6.6	NA	8%
Workstation Revenue	NA	NA	1.6	3.3	4.6	6.7	7.2	7.1	6.9	6.6	NA	8%
Peripheral Revenue	NA	NA	.7	3.6	4.0	1.3	1.3	1.3	1.2	1.2	NA	-22%
Software Revenue	NA	NA	3.5	7.5	9.9	12.2	13.3	13.6	13.5	13.2	NA	6%
Bundled	NA	NA	2.7	4.3	6.7	8.1	8.3	8.1	7.7	7.5	NA	2%
Unbundled	NA	NA	.8	3.2	3.2	4.1	5.0	5.5	5.8	5.8	NA	13%
Service Revenue	.0	.5	.0	1.0	2.0	2.3	2.5	2.4	2.4	2.4	NA	4%
Total Revenue	.0	4.0	7.3	18.9	25.1	29.2	31.4	31.5	30.9	30.0	NA	4%
Increase over Prior Year	NA	NA	83%	158%	33%	16%	8%	0%	-2%	-3%		

Source: Dataquest  
 July 1988

TABLE NUMBER: 40  
 TITLE: History and Forecast  
 APPLICATION: PCB Layout  
 REGION: Rest of World  
 PLATFORM: Personal Computer

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	CAGR 83-87	CAGR 87-92
	****	****	****	****	****	****	****	****	****	****	*****	*****
<b>UNIT SHIPMENT DATA (Workstation Shipments)</b>												
CPU Shipments	0	0	69	70	108	140	160	200	230	280	NA	21%
Workstation Shipments	0	0	69	70	108	140	160	200	230	280	NA	21%
CPU Installed Base	0	0	69	139	247	380	520	670	830	1,010	NA	32%
Workstation Installed Base	0	0	69	139	247	380	520	670	830	1,010	NA	32%
<b>AVERAGE SYSTEM PRICE DATA (Thousands of Dollars)</b>												
Turnkey ASP	.0	.0	.0	25.2	10.7	9.8	9.1	8.3	7.6	7.0	NA	-8%
Hardware-Only ASP	.0	.0	5.1	3.9	4.0	3.7	3.4	3.0	2.7	2.4	NA	-9%
<b>REVENUE DATA (Millions of Dollars)</b>												
Hardware Revenue	NA	NA	.4	.3	.5	.5	.6	.6	.6	.7	NA	9%
CPU Revenue	NA	NA	.2	.1	.2	.3	.3	.3	.3	.3	NA	9%
Workstation Revenue	NA	NA	.2	.1	.2	.3	.3	.3	.3	.3	NA	9%
Peripheral Revenue	NA	NA	.0	.0	.0	.0	.0	.0	.0	.0	NA	9%
Software Revenue	NA	NA	.2	.9	.9	.9	.9	.9	.9	.9	NA	-100%
Bundled	NA	NA	.1	.0	.0	.0	.0	.0	.0	.0	NA	0%
Unbundled	NA	NA	.1	.8	.9	.9	.9	.9	.9	.9	NA	-8%
Service Revenue	.0	.0	.0	.1	.1	.1	.1	.1	.1	.1	NA	0%
Total Revenue	.0	.0	.6	1.3	1.5	1.6	1.6	1.7	1.7	1.7	NA	0%
Increase over Prior Year	NA	NA	NA	131%	17%	6%	3%	2%	2%	2%	NA	3%

Forecasts

Source: Dataquest  
 July 1988

## Appendix B—Market Share

### INTRODUCTION

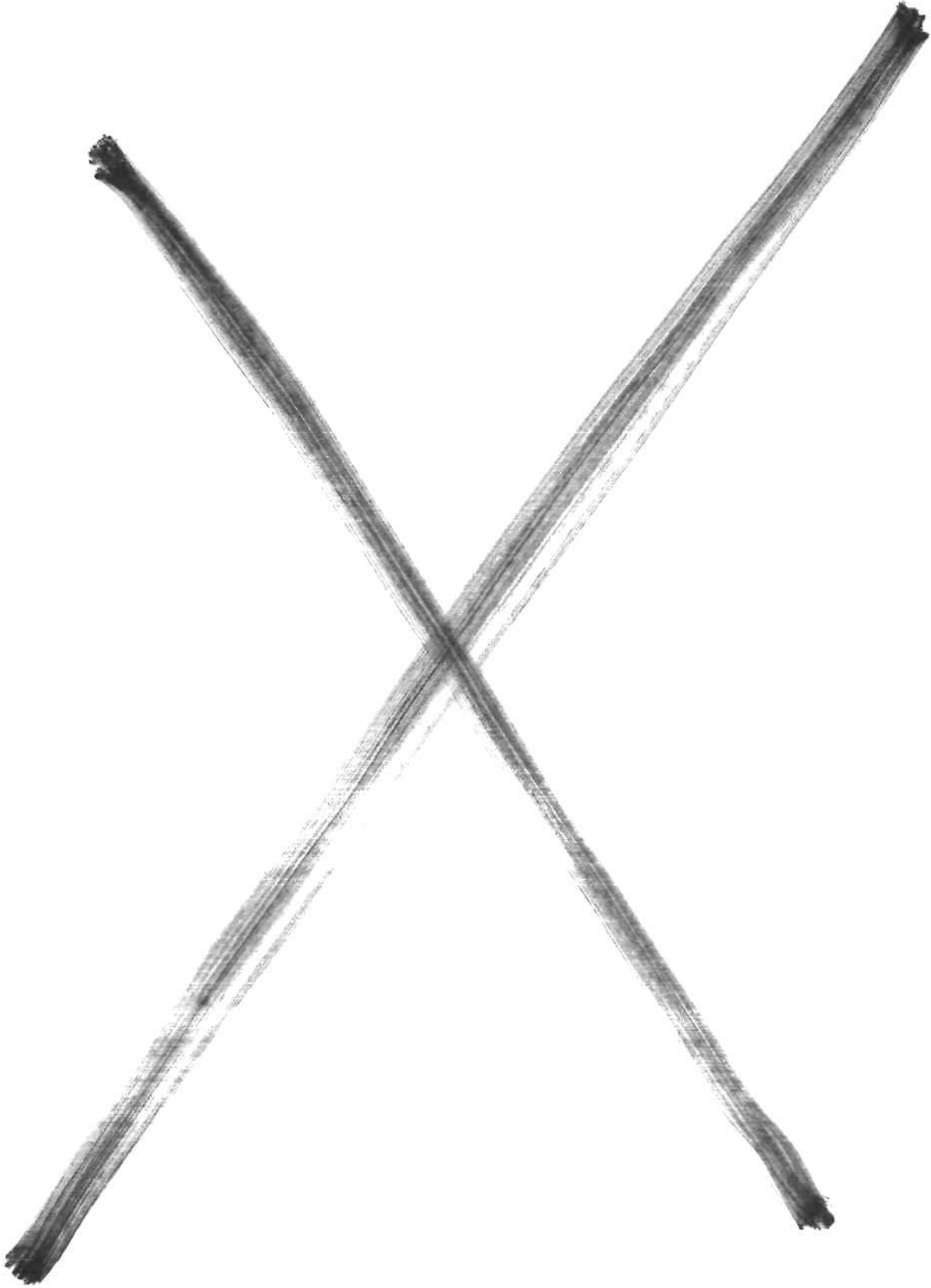
The following market share tables present Dataquest's vendor estimates for the CAD/CAM industry. It is against Dataquest's corporate policy to publish or release individual forecasts for any company.

Please refer to the section entitled "Introduction to the Service" for information on forecasting methodologies, companies contained within the data base, and caveats. Forecasting terms and definitions can be found behind the Glossary tab.

We have tried to segment the market share data in as many meaningful ways as possible. As the forecast data base tends to be quite large by nature, we have limited market shares to the following structure:

- Application by
  - Region

Each market share analysis section includes data arranged by total CAD/CAM revenue, hardware revenue, software revenue, and workstation shipments. The sum of hardware and software revenue does not equal total revenue because we did not include revenue derived from servicing CAD/CAM systems for these market share analyses.



# Market Share

TABLE NUMBER: 1  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	363.6	307.4	32.4	56,507	27.5%	38.4%	7.3%	33.6%
Compaq	136.0	136.0	.0	38,200	10.3%	17.0%	.0%	22.7%
Apple Computer	88.0	88.1	.0	31,592	6.7%	11.0%	.0%	18.8%
Autodesk	74.2	.0	74.2	0	5.6%	.0%	16.6%	.0%
Hitachi	58.9	31.8	21.2	1,601	4.5%	4.0%	4.8%	1.0%
NEC	34.6	15.6	15.6	1,299	2.6%	1.9%	3.5%	.8%
Zenith	33.0	29.7	.0	10,000	2.5%	3.7%	.0%	6.0%
Mutoh Industries	27.5	14.9	9.9	1,127	2.1%	1.9%	2.2%	.7%
Racal-Redac	26.4	.1	22.4	0	2.0%	.0%	5.0%	.0%
Computervision	20.8	2.0	15.6	283	1.6%	.2%	3.5%	.2%
Daisy	19.8	3.1	11.8	253	1.5%	.4%	2.7%	.2%
Futurenet	17.9	.0	15.7	0	1.4%	.0%	3.5%	.0%
Personal CAD Systems	15.9	.0	13.9	0	1.2%	.0%	3.1%	.0%
Andor	14.0	6.7	6.6	500	1.1%	.8%	1.5%	.3%
Hakuto	12.7	5.4	6.7	376	1.0%	.7%	1.5%	.2%
Fujitsu	12.4	.0	11.1	0	.9%	.0%	2.5%	.0%
Toshiba	11.4	4.1	6.1	.0	.9%	.5%	1.4%	.0%
Hitachi Seiko	10.0	6.0	4.0	150	.8%	.7%	.9%	.1%
Wacom	9.0	4.3	4.3	700	.7%	.5%	1.0%	.4%
Ziegler Instruments GmbH	8.5	.0	8.5	0	.6%	.0%	1.9%	.0%
Intergraph	8.2	.0	6.4	0	.6%	.0%	1.4%	.0%
Cadnetix	8.0	.0	7.1	0	.6%	.0%	1.6%	.0%
View Logic	7.8	.0	7.2	0	.6%	.0%	1.6%	.0%
Versacad	6.8	.0	6.7	0	.5%	.0%	1.5%	.0%
Cadkey	6.8	.0	6.8	0	.5%	.0%	1.5%	.0%
Generic Software	6.3	.0	6.3	0	.5%	.0%	1.4%	.0%
Case Technology	6.1	.0	6.1	0	.5%	.0%	1.4%	.0%
EESOF	6.0	.0	6.0	0	.4%	.0%	1.3%	.0%
Uchida Yoko	5.9	4.0	1.3	125	.4%	.5%	.3%	.1%
American Small Business Comput	5.8	.0	5.8	0	.4%	.0%	1.3%	.0%
Altera	5.7	.0	5.0	0	.4%	.0%	1.1%	.0%
Aries Technology	5.2	1.7	3.1	150	.4%	.2%	.7%	.1%
Mitsubishi Electric	4.8	2.6	1.7	144	.4%	.3%	.4%	.1%

(Continued)



# Market Share

TABLE NUMBER: 1  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Control Data	4.6	2.4	1.1	370	.3%	.3%	.2%	.2%
Datagraph	4.5	2.8	1.5	2,200	.3%	.3%	.3%	1.3%
Valid	4.0	.7	2.4	29	.3%	.1%	.5%	.0%
Graphtec	3.6	2.1	1.4	54	.3%	.3%	.3%	.0%
Robocom	3.5	.0	3.5	0	.3%	.0%	.8%	.0%
Info. Services Int'l Dentsu	3.0	.4	2.3	15	.2%	.0%	.5%	.0%
Orcad	2.9	.0	2.8	0	.2%	.0%	.6%	.0%
CADAM	2.7	1.4	1.1	39	.2%	.2%	.2%	.0%
Nitachi Zosen	2.6	1.0	1.6	131	.2%	.1%	.3%	.1%
Innovative Data Design	2.5	.0	2.5	0	.2%	.0%	.6%	.0%
Aptos	2.5	.0	2.5	0	.2%	.0%	.6%	.0%
Skok Systems	2.5	.0	1.8	0	.2%	.0%	.4%	.0%
CAD Software	2.5	.0	2.5	0	.2%	.0%	.6%	.0%
Manufacturing Consultants	2.3	.0	1.9	0	.2%	.0%	.4%	.0%
Foresight Resources	2.2	.0	2.2	0	.2%	.0%	.5%	.0%
Cascade Graphics	2.0	.0	1.6	0	.2%	.0%	.4%	.0%
CPU	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
ERDAS	2.0	1.0	1.0	50	.2%	.1%	.2%	.0%
Micro CAD/CAM	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
Terr-Mar	2.0	1.0	1.0	50	.2%	.1%	.2%	.0%
Visionics	2.0	.0	2.0	0	.2%	.0%	.4%	.0%
Analog Design Tools	1.9	.1	1.8	24	.1%	.0%	.4%	.0%
ISICAD	1.9	.0	1.8	58	.1%	.0%	.4%	.0%
Microsim	1.9	.0	1.9	0	.1%	.0%	.4%	.0%
ESRI	1.8	.0	1.7	0	.1%	.0%	.4%	.0%
Challenger Software	1.8	.0	1.8	0	.1%	.0%	.4%	.0%
Calma	1.6	1.0	.5	78	.1%	.1%	.1%	.0%
Bentley	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Megacad	1.5	.0	1.5	0	.1%	.0%	.3%	.0%
Prime	1.5	.0	1.1	0	.1%	.0%	.2%	.0%
Geographic Data Technologies	1.4	.0	1.4	0	.1%	.0%	.3%	.0%
Swanson Analysis	1.4	.0	1.4	0	.1%	.0%	.3%	.0%
Accugraph	1.3	.3	.9	52	.1%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Algor Interactive Systems	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
CISI	1.2	.5	.6	39	.1%	.1%	.1%	.0%
Evolution Computing	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.1%	.0%	.3%	.0%
MacNeal-Schwendler	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Geobased Systems	1.0	.3	.6	28	.1%	.0%	.1%	.0%
Mapinfo	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
Point Line	1.0	.0	1.0	.0	.1%	.0%	.2%	.0%
The Great Softwestern Co.	1.0	.0	1.0	0	.1%	.0%	.2%	.0%
American Int'l Systems	.9	.5	.4	57	.1%	.1%	.1%	.0%
Omaton	.8	.0	.8	0	.1%	.0%	.2%	.0%
CAD Lab	.7	.0	.5	0	.0%	.0%	.1%	.0%
Vamp	.6	.0	.6	.0	.0%	.0%	.1%	.0%
Zycor	.5	.0	.5	0	.0%	.0%	.1%	.0%
NHB Systems	.5	.0	.4	0	.0%	.0%	.1%	.0%
Strategic Locations Planning	.5	.0	.5	0	.0%	.0%	.1%	.0%
Ithaca Software	.5	.0	.5	0	.0%	.0%	.1%	.0%
Simucad	.4	.0	.4	0	.0%	.0%	.1%	.0%
MATC CAD	.4	.0	.4	0	.0%	.0%	.1%	.0%
Albert Nestler	.4	.3	.1	25	.0%	.0%	.0%	.0%
BV Engineering	.4	.0	.4	0	.0%	.0%	.1%	.0%
Dennis Klein & Associates	.4	.0	.4	0	.0%	.0%	.1%	.0%
DFI	.3	.2	.2	12	.0%	.0%	.0%	.0%
Marconi	.3	.2	.1	9	.0%	.0%	.0%	.0%
TT Solutions	.2	.1	.1	5	.0%	.0%	.0%	.0%
Geomath	.1	.0	.1	0	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 1 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	150.3	121.4	23.9	21,661	11.4%	15.2%	5.4%	12.9%
All Companies	1,323.1	800.9	446.2	167,995	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	1,007.9	673.9	284.0	157,724	76.2%	84.1%	63.6%	93.9%
All Asian-Based Companies	266.2	121.3	123.7	7,878	20.1%	15.2%	27.7%	4.7%
All European-Based Companies	49.0	5.6	38.6	2,394	3.7%	.7%	8.6%	1.4%
All Hardware Companies	604.7	593.2	.0	149,683	45.7%	74.1%	.0%	89.1%
All Turnkey & SW Companies	718.4	207.7	446.2	18,312	54.3%	25.9%	100.0%	10.9%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 2  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	74.2	90,000	34,200	55,800	16.6%	21.0%	13.9%	30.6%
IBM	32.4	7,600	0	7,600	7.3%	1.8%	.0%	4.2%
Racal-Redac	22.4	4,250	0	4,250	5.0%	1.0%	.0%	2.3%
Hitachi	21.2	1,600	0	1,600	4.8%	.4%	.0%	.9%
Futurenet	15.7	650	0	650	3.5%	.2%	.0%	.4%
Computervision	15.6	3,600	0	3,600	3.5%	.8%	.0%	2.0%
NEC	15.6	1,300	0	1,300	3.5%	.3%	.0%	.7%
Personal CAD Systems	13.9	1,600	0	1,600	3.1%	.4%	.0%	.9%
Daisy	11.8	750	0	750	2.7%	.2%	.0%	.4%
Fujitsu	11.1	2,760	0	2,760	2.5%	.6%	.0%	1.5%
Mutoh Industries	9.9	1,130	0	1,130	2.2%	.3%	.0%	.6%
Ziegler Instruments GmbH	8.5	3,200	0	3,200	1.9%	.7%	.0%	1.8%
View Logic	7.2	2,500	0	2,500	1.6%	.6%	.0%	1.4%
Cadnetix	7.1	990	0	990	1.6%	.2%	.0%	.5%
Cadkey	6.8	19,000	0	19,000	1.5%	4.4%	.0%	10.4%
Hakuto	6.7	750	0	750	1.5%	.2%	.0%	.4%
Versacad	6.7	14,000	0	14,000	1.5%	3.3%	.0%	7.7%
Andor	6.6	300	0	300	1.5%	.1%	.0%	.2%
Intergraph	6.4	2,800	0	2,800	1.4%	.7%	.0%	1.5%
Generic Software	6.3	84,600	84,600	0	1.4%	19.7%	34.3%	.0%
Toshiba	6.1	500	0	500	1.4%	.1%	.0%	.3%
Case Technology	6.1	2,200	0	2,200	1.4%	.5%	.0%	1.2%
EESOF	6.0	600	0	600	1.3%	.1%	.0%	.3%
American Small Business Comput	5.8	47,000	47,000	0	1.3%	11.0%	19.1%	.0%
Altera	5.0	1,000	0	1,000	1.1%	.2%	.0%	.5%
Wacom	4.3	700	0	700	1.0%	.2%	.0%	.4%
Hitachi Seiko	4.0	150	0	150	.9%	.0%	.0%	.1%
Robocom	3.5	4,500	0	4,500	.8%	1.0%	.0%	2.5%
Aries Technology	3.1	150	0	150	.7%	.0%	.0%	.1%
Orcad	2.8	9,270	9,270	0	.6%	2.2%	3.8%	.0%
Innovative Data Design	2.5	24,000	24,000	0	.6%	5.6%	9.7%	.0%
Aptos	2.5	900	99	801	.6%	.2%	.0%	.4%
CAD Software	2.5	1,300	0	1,300	.6%	.3%	.0%	.7%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Valid	2.4	250	0	250	.5%	.1%	.0%	.1%
Info. Services Int'l Dentsu	2.3	115	0	115	.5%	.0%	.0%	.1%
Foresight Resources	2.2	11,000	11,000	0	.5%	2.6%	4.5%	.0%
CPU	2.0	1,000	0	1,000	.4%	.2%	.0%	.5%
Micro CAD/CAM	2.0	4,000	0	4,000	.4%	.9%	.0%	2.2%
Visionics	2.0	1,200	0	1,200	.4%	.3%	.0%	.7%
Manufacturing Consultants	1.9	950	0	950	.4%	.2%	.0%	.5%
Microsim	1.9	1,200	0	1,200	.4%	.3%	.0%	.7%
ISICAD	1.8	1,900	0	1,900	.4%	.4%	.0%	1.0%
Skok Systems	1.8	700	0	700	.4%	.2%	.0%	.4%
Analog Design Tools	1.8	300	0	300	.4%	.1%	.0%	.2%
Challenger Software	1.8	4,000	4,000	0	.4%	.9%	1.6%	.0%
ESRI	1.7	400	0	400	.4%	.1%	.0%	.2%
Mitsubishi Electric	1.7	145	0	145	.4%	.0%	.0%	.1%
Cascade Graphics	1.6	1,000	0	1,000	.4%	.2%	.0%	.5%
Hitachi Zosen	1.6	130	0	130	.3%	.0%	.0%	.1%
Bentley	1.5	1,000	0	1,000	.3%	.2%	.0%	.5%
Megacad	1.5	1,700	0	1,700	.3%	.4%	.0%	.9%
Datagraph	1.5	2,200	0	2,200	.3%	.5%	.0%	1.2%
Graphtec	1.4	90	0	90	.3%	.0%	.0%	.0%
Geographic Data Technologies	1.4	280	0	280	.3%	.1%	.0%	.2%
Swanson Analysis	1.4	500	0	500	.3%	.1%	.0%	.3%
Uchida Yoko	1.3	125	0	125	.3%	.0%	.0%	.1%
Algor Interactive Systems	1.2	1,000	1,000	0	.3%	.2%	.4%	.0%
Evolution Computing	1.2	25,400	24,892	508	.3%	5.9%	10.1%	.3%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	.3%	.5%	.0%	1.3%
Prime	1.1	270	0	270	.2%	.1%	.0%	.1%
Control Data	1.1	225	0	225	.2%	.1%	.0%	.1%
CADAM	1.1	7,000	0	7,000	.2%	1.6%	.0%	3.8%
MacNeal-Schwendler	1.0	500	0	500	.2%	.1%	.0%	.3%
ERDAS	1.0	40	0	40	.2%	.0%	.0%	.0%
Mapinfo	1.0	100	0	100	.2%	.0%	.0%	.1%
Point Line	1.0	400	0	400	.2%	.1%	.0%	.2%

(Continued)

# Market Share

TABLE NUMBER: 2  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Terr-Mar	1.0	50	0	50	.2%	.0%	.0%	.0%
The Great Softwestern Co.	1.0	725	0	725	.2%	.2%	.0%	.4%
Accugraph	.9	900	0	900	.2%	.2%	.0%	.5%
Omaton	.8	1,600	0	1,600	.2%	.4%	.0%	.9%
Vamp	.6	2,400	2,400	0	.1%	.6%	1.0%	.0%
Geobased Systems	.6	35	0	35	.1%	.0%	.0%	.0%
CISI	.6	260	0	260	.1%	.1%	.0%	.1%
CAD Lab	.5	800	0	800	.1%	.2%	.0%	.4%
Strategic Locations Planning	.5	35	0	35	.1%	.0%	.0%	.0%
Calma	.5	200	0	200	.1%	.0%	.0%	.1%
Zycor	.5	50	0	50	.1%	.0%	.0%	.0%
Ithaca Software	.5	250	0	250	.1%	.1%	.0%	.1%
NHB Systems	.4	70	0	70	.1%	.0%	.0%	.0%
Simucad	.4	400	0	400	.1%	.1%	.0%	.2%
BV Engineering	.4	1,500	1,500	0	.1%	.3%	.6%	.0%
Dennis Klein & Associates	.4	125	0	125	.1%	.0%	.0%	.1%
American Int'l Systems	.4	2,000	2,000	0	.1%	.5%	.8%	.0%
MATC CAD	.4	555	555	0	.1%	.1%	.2%	.0%
DFI	.2	115	0	115	.0%	.0%	.0%	.1%
Marconi	.1	100	0	100	.0%	.0%	.0%	.1%
Albert Nestler	.1	25	0	25	.0%	.0%	.0%	.0%
TT Solutions	.1	10	0	10	.0%	.0%	.0%	.0%
Geomath	.1	10	0	10	.0%	.0%	.0%	.0%
Kork Systems	.0	15	0	15	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 2 (Continued)  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Other Companies	23.9	9,468	3	9,466	5.4%	2.2%	.0%	5.2%
All Companies	446.2	428,768	246,519	182,250	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 July 1988

# Market Share

TABLE NUMBER: 3  
 TITLE: 1987 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	226.3	179.1	29.2	30,700	37.2%	47.1%	15.5%	42.9%
Apple Computer	46.6	46.6	.0	16,744	7.7%	12.3%	.0%	23.4%
Hitachi	42.1	22.7	15.1	1,143	6.9%	6.0%	8.1%	1.6%
Autodesk	30.7	.0	30.7	0	5.0%	.0%	16.3%	.0%
Zenith	29.7	26.7	.0	9,000	4.9%	7.0%	.0%	12.6%
NEC	22.1	10.0	10.0	798	3.6%	2.6%	5.3%	1.1%
Nutop Industries	21.6	11.7	7.8	922	3.5%	3.1%	4.1%	1.3%
Computervision	13.8	1.3	10.4	187	2.3%	.4%	5.5%	.3%
Andor	11.9	5.7	5.6	425	2.0%	1.5%	3.0%	.6%
Nakuto	11.5	4.9	6.0	338	1.9%	1.3%	3.2%	.5%
Toshiba	11.4	4.1	6.1	.0	1.9%	1.1%	3.3%	.0%
Hitachi Seiko	10.0	6.0	4.0	150	1.6%	1.6%	2.1%	.2%
Cadkey	6.8	.0	6.8	0	1.1%	.0%	3.6%	.0%
Compaq	6.8	6.8	.0	1,910	1.1%	1.8%	.0%	2.7%
Fujitsu	5.7	.0	5.1	0	.9%	.0%	2.7%	.0%
Aries Technology	5.2	1.7	3.1	150	.9%	.4%	1.7%	.2%
Mitsubishi Electric	4.8	2.6	1.7	144	.8%	.7%	.9%	.2%
American Small Business Comput	4.5	.0	4.5	0	.7%	.0%	2.4%	.0%
Graphtec	3.6	2.1	1.4	54	.6%	.6%	.8%	.1%
Uchida Yoko	3.3	2.2	.7	83	.5%	.6%	.4%	.1%
Info. Services Int'l Dentsu	3.0	.4	2.3	15	.5%	.1%	1.2%	.0%
Hitachi Zosen	2.6	1.0	1.6	131	.4%	.3%	.8%	.2%
Generic Software	2.5	.0	2.5	0	.4%	.0%	1.3%	.0%
Intergraph	2.5	.0	1.9	0	.4%	.0%	1.0%	.0%
Ziegler Instruments GmbH	2.5	.0	2.5	0	.4%	.0%	1.3%	.0%
Manufacturing Consultants	2.3	.0	1.9	0	.4%	.0%	1.0%	.0%
Datagraph	2.3	1.3	.9	1,014	.4%	.3%	.5%	1.4%
Versacad	2.1	.0	2.0	0	.3%	.0%	1.1%	.0%
Robocom	2.0	.0	2.0	0	.3%	.0%	1.1%	.0%
CADAM	1.8	.8	.8	23	.3%	.2%	.4%	.0%
Prime	1.5	.0	1.1	0	.2%	.0%	.6%	.0%
Challenger Software	1.4	.0	1.4	0	.2%	.0%	.7%	.0%

(Continued)



# Market Share

TABLE NUMBER: 3 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Mksts Shipped	Revenue	Hardware Revenue	Software Revenue	Mksts Shipped
Micro CAD/CAM	1.4	.0	1.4	0	.2%	.0%	.7%	.0%
Swanson Analysis	1.4	.0	1.4	0	.2%	.0%	.7%	.0%
Skok Systems	1.3	.0	.9	0	.2%	.0%	.5%	.0%
Algor Interactive Systems	1.2	.0	1.2	0	.2%	.0%	.6%	.0%
CISI	1.2	.5	.6	39	.2%	.1%	.3%	.1%
Accugraph	1.0	.3	.7	43	.2%	.1%	.4%	.1%
MacNeal-Schwendler	1.0	.0	1.0	0	.2%	.0%	.5%	.0%
Foresight Resources	.9	.0	.9	0	.1%	.0%	.5%	.0%
American Int'l Systems	.8	.4	.3	48	.1%	.1%	.2%	.1%
Evolution Computing	.8	.0	.8	0	.1%	.0%	.4%	.0%
Bentley	.8	.0	.8	0	.1%	.0%	.4%	.0%
Wacom	.7	.3	.3	56	.1%	.1%	.2%	.1%
Cascade Graphics	.6	.0	.5	0	.1%	.0%	.3%	.0%
Innovative Data Design	.5	.0	.5	0	.1%	.0%	.3%	.0%
Calma	.5	.3	.1	23	.1%	.1%	.1%	.0%
Ithaca Software	.5	.0	.5	0	.1%	.0%	.2%	.0%
MATC CAD	.4	.0	.4	0	.1%	.0%	.2%	.0%
Albert Nestler	.4	.3	.1	25	.1%	.1%	.0%	.0%
CAD Lab	.3	.0	.3	0	.1%	.0%	.1%	.0%
Megacad	.3	.0	.3	0	.0%	.0%	.2%	.0%
DFI	.2	.1	.1	8	.0%	.0%	.1%	.0%
Other Companies	47.5	40.6	5.8	7,381	7.8%	10.7%	3.1%	10.3%
All Companies	608.2	380.5	187.8	71,556	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	425.4	295.8	103.9	65,527	69.9%	77.8%	55.3%	91.6%
All Asian-Based Companies	170.8	80.9	76.3	4,835	28.1%	21.3%	40.6%	6.8%
All European-Based Companies	12.0	3.8	7.6	1,194	2.0%	1.0%	4.0%	1.7%
All Hardware Companies	239.0	232.3	.0	59,188	39.3%	61.0%	.0%	82.7%
All Turnkey & SW Companies	369.2	148.2	187.8	12,367	60.7%	39.0%	100.0%	17.3%

Source: Dataquest  
 July 1988

# Market Share

TABLE NUMBER: 4  
 TITLE: 1987 Software Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Market Share			
	Software Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	30.7	37,247	14,154	23,093
IBM	29.2	6,836	0	6,836
Hitachi	15.1	1,142	0	1,142
Computervision	10.4	2,386	0	2,386
NEC	10.0	833	0	833
Mutoh Industries	7.8	887	0	887
Cadkey	6.8	19,000	0	19,000
Toshiba	6.1	500	0	500
Hakuto	6.0	674	0	674
Andor	5.6	255	0	255
Fujitsu	5.1	1,270	0	1,270
American Small Business Comput	4.5	36,098	36,098	0
Hitachi Seiko	4.0	150	0	150
Aries Technology	3.1	150	0	150
Generic Software	2.5	33,706	33,706	0
Ziegler Instruments GmbH	2.5	927	0	927
Info. Services Int'l Dentsu	2.3	115	0	115
Robocom	2.0	2,605	0	2,605
Versacad	2.0	4,179	0	4,179
Intergraph	1.9	838	0	838
Manufacturing Consultants	1.9	950	0	950
Mitsubishi Electric	1.7	145	0	145
Hitachi Zosen	1.6	130	0	130
Graphtec	1.4	90	0	90
Challenger Software	1.4	3,200	3,200	0
Micro CAD/CAM	1.4	2,800	0	2,800
Swanson Analysis	1.4	500	0	500
Algor Interactive Systems	1.2	1,000	1,000	0
Prime	1.1	270	0	270
MacNeal-Schwendler	1.0	500	0	500
Datagraph	.9	1,299	0	1,299
Foresight Resources	.9	4,400	4,400	0

(Continued)

# Market Share

TABLE NUMBER: 4 (Continued)  
 TITLE: 1987 Software Market Share  
 APPLICATION: Mechanical  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Skok Systems	.9	350	0	350	.5%	.2%	.0%	.4%
CADAM	.8	5,423	0	5,423	.4%	2.7%	.0%	6.4%
Evolution Computing	.8	16,499	16,169	330	.4%	8.2%	14.0%	.4%
Bentley	.8	500	0	500	.4%	.2%	.0%	.6%
Uchida Yoko	.7	71	0	71	.4%	.0%	.0%	.1%
Accugraph	.7	745	0	745	.4%	.4%	.0%	.9%
CISI	.6	260	0	260	.3%	.1%	.0%	.3%
Innovative Data Design	.5	4,857	4,857	0	.3%	2.4%	4.2%	.0%
Cascade Graphics	.5	297	0	297	.3%	.1%	.0%	.3%
Ithaca Software	.5	250	0	250	.2%	.1%	.0%	.3%
MATC CAD	.4	555	555	0	.2%	.3%	.5%	.0%
Wacom	.3	56	0	56	.2%	.0%	.0%	.1%
American Int'l Systems	.3	1,730	1,730	0	.2%	.9%	1.5%	.0%
Megacad	.3	340	0	340	.2%	.2%	.0%	.4%
CAD Lab	.3	385	0	385	.1%	.2%	.0%	.5%
Calma	.1	58	0	58	.1%	.0%	.0%	.1%
DFI	.1	74	0	74	.1%	.0%	.0%	.1%
Albert Nestler	.1	25	0	25	.0%	.0%	.0%	.0%
Other Companies	5.8	3,699	2	3,698	3.1%	1.8%	.0%	4.3%
All Companies	187.8	201,257	115,871	85,386	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 July 1988

# Market Share

TABLE NUMBER:

5

TITLE: 1987 Market Share  
 APPLICATION: Facilities Design  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total Hardware		Software		Wkstns Shipped	Market Share		Wkstns Shipped
	Revenue	Revenue	Revenue	Revenue		Revenue	Revenue	
Compaq	102.0	102.0	.0	28,650	28.5%	36.9%	.0%	43.3%
IBM	78.7	74.5	1.3	15,103	22.0%	26.9%	1.9%	22.8%
Apple Computer	31.7	31.7	.0	11,373	8.9%	11.4%	.0%	17.2%
Autodesk	23.3	.0	23.3	0	6.5%	.0%	33.0%	.0%
Hitachi	10.6	5.7	3.8	289	3.0%	2.1%	5.4%	.4%
NEC	9.0	4.0	4.0	202	2.5%	1.5%	5.7%	.3%
Fujitsu	5.6	.0	5.0	0	1.6%	.0%	7.1%	.0%
Mutoh Industries	4.3	2.4	1.6	150	1.2%	.8%	2.2%	.2%
Intergraph	3.6	.0	2.8	0	1.0%	.0%	3.9%	.0%
Zenith	3.3	3.0	.0	1,000	.9%	1.1%	.0%	1.5%
Computervision	2.9	.3	2.2	40	.8%	.1%	3.1%	.1%
Generic Software	2.8	.0	2.8	0	.8%	.0%	4.0%	.0%
Versacad	2.6	.0	2.6	0	.7%	.0%	3.6%	.0%
CPU	2.0	.0	2.0	0	.6%	.0%	2.8%	.0%
ISICAD	1.9	.0	1.8	58	.5%	.0%	2.5%	.1%
Innovative Data Design	1.6	.0	1.6	0	.5%	.0%	2.3%	.0%
Hakuto	1.3	.5	.7	38	.4%	.2%	1.0%	.1%
Skok Systems	1.3	.0	.9	0	.4%	.0%	1.2%	.0%
Megacad	1.2	.0	1.2	0	.3%	.0%	1.7%	.0%
Point Line	1.0	.0	1.0	.0	.3%	.0%	1.4%	.0%
Ziegler Instruments GmbH	.9	.0	.9	0	.3%	.0%	1.3%	.0%
CADAM	.9	.6	.2	16	.3%	.2%	.3%	.0%
Robocom	.9	.0	.9	0	.2%	.0%	1.3%	.0%
American Small Business Comput	.9	.0	.9	0	.2%	.0%	1.2%	.0%
Foresight Resources	.8	.0	.8	0	.2%	.0%	1.1%	.0%
Micro CAD/CAM	.6	.0	.6	0	.2%	.0%	.9%	.0%
Uacom	.5	.3	.3	42	.2%	.1%	.4%	.1%
Bentley	.5	.0	.5	0	.1%	.0%	.6%	.0%
Datagraph	.5	.3	.1	214	.1%	.1%	.2%	.3%
Calms	.4	.3	.1	21	.1%	.1%	.2%	.0%
Evolution Computing	.4	.0	.4	0	.1%	.0%	.6%	.0%
Challenger Software	.4	.0	.4	0	.1%	.0%	.5%	.0%

(Continued)

# Market Share

TABLE NUMBER: 5 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: Facilities Design  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					..... Market Share .....			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
CAD Lab	.3	.0	.3	0	.1%	.0%	.4%	.0%
TT Solutions	.2	.1	.1	5	.1%	.0%	.1%	.0%
Accugraph	.2	.1	.2	9	.1%	.0%	.2%	.0%
DFI	.1	.1	.1	4	.0%	.0%	.1%	.0%
Cascade Graphics	.1	.0	.1	0	.0%	.0%	.1%	.0%
American Int'l Systems	.1	.1	.0	6	.0%	.0%	.0%	.0%
Other Companies	58.0	51.1	5.3	8,889	16.2%	18.4%	7.5%	13.4%
All Companies	357.3	276.8	70.6	66,109	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	301.5	252.6	43.2	64,404	84.4%	91.3%	61.2%	97.4%
All Asian-Based Companies	53.0	23.8	25.0	1,486	14.8%	8.6%	35.5%	2.2%
All European-Based Companies	2.9	.4	2.3	220	.8%	.1%	3.3%	.3%
All Hardware Companies	251.8	248.8	.0	63,990	70.5%	89.9%	.0%	96.8%
All Turnkey & SW Companies	105.5	28.0	70.6	2,119	29.5%	10.1%	100.0%	3.2%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 6  
 TITLE: 1987 Software Market Share  
 APPLICATION: Facilities Design  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	23.3	28,269	10,742	17,527	33.0%	22.7%	12.7%	43.8%
Fujitsu	5.0	1,242	0	1,242	7.1%	1.0%	.0%	3.1%
NEC	4.0	338	0	338	5.7%	.3%	.0%	.8%
Hitachi	3.8	288	0	288	5.4%	.2%	.0%	.7%
Generic Software	2.8	38,003	38,003	0	4.0%	30.5%	44.8%	.0%
Intergraph	2.8	1,220	0	1,220	3.9%	1.0%	.0%	3.0%
Versacad	2.6	5,349	0	5,349	3.6%	4.3%	.0%	13.4%
Computervision	2.2	509	0	509	3.1%	.4%	.0%	1.3%
CPU	2.0	1,000	0	1,000	2.8%	.8%	.0%	2.5%
ISICAD	1.8	1,900	0	1,900	2.5%	1.5%	.0%	4.7%
Innovative Data Design	1.6	15,429	15,429	0	2.3%	12.4%	18.2%	.0%
Mutoh Industries	1.6	178	0	178	2.2%	.1%	.0%	.4%
IBM	1.3	307	0	307	1.9%	.2%	.0%	.8%
Megacad	1.2	1,360	0	1,360	1.7%	1.1%	.0%	3.4%
Point Line	1.0	400	0	400	1.4%	.3%	.0%	1.0%
Ziegler Instruments GmbH	.9	354	0	354	1.3%	.3%	.0%	.9%
Robocom	.9	1,148	0	1,148	1.3%	.9%	.0%	2.9%
Skok Systems	.9	350	0	350	1.2%	.3%	.0%	.9%
American Small Business Comput	.9	7,026	7,026	0	1.2%	5.6%	8.3%	.0%
Foresight Resources	.8	3,850	3,850	0	1.1%	3.1%	4.5%	.0%
Hakuto	.7	76	0	76	1.0%	.1%	.0%	.2%
Micro CAD/CAM	.6	1,200	0	1,200	.9%	1.0%	.0%	3.0%
Bentley	.5	300	0	300	.6%	.2%	.0%	.7%
Evolution Computing	.4	8,901	8,723	178	.6%	7.1%	10.3%	.4%
Challenger Software	.4	800	800	0	.5%	.6%	.9%	.0%
CAD Lab	.3	415	0	415	.4%	.3%	.0%	1.0%
Wacom	.3	43	0	43	.4%	.0%	.0%	.1%
CADAM	.2	1,577	0	1,577	.3%	1.3%	.0%	3.9%
Accugraph	.2	155	0	155	.2%	.1%	.0%	.4%
Datagraph	.1	207	0	207	.2%	.2%	.0%	.5%
Calma	.1	50	0	50	.2%	.0%	.0%	.1%
Cascade Graphics	.1	51	0	51	.1%	.0%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 6 (Continued)  
 TITLE: 1987 Software Market Share  
 APPLICATION: Facilities Design  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Software Revenue	Software Units	Units < \$500	Units > \$500	Software Revenue	Software Units	Units < \$500	Units > \$500
*****	*****	*****	*****	*****	*****	*****	*****	*****
TT Solutions	.1	10	0	10	.1%	.0%	.0%	.0%
DFI	.1	41	0	41	.1%	.0%	.0%	.1%
American Int'l Systems	.0	162	162	0	.0%	.1%	.2%	.0%
Other Companies	5.3	2,242	2	2,239	7.5%	1.8%	.0%	5.6%
All Companies	70.6	124,748	84,737	40,012	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 7  
 TITLE: 1987 Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	8.9	7.2	1.0	1,289	25.2%	49.1%	5.1%	43.6%
Autodesk	5.3	.0	5.3	0	15.0%	.0%	27.7%	.0%
Apple Computer	2.6	2.7	.0	948	7.5%	18.2%	.0%	32.1%
ERDAS	2.0	1.0	1.0	50	5.6%	7.0%	5.2%	1.7%
Terr-Mar	2.0	1.0	1.0	50	5.6%	6.9%	5.2%	1.7%
Intergraph	2.0	.0	1.5	0	5.6%	.0%	8.1%	.0%
ESRI	1.8	.0	1.7	0	5.0%	.0%	9.0%	.0%
Nutah Industries	1.6	.9	.6	55	4.5%	5.8%	3.0%	1.8%
Geographic Data Technologies	1.4	.0	1.4	0	4.0%	.0%	7.3%	.0%
Geobased Systems	1.0	.3	.6	28	2.8%	2.3%	3.1%	.9%
Mapinfo	1.0	.0	1.0	0	2.8%	.0%	5.2%	.0%
Versacad	.8	.0	.8	0	2.2%	.0%	4.0%	.0%
Ziegler Instruments GmbH	.7	.0	.7	0	1.9%	.0%	3.5%	.0%
Zycor	.5	.0	.5	0	1.4%	.0%	2.5%	.0%
Strategic Locations Planning	.5	.0	.5	0	1.4%	.0%	2.6%	.0%
Robocom	.5	.0	.5	0	1.4%	.0%	2.5%	.0%
Datagraph	.5	.3	.1	271	1.3%	2.3%	.4%	9.2%
Dennis Klein & Associates	.4	.0	.4	0	1.1%	.0%	2.0%	.0%
Generic Software	.3	.0	.3	0	.9%	.0%	1.7%	.0%
Bentley	.3	.0	.3	0	.8%	.0%	1.6%	.0%
Computervision	.2	.0	.2	3	.6%	.0%	.8%	.1%
Innovative Data Design	.1	.0	.1	0	.4%	.0%	.7%	.0%
Foresight Resources	.1	.0	.1	0	.3%	.0%	.6%	.0%
American Small Business Comput	.1	.0	.1	0	.2%	.0%	.4%	.0%
Geomath	.1	.0	.1	0	.1%	.0%	.3%	.0%
American Int'l Systems	.0	.0	.0	3	.1%	.1%	.1%	.1%
Kork Systems	.0	.0	.0	0	.1%	.0%	.2%	.0%

(Continued)



# Market Share

TABLE NUMBER: 7 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company *****	----- Market Share -----							
	Total Revenue *****	Hardware Revenue *****	Software Revenue *****	Wkstns Shipped *****	Total Revenue *****	Hardware Revenue *****	Software Revenue *****	Wkstns Shipped *****
Other Companies	.8	1.2	.0	259	2.2%	8.2%	.0%	8.8%
All Companies	35.4	14.6	19.1	2,956	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	32.2	13.4	17.3	2,630	91.0%	91.9%	90.6%	89.0%
All Asian-Based Companies	1.6	.9	.6	55	4.5%	5.8%	3.0%	1.8%
All European-Based Companies	1.6	.3	1.2	271	4.5%	2.3%	6.4%	9.2%
All Hardware Companies	9.5	9.1	.0	2,301	26.7%	62.7%	.0%	77.8%
All Turnkey & SW Companies	26.0	5.4	19.1	655	73.3%	37.3%	100.0%	22.2%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 8  
 TITLE: 1987 Software Market Share  
 APPLICATION: Mapping  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	5.3	6,430	2,444	3,987	27.7%	35.0%	26.6%	43.4%
ESRI	1.7	400	0	400	9.0%	2.2%	.0%	4.4%
Intergraph	1.5	676	0	676	8.1%	3.7%	.0%	7.4%
Geographic Data Technologies	1.4	280	0	280	7.3%	1.5%	.0%	3.0%
ERDAS	1.0	40	0	40	5.2%	.2%	.0%	.4%
Mapinfo	1.0	100	0	100	5.2%	.5%	.0%	1.1%
Terr-Mar	1.0	50	0	50	5.2%	.3%	.0%	.5%
IBM	1.0	230	0	230	5.1%	1.2%	.0%	2.5%
Versacad	.8	1,609	0	1,609	4.0%	8.7%	.0%	17.5%
Ziegler Instruments GmbH	.7	253	0	253	3.5%	1.4%	.0%	2.8%
Geobased Systems	.6	35	0	35	3.1%	.2%	.0%	.4%
Mutoh Industries	.6	65	0	65	3.0%	.4%	.0%	.7%
Strategic Locations Planning	.5	35	0	35	2.6%	.2%	.0%	.4%
Robocom	.5	619	0	619	2.5%	3.4%	.0%	6.7%
Zycor	.5	50	0	50	2.5%	.3%	.0%	.5%
Dennis Klein & Associates	.4	125	0	125	2.0%	.7%	.0%	1.4%
Generic Software	.3	4,297	4,297	0	1.7%	23.4%	46.7%	.0%
Bentley	.3	200	0	200	1.6%	1.1%	.0%	2.2%
Computervision	.2	35	0	35	.8%	.2%	.0%	.4%
Innovative Data Design	.1	1,238	1,238	0	.7%	6.7%	13.5%	.0%
Foresight Resources	.1	550	550	0	.6%	3.0%	6.0%	.0%
American Small Business Comput	.1	565	565	0	.4%	3.1%	6.1%	.0%
Datagraph	.1	103	0	103	.4%	.6%	.0%	1.1%
Geomath	.1	10	0	10	.3%	.1%	.0%	.1%
Kork Systems	.0	15	0	15	.2%	.1%	.0%	.2%
American Int'l Systems	.0	108	108	0	.1%	.6%	1.2%	.0%
Other Companies	.0	278	0	278	.0%	1.5%	.0%	3.0%
All Companies	19.1	18,396	9,202	9,195	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 9  
 TITLE: 1987 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	49.6	46.6	1.0	9,415	15.4%	36.1%	.6%	34.4%
Compaq	27.2	27.2	.0	7,640	8.4%	21.1%	.0%	27.9%
Racal-Redac	26.4	.1	22.4	0	8.2%	.0%	13.3%	.0%
Daisy	19.8	3.1	11.8	253	6.2%	2.4%	7.0%	.9%
Futurenet	17.9	.0	15.7	0	5.6%	.0%	9.3%	.0%
Personal CAD Systems	15.9	.0	13.9	0	4.9%	.0%	8.2%	.0%
Autodesk	14.9	.0	14.9	0	4.6%	.0%	8.8%	.0%
Cadnetix	8.0	.0	7.1	0	2.5%	.0%	4.2%	.0%
View Logic	7.8	.0	7.2	0	2.4%	.0%	4.3%	.0%
Wacom	7.7	3.7	3.7	602	2.4%	2.9%	2.2%	2.2%
Apple Computer	7.0	7.1	.0	2,527	2.2%	5.5%	.0%	9.2%
Mitachi	6.3	3.4	2.3	170	1.9%	2.6%	1.3%	.6%
Case Technology	6.1	.0	6.1	0	1.9%	.0%	3.6%	.0%
EESOF	6.0	.0	6.0	0	1.8%	.0%	3.5%	.0%
Altera	5.7	.0	5.0	0	1.8%	.0%	3.0%	.0%
Control Data	4.6	2.4	1.1	370	1.4%	1.9%	.7%	1.4%
Ziegler Instruments GmbH	4.4	.0	4.4	0	1.4%	.0%	2.6%	.0%
Valid	4.0	.7	2.4	29	1.2%	.5%	1.4%	.1%
Computervision	3.9	.4	2.9	54	1.2%	.3%	1.7%	.2%
NEC	3.5	1.6	1.6	299	1.1%	1.2%	.9%	1.1%
Orcad	2.9	.0	2.8	0	.9%	.0%	1.7%	.0%
Uchida Yoko	2.6	1.7	.6	42	.8%	1.3%	.3%	.2%
Aptos	2.5	.0	2.5	0	.8%	.0%	1.5%	.0%
CAD Software	2.5	.0	2.5	0	.8%	.0%	1.5%	.0%
Andor	2.1	1.0	1.0	75	.7%	.8%	.6%	.3%
Visionics	2.0	.0	2.0	0	.6%	.0%	1.2%	.0%
Analog Design Tools	1.9	.1	1.8	24	.6%	.1%	1.0%	.1%
Microsim	1.9	.0	1.9	0	.6%	.0%	1.1%	.0%
Versacad	1.4	.0	1.4	0	.4%	.0%	.8%	.0%
Datagraph	1.4	.9	.4	700	.4%	.7%	.2%	2.6%
Cascade Graphics	1.3	.0	1.0	0	.4%	.0%	.6%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.4%	.0%	.7%	.0%

(Continued)

# Market Share

TABLE NUMBER: 9 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					..... Market Share .....			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Fujitsu	1.1	.0	1.0	0	.3%	.0%	.6%	.0%
The Great Softwestern Co.	1.0	.0	1.0	0	.3%	.0%	.6%	.0%
Omaton	.8	.0	.8	0	.2%	.0%	.5%	.0%
Calma	.7	.4	.2	34	.2%	.3%	.1%	.1%
Generic Software	.6	.0	.6	0	.2%	.0%	.4%	.0%
Vamp	.6	.0	.6	.0	.2%	.0%	.4%	.0%
HMB Systems	.5	.0	.4	0	.2%	.0%	.3%	.0%
Foresight Resources	.4	.0	.4	0	.1%	.0%	.3%	.0%
Simucad	.4	.0	.4	0	.1%	.0%	.3%	.0%
American Small Business Comput	.4	.0	.4	0	.1%	.0%	.2%	.0%
BV Engineering	.4	.0	.4	0	.1%	.0%	.2%	.0%
Marconi	.3	.2	.1	9	.1%	.2%	.1%	.0%
Innovative Data Design	.3	.0	.3	0	.1%	.0%	.2%	.0%
Intergraph	.2	.0	.2	0	.1%	.0%	.1%	.0%
Robocom	.1	.0	.1	0	.0%	.0%	.1%	.0%
Other Companies	44.1	28.5	13.4	5,132	13.7%	22.1%	7.9%	18.7%
All Companies	322.1	129.1	168.7	27,375	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	248.8	112.1	119.5	25,164	77.2%	86.8%	70.8%	91.9%
All Asian-Based Companies	40.8	15.9	21.8	1,502	12.7%	12.3%	12.9%	5.5%
All European-Based Companies	32.6	1.1	27.5	709	10.1%	.9%	16.3%	2.6%
All Hardware Companies	104.5	103.0	.0	24,204	32.4%	79.8%	.0%	88.4%
All Turnkey & SW Companies	217.7	26.1	168.7	3,171	67.6%	20.2%	100.0%	11.6%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 10  
 TITLE: 1987 Software Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Racal-Redac	22.4	4,250	0	4,250	13.3%	5.0%	.0%	8.9%
Futurenet	15.7	650	0	650	9.3%	.8%	.0%	1.4%
Autodesk	14.9	18,053	6,860	11,193	8.8%	21.4%	18.7%	23.5%
Personal CAD Systems	13.9	1,600	0	1,600	8.2%	1.9%	.0%	3.4%
Daisy	11.8	750	0	750	7.0%	.9%	.0%	1.6%
View Logic	7.2	2,500	0	2,500	4.3%	3.0%	.0%	5.2%
Cadnetix	7.1	990	0	990	4.2%	1.2%	.0%	2.1%
Case Technology	6.1	2,200	0	2,200	3.6%	2.6%	.0%	4.6%
EESOF	6.0	600	0	600	3.5%	.7%	.0%	1.3%
Altera	5.0	1,000	0	1,000	3.0%	1.2%	.0%	2.1%
Ziegler Instruments GmbH	4.4	1,666	0	1,666	2.6%	2.0%	.0%	3.5%
Wacom	3.7	602	0	602	2.2%	.7%	.0%	1.3%
Computervision	2.9	670	0	670	1.7%	.8%	.0%	1.4%
Orcad	2.8	9,270	9,270	0	1.7%	11.0%	25.2%	.0%
Aptos	2.5	900	99	801	1.5%	1.1%	.3%	1.7%
CAD Software	2.5	1,300	0	1,300	1.5%	1.5%	.0%	2.7%
Valid	2.4	250	0	250	1.4%	.3%	.0%	.5%
Kitachi	2.3	170	0	170	1.3%	.2%	.0%	.4%
Visionics	2.0	1,200	0	1,200	1.2%	1.4%	.0%	2.5%
Microsim	1.9	1,200	0	1,200	1.1%	1.4%	.0%	2.5%
Analog Design Tools	1.8	300	0	300	1.0%	.4%	.0%	.6%
NEC	1.6	130	0	130	.9%	.2%	.0%	.3%
Versacad	1.4	2,863	0	2,863	.8%	3.4%	.0%	6.0%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	.7%	2.7%	.0%	4.8%
Control Data	1.1	225	0	225	.7%	.3%	.0%	.5%
Cascade Graphics	1.0	652	0	652	.6%	.8%	.0%	1.4%
Fujitsu	1.0	248	0	248	.6%	.3%	.0%	.5%
The Great Softwestern Co.	1.0	725	0	725	.6%	.9%	.0%	1.5%
Andor	1.0	45	0	45	.6%	.1%	.0%	.1%
IBM	1.0	227	0	227	.6%	.3%	.0%	.5%
Omaton	.8	1,600	0	1,600	.5%	1.9%	.0%	3.4%
Generic Software	.6	8,594	8,594	0	.4%	10.2%	23.4%	.0%

(Continued)

# Market Share

TABLE NUMBER: 10 (Continued)  
 TITLE: 1987 Software Market Share  
 APPLICATION: Electronic Design Automation  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		----- Market Share -----			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Vamp	.6	2,400	2,400	0	.4%	2.8%	6.5%	.0%
Uchida Yoko	.6	54	0	54	.3%	.1%	.0%	.1%
Foresight Resources	.4	2,200	2,200	0	.3%	2.6%	6.0%	.0%
HNB Systems	.4	70	0	70	.3%	.1%	.0%	.1%
Simucad	.4	400	0	400	.3%	.5%	.0%	.8%
American Small Business Comput	.4	3,311	3,311	0	.2%	3.9%	9.0%	.0%
BV Engineering	.4	1,500	1,500	0	.2%	1.8%	4.1%	.0%
Datagraph	.4	591	0	591	.2%	.7%	.0%	1.2%
Innovative Data Design	.3	2,476	2,476	0	.2%	2.9%	6.7%	.0%
Calma	.2	92	0	92	.1%	.1%	.0%	.2%
Intergraph	.2	66	0	66	.1%	.1%	.0%	.1%
Robocom	.1	129	0	129	.1%	.2%	.0%	.3%
Marconi	.1	100	0	100	.1%	.1%	.0%	.2%
Other Companies	13.4	3,249	4	3,245	7.9%	3.9%	.0%	6.8%
All Companies	168.7	84,367	36,714	47,654	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 11  
 TITLE: 1987 Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
IBM	37.9	36.2	.3	7,410	21.8%	44.3%	.4%	42.2%
Daisy	17.0	2.7	10.2	215	9.8%	3.3%	12.8%	1.2%
Futurenet	14.8	.0	13.0	0	8.5%	.0%	16.3%	.0%
Compaq	13.6	13.6	.0	3,820	7.8%	16.7%	.0%	21.8%
View Logic	7.8	.0	7.2	0	4.5%	.0%	9.1%	.0%
EESOF	6.0	.0	6.0	0	3.4%	.0%	7.5%	.0%
Case Technology	4.2	.0	4.2	0	2.4%	.0%	5.3%	.0%
Valid	4.0	.7	2.4	29	2.3%	.8%	3.0%	.2%
NEC	3.5	1.6	1.6	299	2.0%	1.9%	1.9%	1.7%
Wacom	3.4	1.6	1.6	266	2.0%	2.0%	2.0%	1.5%
Racal-Redac	3.2	.0	2.7	0	1.8%	.0%	3.4%	.0%
Orcad	2.9	.0	2.8	0	1.6%	.0%	3.5%	.0%
Apple Computer	2.6	2.7	.0	948	1.5%	3.2%	.0%	5.4%
Cadnetix	2.4	.0	2.1	0	1.4%	.0%	2.7%	.0%
Ziegler Instruments GmbH	2.4	.0	2.4	0	1.4%	.0%	3.0%	.0%
Analog Design Tools	1.9	.1	1.8	24	1.1%	.2%	2.2%	.1%
Microsim	1.9	.0	1.9	0	1.1%	.0%	2.4%	.0%
Autodesk	1.6	.0	1.6	0	.9%	.0%	2.0%	.0%
Cascade Graphics	1.2	.0	1.0	0	.7%	.0%	1.2%	.0%
Fujitsu	1.1	.0	1.0	0	.6%	.0%	1.3%	.0%
Computervision	1.1	.1	.8	16	.6%	.1%	1.0%	.1%
Datagraph	.9	.5	.3	429	.5%	.6%	.4%	2.4%
Omaton	.8	.0	.8	0	.5%	.0%	1.0%	.0%
Versacad	.8	.0	.8	0	.4%	.0%	1.0%	.0%
HNB Systems	.5	.0	.4	0	.3%	.0%	.6%	.0%
Calma	.5	.3	.1	22	.3%	.3%	.2%	.1%
Simucad	.4	.0	.4	0	.2%	.0%	.5%	.0%
American Small Business Comput	.4	.0	.4	0	.2%	.0%	.5%	.0%
BV Engineering	.4	.0	.4	0	.2%	.0%	.5%	.0%
Foresight Resources	.3	.0	.3	0	.2%	.0%	.4%	.0%
Personal CAD Systems	.3	.0	.3	0	.2%	.0%	.4%	.0%
Generic Software	.3	.0	.3	0	.2%	.0%	.4%	.0%

(Continued)

# Market Share

TABLE NUMBER: 11 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Intergraph	.2	.0	.2	0	.1%	.0%	.2%	.0%
Vamp	.2	.0	.2	.0	.1%	.0%	.3%	.0%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.2%	.0%
Robocom	.1	.0	.1	0	.1%	.0%	.1%	.0%
Marconi	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	33.4	21.7	10.0	4,073	19.2%	26.6%	12.5%	23.2%
All Companies	174.0	81.7	79.6	17,550	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	147.7	75.8	61.3	16,407	84.9%	92.9%	77.1%	93.5%
All Asian-Based Companies	19.7	5.3	12.7	715	11.3%	6.5%	16.0%	4.1%
All European-Based Companies	6.6	.5	5.5	429	3.8%	.6%	6.9%	2.4%
All Hardware Companies	72.6	71.4	.0	16,035	41.7%	87.4%	.0%	91.4%
All Turnkey & SW Companies	101.4	10.3	79.6	1,515	58.3%	12.6%	100.0%	8.6%

Source: Dataquest  
July 1988



# Market Share

TABLE NUMBER: 12  
 TITLE: 1987 Software Market Share  
 APPLICATION: Electronic CAE  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Futurenet	13.0	535	0	535	16.3%	1.3%	.0%	3.1%
Daisy	10.2	647	0	647	12.8%	1.6%	.0%	3.7%
View Logic	7.2	2,500	0	2,500	9.1%	6.2%	.0%	14.4%
EESOF	6.0	600	0	600	7.5%	1.5%	.0%	3.5%
Case Technology	4.2	1,517	0	1,517	5.3%	3.8%	.0%	8.7%
Orcad	2.8	9,270	9,270	0	3.5%	23.1%	40.7%	.0%
Racal-Redac	2.7	511	0	511	3.4%	1.3%	.0%	2.9%
Valid	2.4	250	0	250	3.0%	.6%	.0%	1.4%
Ziegler Instruments GmbH	2.4	901	0	901	3.0%	2.2%	.0%	5.2%
Cadnetix	2.1	296	0	296	2.7%	.7%	.0%	1.7%
Microsim	1.9	1,200	0	1,200	2.4%	3.0%	.0%	6.9%
Analog Design Tools	1.8	300	0	300	2.2%	.7%	.0%	1.7%
Wecom	1.6	266	0	266	2.0%	.7%	.0%	1.5%
Autodesk	1.6	1,905	724	1,181	2.0%	4.7%	3.2%	6.8%
NEC	1.6	130	0	130	1.9%	.3%	.0%	.7%
Fujitsu	1.0	248	0	248	1.3%	.6%	.0%	1.4%
Cascade Graphics	1.0	601	0	601	1.2%	1.5%	.0%	3.5%
Omaton	.8	1,600	0	1,600	1.0%	4.0%	.0%	9.2%
Computervision	.8	177	0	177	1.0%	.4%	.0%	1.0%
Versacad	.8	1,609	0	1,609	1.0%	4.0%	.0%	9.3%
HNB Systems	.4	70	0	70	.6%	.2%	.0%	.4%
Simucad	.4	400	0	400	.5%	1.0%	.0%	2.3%
American Small Business Comput	.4	3,311	3,311	0	.5%	8.2%	14.5%	.0%
BV Engineering	.4	1,500	1,500	0	.5%	3.7%	6.6%	.0%
Datagraph	.3	487	0	487	.4%	1.2%	.0%	2.8%
Foresight Resources	.3	1,650	1,650	0	.4%	4.1%	7.2%	.0%
Generic Software	.3	4,297	4,297	0	.4%	10.7%	18.9%	.0%
IBM	.3	70	0	70	.4%	.2%	.0%	.4%
Personal CAD Systems	.3	33	0	33	.4%	.1%	.0%	.2%
Vamp	.2	800	800	0	.3%	2.0%	3.5%	.0%
Intergraph	.2	66	0	66	.2%	.2%	.0%	.4%
Calma	.1	58	0	58	.2%	.1%	.0%	.3%

(Continued)

# Market Share

**TABLE NUMBER:** 12 (Continued)  
**TITLE:** 1987 Software Market Share  
**APPLICATION:** Electronic CAE  
**PLATFORM:** Personal Computer  
**REGION:** Worldwide  
**UNITS:** Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Innovative Data Design	.1	1,238	1,238	0	.2%	3.1%	5.4%	.0%
Robocom	.1	129	0	129	.1%	.3%	.0%	.7%
Other Companies	10.0	460	0	460	12.5%	1.1%	.0%	2.7%
All Companies	79.6	40,134	22,790	17,342	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 July 1988

# Market Share

TABLE NUMBER: 13  
 TITLE: 1987 Market Share  
 APPLICATION: IC Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Altera	5.7	.0	5.0	0	29.8%	.0%	37.4%	.0%
Autodesk	5.3	.0	5.3	0	27.8%	.0%	39.8%	.0%
IBM	3.4	3.4	.0	682	17.9%	75.6%	.0%	65.0%
Wacom	.9	.4	.4	70	4.7%	9.6%	3.2%	6.7%
Daisy	.8	.1	.5	11	4.4%	2.2%	3.6%	1.1%
Visionics	.6	.0	.6	0	3.1%	.0%	4.5%	.0%
Racal-Redac	.5	.0	.4	0	2.8%	.0%	3.2%	.0%
Datagraph	.5	.3	.1	271	2.3%	7.3%	.5%	25.9%
Versacad	.3	.0	.3	0	1.6%	.0%	2.2%	.0%
Cascade Graphics	.1	.0	.1	0	.5%	.0%	.6%	.0%
Other Companies	1.0	.2	.7	14	5.1%	5.3%	4.9%	1.3%
All Companies	19.2	4.5	13.4	1,049	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	15.2	3.5	10.7	694	79.2%	77.8%	80.2%	66.1%
All Asian-Based Companies	3.0	.7	2.2	84	15.7%	14.9%	16.1%	8.0%
All European-Based Companies	1.0	.3	.5	271	5.1%	7.3%	3.7%	25.9%
All Hardware Companies	3.4	3.4	.0	682	17.9%	75.6%	.0%	65.0%
All Turnkey & SW Companies	15.7	1.1	13.4	367	82.1%	24.4%	100.0%	35.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 14  
 TITLE: 1987 Software Market Share  
 APPLICATION: IC Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	5.3	6,467	2,457	4,009	39.8%	78.0%	100.0%	68.8%
Altera	5.0	500	0	500	37.4%	6.0%	.0%	8.6%
Visionics	.6	360	0	360	4.5%	4.3%	.0%	6.2%
Daisy	.5	30	0	30	3.6%	.4%	.0%	.5%
Racal-Redac	.4	81	0	81	3.2%	1.0%	.0%	1.4%
Wacom	.4	70	0	70	3.2%	.9%	.0%	1.2%
Versacad	.3	627	0	627	2.2%	7.6%	.0%	10.8%
Cascade Graphics	.1	51	0	51	.6%	.6%	.0%	.9%
Datagraph	.1	103	0	103	.5%	1.2%	.0%	1.8%
Other Companies	.7	0	0	0	4.9%	.0%	.0%	.0%
All Companies	13.4	8,290	2,457	5,831	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 July 1988

# Market Share

TABLE NUMBER: 15  
 TITLE: 1987 Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Racal-Redac	22.7	.1	19.3	0	17.6%	.1%	25.5%	.0%
Personal CAD Systems	15.6	.0	13.6	0	12.1%	.0%	18.0%	.0%
Compaq	13.6	13.6	.0	3,820	10.5%	31.7%	.0%	43.5%
IBM	8.3	7.1	.7	1,322	6.4%	16.5%	.9%	15.1%
Autodesk	8.0	.0	8.0	0	6.2%	.0%	10.5%	.0%
Hitachi	6.3	3.4	2.3	170	4.8%	7.9%	3.0%	1.9%
Cadnetix	5.6	.0	4.9	0	4.3%	.0%	6.5%	.0%
Control Data	4.6	2.4	1.1	370	3.5%	5.6%	1.5%	4.2%
Apple Computer	4.4	4.4	.0	1,580	3.4%	10.3%	.0%	18.0%
Wacom	3.4	1.6	1.6	266	2.7%	3.8%	2.1%	3.0%
Futurenet	3.2	.0	2.8	0	2.4%	.0%	3.7%	.0%
Computervision	2.8	.3	2.1	38	2.2%	.6%	2.8%	.4%
Uchida Yoko	2.6	1.7	.6	42	2.0%	4.0%	.8%	.5%
Aptos	2.5	.0	2.5	0	1.9%	.0%	3.3%	.0%
CAD Software	2.5	.0	2.5	0	1.9%	.0%	3.3%	.0%
Andor	2.1	1.0	1.0	75	1.6%	2.4%	1.3%	.9%
Ziegler Instruments GmbH	2.0	.0	2.0	0	1.6%	.0%	2.7%	.0%
Daisy	2.0	.3	1.1	26	1.5%	.8%	1.5%	.3%
Case Technology	1.9	.0	1.9	0	1.5%	.0%	2.5%	.0%
Visionics	1.4	.0	1.4	0	1.1%	.0%	1.8%	.0%
Bishop Graphics CAD Systems	1.2	.0	1.2	0	.9%	.0%	1.5%	.0%
The Great Softwestern Co.	1.0	.0	1.0	0	.8%	.0%	1.3%	.0%
Vamp	.4	.0	.4	.0	.3%	.0%	.5%	.0%
Generic Software	.3	.0	.3	0	.2%	.0%	.4%	.0%
Versacad	.3	.0	.3	0	.2%	.0%	.4%	.0%
Marconi	.3	.2	.1	9	.2%	.5%	.1%	.1%
Calma	.3	.2	.1	12	.2%	.4%	.1%	.1%
Innovative Data Design	.1	.0	.1	0	.1%	.0%	.2%	.0%
Foresight Resources	.1	.0	.1	0	.1%	.0%	.1%	.0%

(Continued)

# Market Share

TABLE NUMBER: 15 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	9.7	6.5	2.7	1,045	7.6%	15.3%	3.6%	11.9%
All Companies	129.0	42.9	75.8	8,775	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	85.9	32.7	47.5	8,064	66.6%	76.3%	62.7%	91.9%
All Asian-Based Companies	18.1	9.9	6.9	703	14.0%	23.0%	9.1%	8.0%
All European-Based Companies	25.0	.3	21.4	9	19.4%	.7%	28.3%	.1%
All Hardware Companies	28.5	28.2	.0	7,487	22.1%	65.8%	.0%	85.3%
All Turnkey & SW Companies	100.5	14.7	75.8	1,288	77.9%	34.2%	100.0%	14.7%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 16  
 TITLE: 1987 Software Market Share  
 APPLICATION: PCB Layout  
 PLATFORM: Personal Computer  
 REGION: Worldwide  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Racal-Redac	19.3	3,657	0	3,657	25.5%	10.2%	.0%	14.9%
Personal CAD Systems	13.6	1,567	0	1,567	18.0%	4.4%	.0%	6.4%
Autodesk	8.0	9,682	3,679	6,003	10.5%	26.9%	32.1%	24.5%
Cadnetix	4.9	694	0	694	6.5%	1.9%	.0%	2.8%
Futurenet	2.8	115	0	115	3.7%	.3%	.0%	.5%
Aptos	2.5	900	99	801	3.3%	2.5%	.9%	3.3%
CAD Software	2.5	1,300	0	1,300	3.3%	3.6%	.0%	5.3%
Hitachi	2.3	170	0	170	3.0%	.5%	.0%	.7%
Computervision	2.1	493	0	493	2.8%	1.4%	.0%	2.0%
Ziegler Instruments GmbH	2.0	765	0	765	2.7%	2.1%	.0%	3.1%
Case Technology	1.9	683	0	683	2.5%	1.9%	.0%	2.8%
Wacom	1.6	266	0	266	2.1%	.7%	.0%	1.1%
Visionics	1.4	840	0	840	1.8%	2.3%	.0%	3.4%
Bishop Graphics CAD Systems	1.2	2,300	0	2,300	1.5%	6.4%	.0%	9.4%
Daisy	1.1	72	0	72	1.5%	.2%	.0%	.3%
Control Data	1.1	225	0	225	1.5%	.6%	.0%	.9%
The Great Softwestern Co.	1.0	725	0	725	1.3%	2.0%	.0%	3.0%
Andor	1.0	45	0	45	1.3%	.1%	.0%	.2%
IBM	.7	157	0	157	.9%	.4%	.0%	.6%
Uchida Yoko	.6	54	0	54	.8%	.2%	.0%	.2%
Vamp	.4	1,600	1,600	0	.5%	4.5%	14.0%	.0%
Generic Software	.3	4,297	4,297	0	.4%	12.0%	37.5%	.0%
Versacad	.3	627	0	627	.4%	1.7%	.0%	2.6%
Innovative Data Design	.1	1,238	1,238	0	.2%	3.4%	10.8%	.0%
Foresight Resources	.1	550	550	0	.1%	1.5%	4.8%	.0%
Marconi	.1	100	0	100	.1%	.3%	.0%	.4%
Calma	.1	33	0	33	.1%	.1%	.0%	.1%
Other Companies	2.7	2,789	1	2,788	3.6%	7.8%	.0%	11.4%
All Companies	75.8	35,943	11,464	24,480	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 17  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	165.9	146.1	14.1	27,343	26.9%	36.7%	7.1%	27.8%
Compaq	95.2	95.2	.0	26,740	15.4%	23.9%	.0%	27.2%
Apple Computer	64.3	64.3	.0	23,062	10.4%	16.2%	.0%	23.4%
Autodesk	47.0	.0	47.0	0	7.6%	.0%	23.9%	.0%
Zenith	33.0	29.7	.0	10,000	5.3%	7.5%	.0%	10.2%
Futurenet	13.1	.0	11.6	0	2.1%	.0%	5.9%	.0%
Daisy	9.4	2.0	5.0	122	1.5%	.5%	2.5%	.1%
Computervision	8.1	.8	6.1	67	1.3%	.2%	3.1%	.1%
Personal CAD Systems	7.8	.0	6.8	0	1.3%	.0%	3.5%	.0%
Cadnetix	7.3	.0	6.4	0	1.2%	.0%	3.3%	.0%
Generic Software	6.0	.0	6.0	0	1.0%	.0%	3.0%	.0%
View Logic	5.8	.0	5.3	0	.9%	.0%	2.7%	.0%
Cadkey	5.4	.0	5.4	0	.9%	.0%	2.8%	.0%
Versacad	5.1	.0	4.9	0	.8%	.0%	2.5%	.0%
EESOF	4.8	.0	4.8	0	.8%	.0%	2.4%	.0%
American Small Business Comput	4.6	.0	4.6	0	.7%	.0%	2.3%	.0%
Aries Technology	4.4	1.4	2.6	128	.7%	.4%	1.3%	.1%
Intergraph	4.4	.0	3.6	0	.7%	.0%	1.8%	.0%
Recal-Redec	4.4	.0	3.7	0	.7%	.0%	1.9%	.0%
Altera	4.0	.0	3.5	0	.6%	.0%	1.8%	.0%
Case Technology	3.9	.0	3.9	0	.6%	.0%	2.0%	.0%
Control Data	2.5	1.1	.7	204	.4%	.3%	.4%	.2%
CAD Software	2.5	.0	2.5	0	.4%	.0%	1.3%	.0%
Valid	2.3	.7	1.0	29	.4%	.2%	.5%	.0%
Innovative Data Design	2.0	.0	2.0	0	.3%	.0%	1.0%	.0%
Terr-Mar	2.0	1.0	1.0	50	.3%	.3%	.5%	.1%
Visionics	2.0	.0	2.0	0	.3%	.0%	1.0%	.0%
Cascade Graphics	2.0	.0	1.5	0	.3%	.0%	.8%	.0%
Manufacturing Consultants	1.9	.0	1.6	0	.3%	.0%	.8%	.0%
Aptos	1.9	.0	1.9	0	.3%	.0%	1.0%	.0%
Drcad	1.9	.0	1.8	0	.3%	.0%	.9%	.0%
ESRI	1.8	.0	1.7	0	.3%	.0%	.9%	.0%
Foresight Resources	1.8	.0	1.8	0	.3%	.0%	.9%	.0%

(Continued)



# Market Share

TABLE NUMBER: 17  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Challenger Software	1.8	.0	1.8	0	.3%	.0%	.9%	.0%
ISICAD	1.6	.0	1.6	0	.3%	.0%	.8%	.0%
Calma	1.6	1.0	.5	77	.3%	.2%	.2%	.1%
ERDAS	1.6	.8	.8	40	.3%	.2%	.4%	.0%
Microsim	1.5	.0	1.5	0	.2%	.0%	.8%	.0%
Bentley	1.5	.0	1.5	0	.2%	.0%	.8%	.0%
Analog Design Tools	1.4	.1	1.3	18	.2%	.0%	.7%	.0%
Geographic Data Technologies	1.4	.0	1.4	0	.2%	.0%	.7%	.0%
Micro CAD/CAM	1.3	.0	1.3	0	.2%	.0%	.7%	.0%
Megacad	1.3	.0	1.3	0	.2%	.0%	.6%	.0%
Algor Interactive Systems	1.2	.0	1.2	0	.2%	.0%	.6%	.0%
Evolution Computing	1.2	.0	1.2	0	.2%	.0%	.6%	.0%
Robocom	1.2	.0	1.2	0	.2%	.0%	.6%	.0%
Swanson Analysis	1.1	.0	1.1	0	.2%	.0%	.6%	.0%
Accugraph	1.1	.3	.7	44	.2%	.1%	.4%	.0%
CADAM	1.1	.5	.4	15	.2%	.1%	.2%	.0%
Skok Systems	1.0	.0	.7	0	.2%	.0%	.4%	.0%
Mapinfo	1.0	.0	1.0	0	.2%	.0%	.5%	.0%
Point Line	1.0	.0	1.0	.0	.2%	.0%	.5%	.0%
The Great Softwestern Co.	1.0	.0	1.0	0	.2%	.0%	.5%	.0%
Bishop Graphics CAD Systems	.9	.0	.9	0	.1%	.0%	.4%	.0%
Geobased Systems	.9	.3	.5	24	.1%	.1%	.3%	.0%
Prime	.9	.0	.6	0	.1%	.0%	.3%	.0%
Mutoh Industries	.8	.5	.3	81	.1%	.1%	.2%	.1%
American Int'l Systems	.8	.4	.3	51	.1%	.1%	.2%	.1%
MacNeal-Schwendler	.7	.0	.7	0	.1%	.0%	.3%	.0%
Onation	.6	.0	.6	0	.1%	.0%	.3%	.0%
Vamp	.5	.0	.5	.0	.1%	.0%	.3%	.0%
Strategic Locations Planning	.5	.0	.5	0	.1%	.0%	.3%	.0%
MATC CAD	.4	.0	.4	0	.1%	.0%	.2%	.0%
BV Engineering	.4	.0	.4	0	.1%	.0%	.2%	.0%
Dennis Klein & Associates	.4	.0	.4	0	.1%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 17 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Ithaca Software	.4	.0	.4	0	.1%	.0%	.2%	.0%
DFI	.3	.2	.2	12	.1%	.0%	.1%	.0%
Simucad	.3	.0	.3	0	.1%	.0%	.2%	.0%
Zycor	.3	.0	.3	0	.1%	.0%	.2%	.0%
HNB Systems	.3	.0	.2	0	.0%	.0%	.1%	.0%
Geomath	.1	.0	.1	0	.0%	.0%	.0%	.0%
CISI	.0	.0	.0	1	.0%	.0%	.0%	.0%
Kork Systems	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	54.2	51.6	2.0	10,311	8.8%	13.0%	1.0%	10.5%
All Companies	617.5	397.8	197.0	98,418	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	611.1	397.4	191.8	98,335	99.0%	99.9%	97.4%	99.9%
All Asian-Based Companies	.8	.5	.3	81	.1%	.1%	.2%	.1%
All European-Based Companies	5.6	.0	4.9	1	.9%	.0%	2.5%	.0%
All Hardware Companies	369.0	365.7	.0	95,113	59.8%	91.9%	.0%	96.6%
All Turnkey & SW Companies	248.4	32.1	197.0	3,304	40.2%	8.1%	100.0%	3.4%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 18  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Autodesk	47.0	56,999	21,660	35,339	23.9%	18.2%	10.4%	34.1%
IBM	14.1	3,293	0	3,293	7.1%	1.1%	.0%	3.2%
Futurenet	11.6	478	0	478	5.9%	.2%	.0%	.5%
Personal CAD Systems	6.8	783	0	783	3.5%	.3%	.0%	.8%
Cadnetix	6.4	904	0	904	3.3%	.3%	.0%	.9%
Computervision	6.1	1,396	0	1,396	3.1%	.4%	.0%	1.3%
Generic Software	6.0	80,303	80,303	0	3.0%	25.7%	38.4%	.0%
Cadkey	5.4	15,200	0	15,200	2.8%	4.9%	.0%	14.7%
View Logic	5.3	1,849	0	1,849	2.7%	.6%	.0%	1.8%
Daisy	5.0	317	0	317	2.5%	.1%	.0%	.3%
Versacad	4.9	10,322	0	10,322	2.5%	3.3%	.0%	10.0%
EESOF	4.8	480	0	480	2.4%	.2%	.0%	.5%
American Small Business Comput	4.6	37,067	37,067	0	2.3%	11.9%	17.7%	.0%
Case Technology	3.9	1,406	0	1,406	2.0%	.4%	.0%	1.4%
Racal-Redac	3.7	705	0	705	1.9%	.2%	.0%	.7%
Intergraph	3.6	1,571	0	1,571	1.8%	.5%	.0%	1.5%
Altera	3.5	701	0	701	1.8%	.2%	.0%	.7%
Aries Technology	2.6	127	0	127	1.3%	.0%	.0%	.1%
CAD Software	2.5	1,300	0	1,300	1.3%	.4%	.0%	1.3%
Innovative Data Design	2.0	19,048	19,048	0	1.0%	6.1%	9.1%	.0%
Visionics	2.0	1,200	0	1,200	1.0%	.4%	.0%	1.2%
Aptos	1.9	674	74	600	1.0%	.2%	.0%	.6%
Orcad	1.8	6,026	6,026	0	.9%	1.9%	2.9%	.0%
Foresight Resources	1.8	8,800	8,800	0	.9%	2.8%	4.2%	.0%
Challenger Software	1.8	4,000	4,000	0	.9%	1.3%	1.9%	.0%
ESRI	1.7	400	0	400	.9%	.1%	.0%	.4%
ISICAD	1.6	1,760	0	1,760	.8%	.6%	.0%	1.7%
Manufacturing Consultants	1.6	801	0	801	.8%	.3%	.0%	.8%
Cascade Graphics	1.5	975	0	975	.8%	.3%	.0%	.9%
Microsim	1.5	960	0	960	.8%	.3%	.0%	.9%
Bentley	1.5	1,000	0	1,000	.8%	.3%	.0%	1.0%
Geographic Data Technologies	1.4	280	0	280	.7%	.1%	.0%	.3%
Analog Design Tools	1.3	225	0	225	.7%	.1%	.0%	.2%

(Continued)

# Market Share

TABLE NUMBER: 18  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: North America  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Micro CAD/CAM	1.3	2,580	0	2,580	.7%	.8%	.0%	2.5%
Megacad	1.3	1,428	0	1,428	.6%	.5%	.0%	1.4%
Algor Interactive Systems	1.2	1,000	1,000	0	.6%	.3%	.5%	.0%
Evolution Computing	1.2	25,400	24,892	508	.6%	8.1%	11.9%	.5%
Robocom	1.2	1,509	0	1,509	.6%	.5%	.0%	1.5%
Swanson Analysis	1.1	393	0	393	.6%	.1%	.0%	.4%
Mapinfo	1.0	100	0	100	.5%	.0%	.0%	.1%
Point Line	1.0	400	0	400	.5%	.1%	.0%	.4%
Terr-Mar	1.0	50	0	50	.5%	.0%	.0%	.0%
The Great Softwestern Co.	1.0	725	0	725	.5%	.2%	.0%	.7%
Valid	1.0	105	0	105	.5%	.0%	.0%	.1%
Bishop Graphics CAD Systems	.9	1,725	0	1,725	.4%	.6%	.0%	1.7%
ERDAS	.8	32	0	32	.4%	.0%	.0%	.0%
Accugraph	.7	766	0	766	.4%	.2%	.0%	.7%
Skok Systems	.7	286	0	286	.4%	.1%	.0%	.3%
Control Data	.7	145	0	145	.4%	.0%	.0%	.1%
MacNeal-Schwendler	.7	322	0	322	.3%	.1%	.0%	.3%
Prime	.6	156	0	156	.3%	.0%	.0%	.2%
Omaton	.6	1,200	0	1,200	.3%	.4%	.0%	1.2%
Vamp	.5	2,160	2,160	0	.3%	.7%	1.0%	.0%
Geobased Systems	.5	30	0	30	.3%	.0%	.0%	.0%
Strategic Locations Planning	.5	35	0	35	.3%	.0%	.0%	.0%
Calma	.5	200	0	200	.2%	.1%	.0%	.2%
CADAM	.4	2,649	0	2,649	.2%	.8%	.0%	2.6%
BV Engineering	.4	1,500	1,500	0	.2%	.5%	.7%	.0%
Dennis Klein & Associates	.4	119	0	119	.2%	.0%	.0%	.1%
NATC CAD	.4	555	555	0	.2%	.2%	.3%	.0%
Ithaca Software	.4	200	0	200	.2%	.1%	.0%	.2%
American Int'l Systems	.3	1,838	1,838	0	.2%	.6%	.9%	.0%
Sinucad	.3	307	0	307	.2%	.1%	.0%	.3%
Zycor	.3	32	0	32	.2%	.0%	.0%	.0%
Mutoh Industries	.3	34	0	34	.2%	.0%	.0%	.0%

(Continued)

# Market Share

**TABLE NUMBER:** 18 (Continued)  
**TITLE:** 1987 Software Market Share  
**APPLICATION:** All Applications  
**PLATFORM:** Personal Computer  
**REGION:** North America  
**UNITS:** Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
HHB Systems	.2	35	0	35	.1%	.0%	.0%	.0%
DFI	.2	115	0	115	.1%	.0%	.0%	.1%
Geomath	.1	10	0	10	.0%	.0%	.0%	.0%
Kork Systems	.0	15	0	15	.0%	.0%	.0%	.0%
CISI	.0	5	0	5	.0%	.0%	.0%	.0%
Other Companies	2.0	2,900	1	2,899	1.0%	.9%	.0%	2.8%
All Companies	197.0	312,407	208,924	103,487	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
 July 1988

# Market Share

TABLE NUMBER: 19  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	----- Market Share -----							
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
IBM	94.3	78.8	11.0	14,322	32.5%	47.1%	10.4%	37.4%
Compeq	34.0	34.0	.0	9,550	11.7%	20.3%	.0%	24.9%
Racal-Redac	21.8	.0	18.6	0	7.5%	.0%	17.7%	.0%
Autodesk	20.9	.0	20.9	0	7.2%	.0%	19.9%	.0%
Apple Computer	15.0	15.0	.0	5,371	5.2%	9.0%	.0%	14.0%
Computervision	12.5	1.2	9.4	215	4.3%	.7%	8.9%	.6%
Daisy	9.1	1.0	5.7	125	3.1%	.6%	5.4%	.3%
Ziegler Instruments GmbH	8.1	.0	8.1	0	2.8%	.0%	7.7%	.0%
Personal CAD Systems	6.1	.0	5.3	0	2.1%	.0%	5.0%	.0%
Datagraph	4.5	2.8	1.5	2,200	1.6%	1.7%	1.4%	5.7%
Intergraph	3.6	.0	2.5	0	1.2%	.0%	2.4%	.0%
Robocom	2.3	.0	2.3	0	.8%	.0%	2.2%	.0%
Futurenet	2.3	.0	2.0	0	.8%	.0%	1.9%	.0%
Control Data	1.8	1.2	.3	144	.6%	.7%	.3%	.4%
Valid	1.6	.0	1.4	0	.6%	.0%	1.3%	.0%
Case Technology	1.5	.0	1.5	0	.5%	.0%	1.4%	.0%
Mutoh Industries	1.4	.8	.5	136	.5%	.5%	.5%	.4%
CISI	1.2	.5	.6	38	.4%	.3%	.5%	.1%
Altera	1.1	.0	1.0	0	.4%	.0%	1.0%	.0%
Cadkey	1.0	.0	1.0	0	.4%	.0%	1.0%	.0%
View Logic	.9	.0	.9	0	.3%	.0%	.8%	.0%
EESOF	.9	.0	.9	0	.3%	.0%	.8%	.0%
Versacad	.9	.0	.9	0	.3%	.0%	.8%	.0%
CADAM	.8	.4	.3	12	.3%	.3%	.3%	.0%
Skok Systems	.8	.0	.5	0	.3%	.0%	.5%	.0%
American Small Business Comput	.7	.0	.7	0	.2%	.0%	.7%	.0%
CAD Lab	.7	.0	.5	0	.2%	.0%	.5%	.0%
Orcad	.6	.0	.6	0	.2%	.0%	.5%	.0%
Prime	.6	.0	.4	0	.2%	.0%	.4%	.0%
Aptos	.5	.0	.5	0	.2%	.0%	.5%	.0%
Micro CAD/CAM	.5	.0	.5	0	.2%	.0%	.4%	.0%
Foresight Resources	.4	.0	.4	0	.2%	.0%	.4%	.0%
Albert Nestler	.4	.3	.1	25	.1%	.1%	.1%	.1%

(Continued)

# Market Share

TABLE NUMBER: 19  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Manufacturing Consultants	.4	.0	.3	0	.1%	.0%	.3%	.0%
Marconi	.3	.2	.1	9	.1%	.1%	.1%	.0%
Aries Technology	.3	.1	.2	8	.1%	.0%	.2%	.0%
Megacad	.2	.0	.2	0	.1%	.0%	.2%	.0%
TT Solutions	.2	.1	.1	5	.1%	.1%	.1%	.0%
Bishop Graphics CAD Systems	.2	.0	.2	0	.1%	.0%	.2%	.0%
Swanson Analysis	.2	.0	.2	0	.1%	.0%	.2%	.0%
ERDAS	.2	.1	.1	5	.1%	.1%	.1%	.0%
Innovative Data Design	.2	.0	.2	0	.1%	.0%	.2%	.0%
MacNeal-Schwendler	.2	.0	.2	0	.1%	.0%	.2%	.0%
Microsim	.2	.0	.2	0	.1%	.0%	.2%	.0%
Accugraph	.2	.0	.1	7	.1%	.0%	.1%	.0%
Generic Software	.2	.0	.2	0	.1%	.0%	.2%	.0%
NHB Systems	.2	.0	.1	0	.1%	.0%	.1%	.0%
ISICAD	.1	.0	.0	58	.0%	.0%	.0%	.2%
Zycor	.1	.0	.1	0	.0%	.0%	.1%	.0%
Analog Design Tools	.1	.0	.1	1	.0%	.0%	.1%	.0%
Omaton	.1	.0	.1	0	.0%	.0%	.1%	.0%
American Int'l Systems	.1	.1	.0	6	.0%	.0%	.0%	.0%
Simucad	.1	.0	.1	0	.0%	.0%	.1%	.0%
Vamp	.1	.0	.1	0	.0%	.0%	.1%	.0%
Cascade Graphics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Ithaca Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%

(Continued)

# Market Share

TABLE NUMBER: 19 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
Other Companies	33.2	30.8	1.3	6,068	11.5%	18.4%	1.3%	15.8%
All Companies	289.8	167.2	105.2	38,305	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	245.4	160.9	71.4	35,777	84.7%	96.2%	67.9%	93.4%
All Asian-Based Companies	1.4	.8	.5	136	.5%	.5%	.5%	.4%
All European-Based Companies	43.0	5.6	33.3	2,393	14.8%	3.3%	31.6%	6.2%
All Hardware Companies	141.2	140.5	.0	33,374	48.7%	84.0%	.0%	87.1%
All Turnkey & SW Companies	148.5	26.7	105.2	4,931	51.3%	16.0%	100.0%	12.9%

Source: Dataquest  
July 1988



# Market Share

TABLE NUMBER: 20  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Software Units	Units < \$500	Units > \$500
Autodesk	20.9	25,381	9,645	15,737	19.9%	34.1%	40.5%	31.1%
Racal-Redac	18.6	3,530	0	3,530	17.7%	4.7%	.0%	7.0%
IBM	11.0	2,566	0	2,566	10.4%	3.4%	.0%	5.1%
Computervision	9.4	2,167	0	2,167	8.9%	2.9%	.0%	4.3%
Ziegler Instruments GmbH	8.1	3,068	0	3,068	7.7%	4.1%	.0%	6.1%
Daisy	5.7	363	0	363	5.4%	.5%	.0%	.7%
Personal CAD Systems	5.3	608	0	608	5.0%	.8%	.0%	1.2%
Intergraph	2.5	1,115	0	1,115	2.4%	1.5%	.0%	2.2%
Robocom	2.3	2,991	0	2,991	2.2%	4.0%	.0%	5.9%
Futurenet	2.0	84	0	84	1.9%	.1%	.0%	.2%
Datagraph	1.5	2,200	0	2,200	1.4%	3.0%	.0%	4.3%
Case Technology	1.5	528	0	528	1.4%	.7%	.0%	1.0%
Valid	1.4	143	0	143	1.3%	.2%	.0%	.3%
Cadkey	1.0	2,850	0	2,850	1.0%	3.8%	.0%	5.6%
Altera	1.0	200	0	200	1.0%	.3%	.0%	.4%
EESOF	.9	90	0	90	.8%	.1%	.0%	.2%
Versacad	.9	1,839	0	1,839	.8%	2.5%	.0%	3.6%
View Logic	.9	301	0	301	.8%	.4%	.0%	.6%
American Small Business Comput	.7	5,653	5,653	0	.7%	7.6%	23.7%	.0%
Orcad	.6	1,854	1,854	0	.5%	2.5%	7.8%	.0%
CISI	.6	255	0	255	.5%	.3%	.0%	.5%
Skok Systems	.5	211	0	211	.5%	.3%	.0%	.4%
CAD Lab	.5	800	0	800	.5%	1.1%	.0%	1.6%
Mutoh Industries	.5	58	0	58	.5%	.1%	.0%	.1%
Aptos	.5	179	20	160	.5%	.2%	.1%	.3%
Micro CAD/CAM	.5	940	0	940	.4%	1.3%	.0%	1.9%
Foresight Resources	.4	2,200	2,200	0	.4%	3.0%	9.2%	.0%
Prime	.4	105	0	105	.4%	.1%	.0%	.2%
CADAM	.3	2,144	0	2,144	.3%	2.9%	.0%	4.2%
Control Data	.3	65	0	65	.3%	.1%	.0%	.1%
Manufacturing Consultants	.3	149	0	149	.3%	.2%	.0%	.3%
Megacad	.2	272	0	272	.2%	.4%	.0%	.5%

(Continued)

# Market Share

TABLE NUMBER: 20 (Continued)  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Europe  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Bishop Graphics CAD Systems	.2	456	0	456	.2%	.6%	.0%	.9%
Swanson Analysis	.2	79	0	79	.2%	.1%	.0%	.2%
Innovative Data Design	.2	1,905	1,905	0	.2%	2.6%	8.0%	.0%
MacNeal-Schwendler	.2	99	0	99	.2%	.1%	.0%	.2%
Microsim	.2	120	0	120	.2%	.2%	.0%	.2%
Aries Technology	.2	8	0	8	.2%	.0%	.0%	.0%
Generic Software	.2	2,149	2,149	0	.2%	2.9%	9.0%	.0%
Accugraph	.1	134	0	134	.1%	.2%	.0%	.3%
HNB Systems	.1	21	0	21	.1%	.0%	.0%	.0%
Zycor	.1	13	0	13	.1%	.0%	.0%	.0%
ERDAS	.1	4	0	4	.1%	.0%	.0%	.0%
Omation	.1	200	0	200	.1%	.3%	.0%	.4%
Analog Design Tools	.1	15	0	15	.1%	.0%	.0%	.0%
Marconi	.1	100	0	100	.1%	.1%	.0%	.2%
Albert Nestler	.1	25	0	25	.1%	.0%	.0%	.0%
TT Solutions	.1	10	0	10	.1%	.0%	.0%	.0%
Simuced	.1	56	0	56	.1%	.1%	.0%	.1%
Vamp	.1	240	240	0	.1%	.3%	1.0%	.0%
American Int'l Systems	.0	162	162	0	.0%	.2%	.7%	.0%
Cascade Graphics	.0	13	0	13	.0%	.0%	.0%	.0%
Ithaca Software	.0	11	0	11	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	3	0	3	.0%	.0%	.0%	.0%
Other Companies	1.3	3,760	0	3,759	1.3%	5.0%	.0%	7.4%
All Companies	105.2	74,494	23,828	50,665	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 21  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Total				Market Share			
	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
IBM	93.6	73.8	6.7	13,212	24.2%	34.8%	4.8%	50.9%
Hitachi	58.9	31.8	21.2	1,601	15.2%	15.0%	15.2%	6.2%
NEC	34.6	15.6	15.6	1,299	8.9%	7.3%	11.2%	5.0%
Mutoh Industries	24.7	13.3	8.9	856	6.4%	6.3%	6.4%	3.3%
Andor	14.0	6.7	6.6	500	3.6%	3.2%	4.7%	1.9%
Nakuto	12.7	5.4	6.7	376	3.3%	2.5%	4.8%	1.4%
Fujitsu	12.4	.0	11.1	0	3.2%	.0%	8.0%	.0%
Toshiba	11.4	4.1	6.1	.0	2.9%	1.9%	4.4%	.0%
Hitachi Seiko	10.0	6.0	4.0	150	2.6%	2.8%	2.9%	.6%
Wacom	9.0	4.3	4.3	700	2.3%	2.0%	3.1%	2.7%
Compaq	6.8	6.8	.0	1,910	1.8%	3.2%	.0%	7.4%
Apple Computer	6.2	6.2	.0	2,211	1.6%	2.9%	.0%	8.5%
Uchida Yoko	5.9	4.0	1.3	125	1.5%	1.9%	.9%	.5%
Autodesk	5.6	.0	5.6	0	1.4%	.0%	4.0%	.0%
Mitsubishi Electric	4.8	2.6	1.7	144	1.2%	1.2%	1.2%	.6%
Graphtec	3.6	2.1	1.4	54	.9%	1.0%	1.0%	.2%
Info. Services Int'l Dentsu	3.0	.4	2.3	15	.8%	.2%	1.7%	.1%
Hitachi Zosen	2.6	1.0	1.6	131	.7%	.5%	1.1%	.5%
Futurenet	2.2	.0	1.9	0	.6%	.0%	1.3%	.0%
CPU	2.0	.0	2.0	0	.5%	.0%	1.4%	.0%
Personal CAD Systems	1.4	.0	1.3	0	.4%	.0%	.9%	.0%
View Logic	1.1	.0	1.0	0	.3%	.0%	.7%	.0%
Dalay	1.0	.0	.9	0	.3%	.0%	.6%	.0%
CADAM	.8	.4	.3	12	.2%	.2%	.2%	.0%
Case Technology	.7	.0	.7	0	.2%	.0%	.5%	.0%
Skok Systems	.7	.0	.5	0	.2%	.0%	.4%	.0%
Cadnetix	.6	.0	.6	0	.2%	.0%	.4%	.0%
Altera	.6	.0	.5	0	.1%	.0%	.4%	.0%
American Small Business Comput	.5	.0	.5	0	.1%	.0%	.4%	.0%
Aries Technology	.5	.2	.3	15	.1%	.1%	.2%	.1%
Versacad	.5	.0	.4	0	.1%	.0%	.3%	.0%
Analog Design Tools	.4	.0	.4	5	.1%	.0%	.3%	.0%

(Continued)

# Market Share

TABLE NUMBER: 21 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Market Share			
					Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
-----	-----	-----	-----	-----	-----	-----	-----	-----
Cadkey	.3	.0	.3	0	.1%	.0%	.2%	.0%
EESOF	.3	.0	.3	0	.1%	.0%	.2%	.0%
Orcad	.3	.0	.3	0	.1%	.0%	.2%	.0%
Control Data	.2	.1	.1	19	.1%	.0%	.0%	.1%
Microsim	.2	.0	.2	0	.0%	.0%	.1%	.0%
Innovative Data Design	.2	.0	.2	0	.0%	.0%	.1%	.0%
Generic Software	.2	.0	.2	0	.0%	.0%	.1%	.0%
Geobased Systems	.2	.1	.1	4	.0%	.0%	.1%	.0%
MacNeal-Schwendler	.2	.0	.2	0	.0%	.0%	.1%	.0%
Aptos	.1	.0	.1	0	.0%	.0%	.1%	.0%
ISICAD	.1	.0	.1	0	.0%	.0%	.1%	.0%
HNB Systems	.1	.0	.1	0	.0%	.0%	.1%	.0%
Omaton	.1	.0	.1	0	.0%	.0%	.1%	.0%
Racal-Redac	.1	.1	.0	0	.0%	.0%	.0%	.0%
Swanson Analysis	.1	.0	.1	0	.0%	.0%	.1%	.0%
Bishop Graphics CAD Systems	.1	.0	.1	0	.0%	.0%	.0%	.0%
Simucad	.0	.0	.0	0	.0%	.0%	.0%	.0%
Cascade Graphics	.0	.0	.0	0	.0%	.0%	.0%	.0%
Ithaca Software	.0	.0	.0	0	.0%	.0%	.0%	.0%
Accugraph	.0	.0	.0	0	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	.0	.0	0	.0%	.0%	.0%	.0%
Other Companies	51.3	26.9	20.5	2,611	13.3%	12.7%	14.7%	10.1%
All Companies	386.8	211.8	139.3	25,951	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	123.4	91.9	16.6	18,344	31.9%	43.4%	11.9%	70.7%
All Asian-Based Companies	263.4	119.8	122.7	7,606	68.1%	56.6%	88.1%	29.3%
All European-Based Companies	.1	.1	.0	0	.0%	.0%	.0%	.0%
All Hardware Companies	72.7	64.7	.0	16,077	18.8%	30.5%	.0%	62.0%
All Turnkey & SW Companies	314.1	147.2	139.3	9,873	81.2%	69.5%	100.0%	38.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 22  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Hitachi	21.2	1,600	0	1,600	15.2%	4.3%	.0%	6.4%
NEC	15.6	1,300	0	1,300	11.2%	3.5%	.0%	5.2%
Fujitsu	11.1	2,760	0	2,760	8.0%	7.5%	.0%	11.0%
Mutoh Industries	8.9	1,015	0	1,015	6.4%	2.8%	.0%	4.0%
Nakuto	6.7	750	0	750	4.8%	2.0%	.0%	3.0%
IBM	6.7	1,558	0	1,558	4.8%	4.2%	.0%	6.2%
Andor	6.6	300	0	300	4.7%	.8%	.0%	1.2%
Toshiba	6.1	500	0	500	4.4%	1.4%	.0%	2.0%
Autodesk	5.6	6,794	2,582	4,212	4.0%	18.4%	22.1%	16.7%
Wacom	4.3	700	0	700	3.1%	1.9%	.0%	2.8%
Hitachi Seiko	4.0	150	0	150	2.9%	.4%	.0%	.6%
Info. Services Int'l Dentsu	2.3	115	0	115	1.7%	.3%	.0%	.5%
CPU	2.0	1,000	0	1,000	1.4%	2.7%	.0%	4.0%
Futurenet	1.9	77	0	77	1.3%	.2%	.0%	.3%
Mitsubishi Electric	1.7	145	0	145	1.2%	.4%	.0%	.6%
Hitachi Zosen	1.6	130	0	130	1.1%	.4%	.0%	.5%
Graphtec	1.4	90	0	90	1.0%	.2%	.0%	.4%
Uchida Yoko	1.3	125	0	125	.9%	.3%	.0%	.5%
Personal CAD Systems	1.3	145	0	145	.9%	.4%	.0%	.6%
View Logic	1.0	350	0	350	.7%	.9%	.0%	1.4%
Daisy	.9	56	0	56	.6%	.2%	.0%	.2%
Case Technology	.7	266	0	266	.5%	.7%	.0%	1.1%
Cadnetix	.6	86	0	86	.4%	.2%	.0%	.3%
American Small Business Comput	.5	4,280	4,280	0	.4%	11.6%	36.7%	.0%
Skok Systems	.5	203	0	203	.4%	.6%	.0%	.8%
Altera	.5	100	0	100	.4%	.3%	.0%	.4%
Versacad	.4	919	0	919	.3%	2.5%	.0%	3.7%
Analog Design Tools	.4	60	0	60	.3%	.2%	.0%	.2%
Cadkey	.3	950	0	950	.2%	2.6%	.0%	3.8%
CADAM	.3	2,144	0	2,144	.2%	5.8%	.0%	8.5%
Aries Technology	.3	15	0	15	.2%	.0%	.0%	.1%
EESOF	.3	30	0	30	.2%	.1%	.0%	.1%

(Continued)

# Market Share

TABLE NUMBER: 22 (Continued)  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Asia  
 UNITS: Millions of Dollars/Actual Units

Company	Software		Units		Market Share			
	Revenue	Units	< \$500	> \$500	Revenue	Units	< \$500	> \$500
Orcad	.3	927	927	0	.2%	2.5%	8.0%	.0%
Microsim	.2	120	0	120	.1%	.3%	.0%	.5%
Innovative Data Design	.2	1,714	1,714	0	.1%	4.7%	14.7%	.0%
Generic Software	.2	2,149	2,149	0	.1%	5.8%	18.4%	.0%
MacNeal-Schwendler	.2	74	0	74	.1%	.2%	.0%	.3%
Aptos	.1	47	5	41	.1%	.1%	.0%	.2%
ISICAD	.1	140	0	140	.1%	.4%	.0%	.6%
Omatron	.1	200	0	200	.1%	.5%	.0%	.8%
Geobased Systems	.1	5	0	5	.1%	.0%	.0%	.0%
HNB Systems	.1	14	0	14	.1%	.0%	.0%	.1%
Swanson Analysis	.1	25	0	25	.1%	.1%	.0%	.1%
Bishop Graphics CAD Systems	.1	119	0	119	.0%	.3%	.0%	.5%
Control Data	.1	12	0	12	.0%	.0%	.0%	.0%
Simucad	.0	37	0	37	.0%	.1%	.0%	.1%
Cascade Graphics	.0	13	0	13	.0%	.0%	.0%	.1%
Ithaca Software	.0	11	0	11	.0%	.0%	.0%	.0%
Dennis Klein & Associates	.0	3	0	3	.0%	.0%	.0%	.0%
Other Companies	20.5	2,506	0	2,506	14.7%	6.8%	.0%	10.0%
All Companies	139.3	36,830	11,657	25,171	100.0%	100.0%	100.0%	100.0%

Source: Dataquest  
July 1988

# Market Share

TABLE NUMBER: 23  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					..... Market Share .....			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
IBM	9.8	8.7	.8	1,630	33.7%	36.1%	16.3%	30.6%
Apple Computer	2.6	2.6	.0	948	9.1%	10.9%	.0%	17.8%
Autodesk	.7	.0	.7	0	2.3%	.0%	14.2%	.0%
Personal CAD Systems	.6	.0	.6	0	2.2%	.0%	11.5%	.0%
Mutoh Industries	.6	.3	.2	54	1.9%	1.3%	4.2%	1.0%
Versacad	.5	.0	.4	0	1.6%	.0%	9.2%	.0%
Daisy	.4	.1	.2	6	1.4%	.4%	4.8%	.1%
Ziegler Instruments GmbH	.4	.0	.4	0	1.2%	.0%	7.3%	.0%
Intergraph	.3	.0	.3	0	1.1%	.0%	5.4%	.0%
Futurenet	.3	.0	.3	0	1.0%	.0%	5.2%	.0%
Micro CAD/CAM	.2	.0	.2	0	.8%	.0%	5.0%	.0%
Computervision	.2	.0	.2	2	.8%	.1%	3.3%	.0%
ERDAS	.2	.1	.1	5	.7%	.5%	2.1%	.1%
Innovative Data Design	.1	.0	.1	0	.5%	.0%	2.9%	.0%
Orcad	.1	.0	.1	0	.5%	.0%	2.9%	.0%
Racal-Redac	.1	.0	.1	0	.3%	.0%	1.7%	.0%
Control Data	.1	.0	.0	4	.2%	.1%	.2%	.1%
Ithaca Software	.1	.0	.1	0	.2%	.0%	1.0%	.0%
Prime	.1	.0	.0	0	.2%	.0%	.8%	.0%
Zycor	.1	.0	.1	0	.2%	.0%	1.0%	.0%
Valid	.0	.0	.0	0	.1%	.1%	.4%	.0%
CADAM	.0	.0	.0	0	.1%	.0%	.2%	.0%
Calma	.0	.0	.0	2	.1%	.1%	.0%	.0%
MacNeal-Schwendler	.0	.0	.0	0	.0%	.0%	.2%	.0%
Swanson Analysis	.0	.0	.0	0	.0%	.0%	.2%	.0%

(Continued)

# Market Share

TABLE NUMBER: 23 (Continued)  
 TITLE: 1987 Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company					----- Market Share -----			
	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped	Total Revenue	Hardware Revenue	Software Revenue	Wkstns Shipped
*****	*****	*****	*****	*****	*****	*****	*****	*****
Other Companies	11.6	12.2	.0	2,671	39.9%	50.5%	.0%	50.2%
All Companies	29.0	24.1	4.8	5,322	100.0%	100.0%	100.0%	100.0%
All U.S.-Based Companies	28.0	23.8	4.2	5,268	96.6%	98.7%	86.9%	99.0%
All Asian-Based Companies	.6	.3	.2	54	1.9%	1.3%	4.2%	1.0%
All European-Based Companies	.4	.0	.4	0	1.5%	.0%	9.0%	.0%
All Hardware Companies	21.7	22.3	.0	5,119	74.9%	92.7%	.0%	96.2%
All Turnkey & SW Companies	7.3	1.8	4.8	203	25.1%	7.3%	100.0%	3.8%

Source: Dataquest  
 July 1988

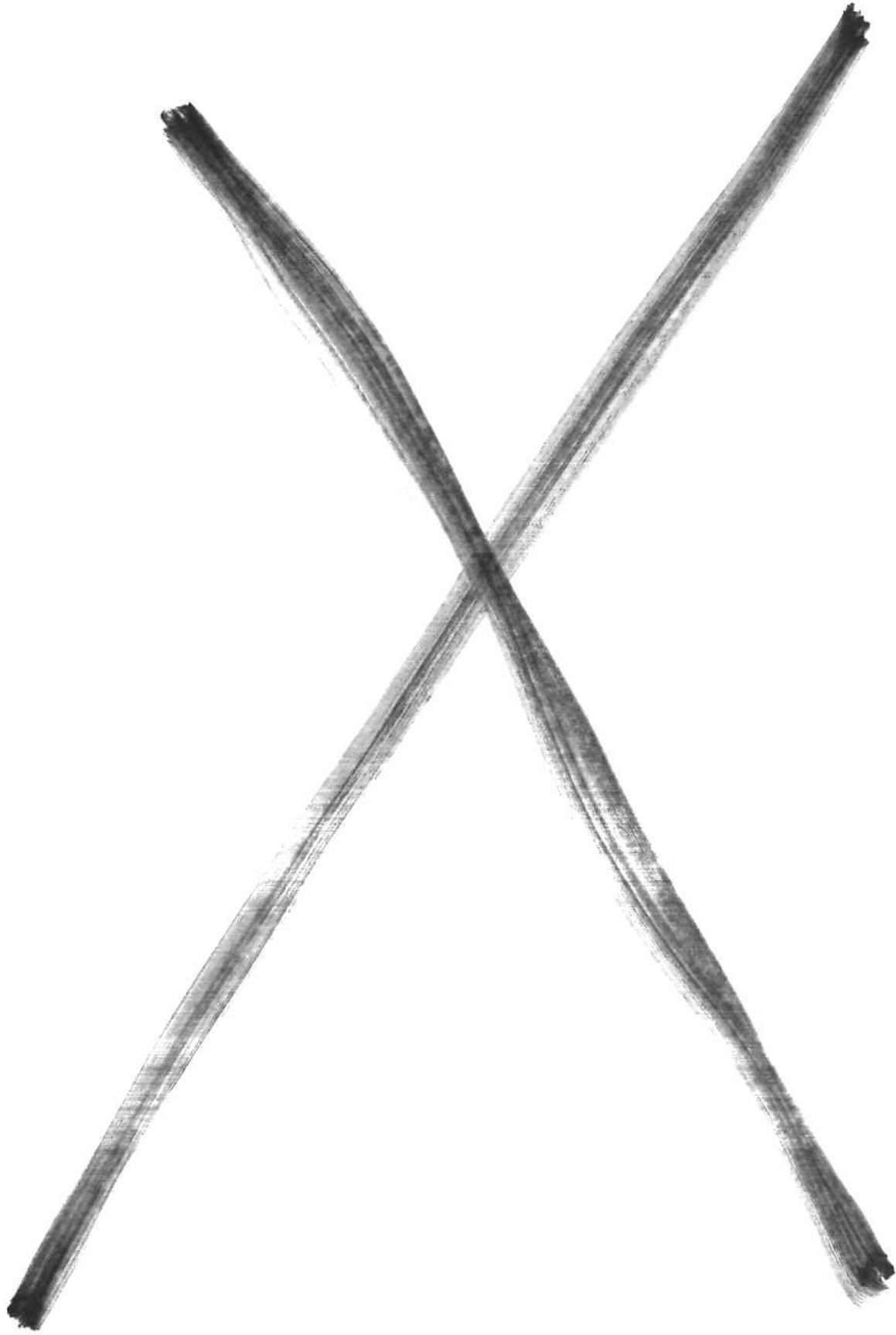


# Market Share

TABLE NUMBER: 24  
 TITLE: 1987 Software Market Share  
 APPLICATION: All Applications  
 PLATFORM: Personal Computer  
 REGION: Rest of World  
 UNITS: Millions of Dollars/Actual Units

Company	Market Share			
	Software Revenue	Software Units	Units < \$500	Units > \$500
IBM	.8	183	0	183
Autodesk	.7	825	314	512
Personal CAD Systems	.6	63	0	63
Versacad	.4	919	0	919
Ziegler Instruments GmbH	.4	132	0	132
Intergraph	.3	114	0	114
Futurenet	.3	10	0	10
Micro CAD/CAM	.2	480	0	480
Daisy	.2	15	0	15
Mutoh Industries	.2	23	0	23
Computervision	.2	37	0	37
Innovative Data Design	.1	1,333	1,333	0
Orcad	.1	464	464	0
ERDAS	.1	4	0	4
Racal-Redac	.1	15	0	15
Ithaca Software	.1	28	0	28
Zycor	.1	5	0	5
Prime	.0	10	0	10
Valid	.0	2	0	2
CADAM	.0	63	0	63
Control Data	.0	2	0	2
MacNeal-Schwendler	.0	5	0	5
Swanson Analysis	.0	4	0	4
Other Companies	.0	302	0	302
All Companies	4.8	5,038	2,111	2,928

Source: Dataquest  
 July 1988



## Appendix G—Glossary

### DATAQUEST CAD/CAM GLOSSARY

**accelerator.** Hardware used to increase throughput by decreasing processing time. An accelerator may be in the form of a plug-in board or a self-contained, standalone unit used in a network.

**AEC.** Architecture, engineering, and construction. See **facilities design**.

**analog.** Denotes the dominant component type, function(s), or circuit characteristics of a particular design. May include software-generated analog test instruments, such as oscilloscopes.

**annual GDP growth.** The percentage change in the gross domestic product (GDP), in local currency, from the previous year's GDP. This statistic allows one to view a country's growth independent of the dollar exchange rates.

**architectural.** Computer-aided tools intended for use in design and drafting of facilities' architectural aspects.

**A.S.E.A.N. (Association of Southeast Asian Nations).** An international organization whose members include Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand.

**Asia.** Includes China, Hong Kong, Japan, Korea, Singapore, and Taiwan.

**ASIC.** Application-specific integrated circuit.

**automated mapping/facilities management (AM/FM).** Software used to create and/or develop a digital map data base of corporate facility assets (AM) and the related software whose purpose is to efficiently and effectively manage the capital assets of the company through utilization of the digital data base.

**average price per seat.** The price a buyer pays for accessing a workstation or a CAD/CAM seat. (In the case of host-dependent systems, the system price takes into account the average workstation price and the average number of workstations per system. In the case of a technical workstation and personal computer-based workstation, there is a 1:1 ratio between the price of the system and the price of the workstation.)

**average system selling price.** The price a buyer pays for a CAD/CAM system, workstation, and all of the system's peripherals and software. (In the case of technical workstations and personal computer-based workstations, there is a 1:1 ratio between the price of the system and the price of the workstation.)

**balance of payments.** A double-entry accounting of the value of all exchanges and transfers of goods, services, capital loans, investments, and gold and international reserves between the public and private sectors of a given country and the rest of the world over a given time, usually one year. Balance of payments is divided into three accounts—current, capital, and the reserve and gold account.

**balance of trade.** The difference between the value of a country's exports and imports of *tangible goods* over a given period, usually one year.

**balance on current account.** See **current account**.

**behavioral simulation.** Simulation of ICs or systems that are based on high-level models, as opposed to gate, transistor, or switch-level models. Behavioral models can be of an entire section of an IC or system (e.g., I/O management) or of a specific complex component (e.g., a microprocessor or register).

**block place and route.** An IC design methodology for interconnecting large blocks in a design. The blocks can be made up of smaller cells or handcrafted custom blocks. A special placer positions the blocks to minimize the routing distances and optimize the IC performance. The blocks are then connected by a router or routers that takes into account the block topology.

**bundled software revenue.** The value of a turnkey system that is associated with application-related software.

**CAD.** Computer-aided design. The use of a computer for automated product design.

**CAM.** Computer-aided manufacturing. See **manufacturing automation**.

**capacity utilization.** The ratio of actual production output to potential production output, with existing plant, workers, and equipment.

**capital account.** Balance of payments category for the inward and outward flow of investment capital.

**capital goods.** All goods used for the *production* of other goods and services. See also **consumer goods**.

**cell-based IC.** An IC design methodology that allows creation of ICs or blocks within ICs from predefined cells that are placed and then routed together to create logic functions. See **block place and route**.

**channel type.** Identifies how CAD/CAM systems reach the end user; distinguishes the various distribution channels and marketing arrangements used when selling CAD/CAM systems.

**c.i.f.** Cost, insurance, and freight, or charged-in-full. For example, most nations record imports in terms of their c.i.f. value and exports in terms of f.o.b. (See f.o.b.)

**circuit simulation.** The process of simulating an IC at the switch, transistor, or device level. This is the most accurate form of IC verification. The best-known circuit simulator is SPICE, which was invented at Berkeley and is now available in the public domain. It is also available in enhanced forms from several suppliers.

**compound annual growth rate (CAGR).** Determines the average compound rate of growth over a specified period. (The formula used to calculate CAGR is (future value/present value) raised to the power of (1/number of years) - 1.)

**consumer.** An individual who buys goods and services for personal use, rather than for manufacturing, processing, or resale.

**consumer goods.** Products used directly to satisfy human needs or wants, such as food and clothing. The distinction between consumer and capital goods lies in how products are used rather than in the products themselves.

**consumer price indices (CPI).** Monthly measures by the U.S. Bureau of Labor Statistics of the average retail prices of products commonly bought by households, compared with the average prices of a selected base year.

**consumption.** Expenditures for durable goods, nondurable goods, and services.

**copyright.** An intangible right granted by statute to the author of certain works; a form of intellectual property.

**Council for Mutual Economic Aid (Comecon).** A council set up in 1949 to develop the member nations' economies for the purpose of achieving self-sufficiency. Members include: Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, and the U.S.S.R. with outer Mongolia.

**CPU installed base.** The installed base of CPUs at the end of a given year, minus any system retirements. (This element takes into account current year system shipments, estimated current year system retirements, and previous year system population.)

**CPU revenue.** The portion of revenue derived from a system sale that is related to the value of the CPU. (In the case of technical workstations and personal computer-based workstations, CPU revenue and workstation revenue are equal.)

**CPUs shipped.** The unit number of systems shipped. (In the case of technical workstations and personal computers, there is a 1:1 ratio of systems shipped and workstations shipped.)

**current account.** Balance of payments category for goods and services. The difference between total exports and imports of goods and services is the **balance on current account**.

**custom IC.** A handcrafted IC that has been constructed for a specific use by designing at the polygon level.

**dealer.** A product reseller with storefront selling to end users. A dealer's primary added value is distribution; secondary added values are service, training, and support.

**design rule checking.** The process of verifying that an IC or board layout meets known fabrication tolerances. Examples of such tolerances or rules include trace-to-trace spacing, via adjacency, or trace-to-via spacing.

**design service.** An organization that creates and/or executes CAD designs for external customers.

**deutsche mark.** German currency.

**direct channels.** The sale of CAD/CAM equipment directly to the end user by a vendor who contributes significant development or integration to the product. Can be either sales of complete systems by turnkey vendors or components of systems sold by individual suppliers.

**disposable income.** An individual's income remaining after any payments to government (taxes, fines) and thus available for either spending or saving.

**distributor.** (1) A wholesaler selling to dealers and large end users. Distributors primarily provide dealers and VARs with a warehouse of suitable inventory. (2) A company providing sales and product support services for another company that manufactures the product. Distributors in this case are usually based in a different country than the manufacturer.

**documentation.** A general term used to describe a large family of related documents, including drawings, specification or operation sheets, bills of materials, schematics, training manuals, technical illustrations, diagrams, or other documents. All or part of these documents may be created using CAD/CAM tools.

**dollar.** Currency term used for different currencies in Canada, Hong Kong, Singapore, Taiwan, and the United States.

**drachma.** Greek currency.

**drafting.** A process used to generate drawings in virtually all CAD/CAM applications.

**drafting software.** A program used to create mostly two-dimensional representations of a drawing or design. Drawings typically include noted information describing material, processing, and/or unusual manufacturing specifications.

**DRC/ERC.** Design rule check/electrical rule check.

**durable goods.** Items that yield their services over an extended period of time, generally three years or more. Durables are often divided into the categories of *producer durables* (e.g., metals, machinery, equipment) and *consumer durables* (e.g., automobiles, appliances).

**ECAE.** Electronic computer-aided engineering. Computer-aided tools used in the engineering or design phase of electronic products (as opposed to the physical layout of the product). Examples of ECAE applications are schematic capture, simulation, and test pattern creation. ECAE systems are used most often by electrical engineers.

**EDA.** Electronic design automation. Computer-based tools that are used to automate the process of designing an electronic product, including boards, ICs, and systems. Formerly referred to as ECAD.

**electrical.** Creation of a diagram of the logical arrangement of hardware in an electrical circuit/system using conventional component symbols.

**electrical rule checking.** A term used to describe two distinct types of design verification. ERC can refer to verifying that a final layout corresponds to the original design that was done prior to layout (netlist vs. layout). It can also refer to making sure that a logic design conforms to known process limitations (e.g., maximum fanout from a component). This second process is also called logic design rule checking (LDRC).

**electronic testing.** ECAE software applications used to create the test patterns that will be used during the manufacture of a product. Electronic test products include pattern editing, pattern generation, and fault grading or simulation.

**escudo.** Portuguese currency.

**Europe.** Includes Benelux countries, France, Italy, Scandinavian countries, United Kingdom, West Germany, and the rest of Europe.

**European Economic Community (EEC).** European countries that have joined together to form a common market. The 12 member nations include Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, West Germany, and the United Kingdom. The EEC provides a common external tariff, a common agricultural policy, a joint transportation policy, and the free movement of goods, labor, and capital.

**European Free Trade Association (EFTA).** In principle similar to the EEC, EFTA members include Austria, Finland, Iceland, Norway, Sweden, and Switzerland. Member nations have eliminated all import duties originating from goods of its members. Free trade agreements exist between the EFTA and EEC, exempting most industrial products and certain processed agricultural products from import duties.

**external debt.** The total sum of a country's public and private debt owed to foreigners.

**facilities design.** Also known as *AEC and facilities design/management*. The use of computer-aided tools by architects, contractors, plant engineers, civil engineers, and others associated with these disciplines to aid in designing buildings, power plants, process plants, ships, and other types of nondiscrete entities.

**Far East.** See Asia.

**fault simulation.** Also referred to as fault grading. A fault simulator is used to evaluate or grade the quality of test patterns relative to a design. Quality is determined by a measure of the coverage of the test vectors (i.e., the percent of the time that the patterns will identify potential errors in a circuit).

**federal debt, federal deficit.** See public debt, public deficit.

**FEM/FEA.** Finite element modeling/finite element analysis.

**finite element analysis.** Method for determining the structural integrity of a mechanical design by analyzing a finite element model to determine a structure's strength, safety, or performance characteristics. Typical applications include stress analysis, vibration analysis, acoustics, electromagnetics, and fluid/structure interaction.

**finite element modeling.** Creation of a mathematical model to represent a mechanical design by subdividing the design model into smaller and simpler elements, such as triangles or bricks, which are interconnected. The finite element model is composed of all interconnected elements, attributes such as material and thickness, as well as boundary conditions and loads.

**fixed investment.** Assets for production of goods or services that cannot be quickly converted into money without disrupting operations, such as plant and equipment.

**flat pattern.** The design and unfolding of a three-dimensional design of a sheet metal part.

**f.o.b. (free on board).** A term applied to the valuation of goods up to the point of embarkation; trade unit applied to exports.

**franc (Fr).** Currency term used in Belgium (BFr), France (FFr) and Switzerland (SFr). Different national francs trade at different exchange rates.



**gate array.** Software tools used to create ASICs. The gate array itself is a predefined pattern of transistors that a semiconductor supplier prefabricates on wafers. It is customized for users by interconnecting the transistors using one or more layers of metal.

**geographic information systems (GIS).** A computer-based technology, composed of hardware, software, and data used to capture, edit, display, and, most importantly, analyze geographic information.

**geologic modeling.** Software used to model the geology of the earth's surface and subsurface strata. Models may be several miles deep and are often used for geologic exploration.

**goods.** Tangible items of trade, such as automobiles or shoes. Merchandise.

**gross domestic product (GDP).** The market value of an economy's domestically produced goods and services. GDP is calculated as the gross national product (GNP) minus the net factor income from abroad. As used here, GDP is expressed in two ways: (1) in terms of 1980 US dollars and (2) in terms of a country's 1987 valuation of local currency. The 1987 GDP (\$US 1980) provides a basis for comparing the economic status of different countries, independent of short-term variations in exchange rates. The 1987 GDP (local currency) provides a basis for evaluating an individual country's growth, independent of the value of the US dollar in that country. From a CAD/CAM business perspective, this makes sense because most prices are set in local currency.

**gross national product (GNP).** GNP equals GDP plus the net of income accrued by domestic residents from investments abroad minus income earned in the domestic market by foreigners abroad.

**gross national product deflator.** A revision in the calculation of GNP derived by adjusting each component of GNP for price changes, then summing each into a weighted total. The result thus measures both changes in prices and shifts in consumption patterns.

**group technology.** A coding and classification system for combining similar, often-used parts into families to allow groups of similar parts to be retrieved, processed, and fabricated in an efficient, economical batch mode.

**guilder.** Currency used in The Netherlands; also known as gulden.

**hardware revenue.** The sum of revenue derived from the sale of CPUs, workstations, and peripherals.

**host-dependent.** A shared logic system in which the external workstations' functions are dependent on a host computer.

**HVAC.** Heating, ventilation, and air-conditioning design and analysis.

**hybrids.** A hybrid is made by putting several integrated circuit dies and/or passive components into a single package and interconnecting the dies inside of the package.

**IC layout.** Software tools that are used to create and validate physical implementations of an integrated circuit. IC layout tools include polygon editors for creating geometric data, symbolic editors, placement and routing (gate array, cell, and block), and DRC/ERC verification tools.

**image processing.** A variety of techniques for processing pictorial information by computer.

**increase over prior year.** Total revenue percent change over the prior year's total revenue. (The formula used for this calculation is (present year revenue minus previous year revenue) divided by previous year revenue.)

**indirect channels.** The sale of CAD/CAM equipment through independent dealers and distributors that do not contribute significant development or integration to the product. This channel is typically used for sales of personal computer-based CAD/CAM systems. Examples of indirect CAD/CAM suppliers include Businessland, ComputerLand, and National CAD Pro.

**industrial production index.** A monthly measure of the quantity of U.S. output in mining, manufacturing, and utilities industries compared with a base year and seasonally adjusted.

**inflation.** A sustained increase in the average level of all prices.

**input devices.** A variety of data entry devices, such as mice, digitizers, or scanners, that allow users to communicate with CAD/CAM systems.

**intellectual property.** The intangible product of intellectual, scientific or artistic creation associated with four bodies of law: copyright, patent, trade secret, and (in the United States and other countries) legislation providing specific protection for semiconductor mask designs.

**internal debt.** The total sum of a country's public and private debt owed to citizens of the same country.

**International Monetary Fund (IMF).** A fund established to provide international cooperation in the monetary field and the removal of foreign exchange restrictions, to stabilize exchange rates and to facilitate a multilateral payments system between member countries.

**investment.** Expenditures for capital goods.

**invisibles.** Items of foreign trade that are intangible, such as banking, insurance, tourism, and transportation . Unlike visibles, such items are not recognized by customs and until recently were not reported in trade statistics.

**kinematics.** An MCAE process for plotting or animating the motion of parts in a design. Kinematics simulation allows the motion of mechanisms to be studied for interference, acceleration, and force.

**krona (SKr).** Swedish currency.

**krone.** Currency term used to refer to Danish (DKr) and Norwegian (NKR) currencies. The different krone trade at different exchange rates.

**lira.** Italian currency.

**logic design automation.** Tools used to automate the process of design specification and creation of electronic circuits, including behavioral/architectural tools, logic minimization, technology conversion, and automatic schematic synthesis/generation.

**logic simulation.** ECAE software that verifies the logic and timing behavior of a digital electronic design.

**manufacturing.** The process of producing finished goods; the people and equipment used to plan, build, and operate production, fabrication, assembly, and test equipment. It also refers to the use of CAD/CAM in the manufacturing process.

**manufacturing automation.** Use of a computer to aid and improve a manufacturing process.

**manufacturing engineering.** An organization responsible for the efficient design of the manufacturing process. It involves the design of tooling, fixtures, and procedures.

**manufacturing process simulation.** Computer-aided simulation of the manufacturing process. Numerical control, off-line robot, and coordinate measuring machine programming are examples of CAD/CAM manufacturing applications.

**map compilation.** Software used in the process of manually entering discrete spatial data items, including symbols and text, into a digital map file.

**map conversion.** Software that converts existing hard-copy maps to a computer data base.

**mapping.** Computer-aided tools that allow geographically related data to be captured, edited, analyzed, and managed. Typical users are civil and utility engineers, geophysicists, and geologists.

**mechanical.** Mechanical CAD/CAM is the application of computer-aided tools to design, analyze, document, and manufacture discrete parts, components, and assemblies.

**mechanical computer-aided engineering (MCAE).** The application of CAD/CAM tools for mechanical design and analysis. MCAE applications range from conceptual product design through detail product design and analysis, and supporting production product design. Commonly used MCAE products are solid modeling and finite element analysis technology.

**mechanical testing.** Software that combines and compares simulated test data with laboratory test data for further analysis prior to manufacture; includes modal analysis.

**mechanisms.** Software that models machinery capable of mechanical action. See kinematics.

**mold design/analysis.** Typically means design of plastic injection molds and analysis of material flow; can also include design and analysis of molds for any material.

**nesting.** Arrangement of multiple parts on a larger sheet or plate for optimum use of material.

**net factor income from abroad.** Income earned by residents of a country from labor supplied to foreign countries or from net claims on foreign assets.

**newly industrializing nations (NIC).** Reference to countries with GNPs that only recently show a significant industrial component, e.g., Hong Kong, Korea, People's Republic of China, Singapore, and Taiwan.

**N.I.C.** See newly industrializing nations.

**nominal GDP/GNP.** GDP/GNP valued in prices prevailing at the time of measurement. Year-to-year changes then reflect differences in both quantities and market prices.

**nondurable goods.** Items that yield their services over a short period of time, generally less than three years. Examples are food, clothing, paper, chemicals, petroleum, and rubber.

**nonturnkey channels.** These channels allow users to pick and choose individual system components (e.g., computers, software) and perform system integration to assemble complete CAD/CAM systems. Examples of vendors who sell components directly to end users include software vendors such as Futurenet, MacNeal-Schwendler, and PDA Engineering. Examples of nonturnkey hardware vendors include Apollo, Digital Equipment, and IBM.

**North America.** Includes the United States, Canada, and Mexico.

**numerical control.** A technique of simulating the operation of a machine tool. Also the process that generates the data or tapes necessary to guide a machine tool in the manufacture of a part.

**Organization for Economic Cooperation and Development (OECD).** The OECD arose from the European Recovery Program, originally set up to guide efficient distribution of U.S. aid to Europe following World War II. Under the original agreement, multilateral trading was reestablished along with a system of trade adjustments and restrictions. The organization's activities have more recently included freeing labor and capital payments. Member nations include: Austria, Belgium, Denmark, and France.

**output devices.** A variety of devices, such as plotters and printers, that make hard copies of designs, documentation, or analysis created on a CAD system.

**patent.** A legal monopoly granted to an inventor. The U.S. Patent Act defines patentable inventions as any new and useful process, machine, manufacture, or composition of matter.

**PCB layout.** Products that are used to create the layout of the traces and components to be placed on a printed circuit board.

**penetration.** The amount of the total available market (TAM) that is using a CAD/CAM system. It is expressed as either a ratio of the number of users per system or as a percent of TAM using a system.

**peripherals revenue.** The value of all peripherals of a system sale. (Peripherals include all hardware except the CPU itself and any associated workstations.)

**personal computer.** A single-user computer with a nonvirtual operating system whose networking, high-performance graphics, or multitasking capabilities are optional features rather than integrated capabilities. A personal computer's operating system is typically DOS, OS/2, or Apple's Macintosh System.

**peseta.** Spanish currency.

**pipng.** Software for design and analysis of a facility's pipe network.

**platform.** A group of computer products with common characteristics, i.e., the personal computer platform.

**PLD.** Programmable logic device. A type of application-specific IC that is user programmable rather than mask programmable. The function of a PLD is determined by blowing fuse links or programming memory devices to create the desired interconnections between the fixed logic elements on the device.

**pound.** Currency used in the United Kingdom.

**private.** Relating to individuals and businesses, rather than government.

**producer price indices (PPI).** Monthly measures by the U.S. Bureau of Labor Statistics of the prices of 2,800 representative commodities compared with those prices of a given base year.

**production planning.** Software used to plan for all factory resources of a manufacturing company.

**public.** Relating to local, state, or national governments.

**public debt.** The sum of debts outstanding of local, state, and national governments in a given country. Debt of the national government alone is the *national public debt* or *national debt*. In effect, the public debt is a measure of the extent to which government expenditures are financed by borrowing rather than taxation.

**public deficit.** Circumstance where government outlays for goods and services exceed receipts for a fiscal year.

**real effective exchange rate.** An exchange rate measure that takes into account inflation differences between countries. This is the exchange rate multiplied by the real exchange rate.

**real exchange rate.** The exchange rate between two currencies divided by the ratio of the price levels of the two countries.

**real GDP/GNP.** GDP/GNP valued in *constant* prices prevailing in a reference base year—1982 in this publication. Year-to-year changes thus reflect changes only in *quantities* produced.

**real GDP growth rates.** GDP growth, expressed as a percentage, here represents aggregates at 1980 prices and 1980 exchange rates. This measure factors out inflation.

**recession.** A broad downward movement of the economy over an extended time. Generally defined for the United States as two successive quarterly decreases in U.S. GNP.

**renminbi.** Internally traded currency of the People's Republic of China.

**rest of world.** Includes territories not included in North America, Europe, or the Far East.

**retirement.** The number of CPUs or workstations that are retired in any given year from general day-to-day CAD/CAM use. The retirement model takes into account product life cycles.

**robotics.** Programs for controlling robots.

**schematic capture.** Automated graphic design entry method that allows a designer to define the logic of a circuit to create a schematic design. Following schematic capture, a netlist (list of logic components and their logical connections) can be produced.

**schilling.** Austrian currency.

**seasonal variation.** A regularly recurring pattern of change in economic activity owing to factors such as periodic climate changes, holidays, and vacations. Seasonal variations are commonly adjusted for in the analysis of data to clarify overall trends.

**server.** A hardware device attached to a network to facilitate sharing or managing resources.

**service revenue.** Revenue derived from the service and support of CAD/CAM systems. (Service revenue does not include revenue from the portions of a company's business related to service bureaus or product designs.)

**services.** Intangible items of trade, such as education, transportation, banking, and legal and medical care.

**shipment.** Shipment estimates include only products actually delivered to paying customers, not the total number manufactured (the backlog).

**silicon compilation.** IC design methodology that employs high-level specifications to automatically generate the mask tooling as output. A silicon compiler is a layout system; silicon compilation is a design method.

**site engineering.** Software used for the modeling of the earth's surface, permitting the development of manipulated models to examine alternative designs for cut and fill operations.

**software revenue.** The sum of bundled and unbundled software revenue.

**solid modeling.** Representation of all the external and internal geometry of a part, allowing the solid nature of an object to be represented in a computer. Solid models are constructed in two ways: using primitive building blocks (constructive solid geometry) and/or using boundary definitions (boundary representation).

**specification/assessment.** Software that allows definition of high-level behavioral and performance characteristics of an electronic product.

**structural.** Software for modeling and analysis of the integrity of a structure.

**surface-mount design.** Design methodology that supports designs using surface-mount devices (SMDs). SMD is a type of IC package that can be attached to the surface of a PC board, as opposed to through-hole mounted devices.

**system.** Comprises many parts, including the computer, operating system, peripherals, graphics devices, and application software. (The lowest common denominator of a system is that it contains the CPU that runs the operating system. By this definition, technical workstations and personal computer-based workstations are also counted as systems.)

**system revenue.** Revenue derived from system sales. (System revenue does not include service revenue. System revenue is the sum of CPU revenue, workstation revenue, bundled software revenue, and peripherals revenue.)

**technical publications.** Software to create product information in a format suitable for use outside of the engineering and manufacturing environments. Products provide for merging of text and graphics; typical applications include operating/maintenance manuals and technical illustrations.

**technical workstation.** A single-user computer with a virtual, multitasking operating system designed to run high-performance graphic applications in a networked environment. A technical workstation's operating system is typically UNIX, VMS, or DOMAIN.

**terms of trade.** The ratio of the average price of a country's exports to the average price of its imports.

**third-party software.** Software sold directly to end users or resellers, as opposed to software that is a part of a turnkey system.

**three-dimensional.** A representation of the surface or edges of a design that contains X, Y, and Z coordinates.

**total available market (TAM).** The universe of technical professionals that could benefit from the use of a CAD/CAM system.

**total revenue.** Total CAD/CAM-related revenue received, measured in U.S. dollars. It is the sum of system, unbundled software, and service revenue. Total revenue as reported does not include revenue that a company may receive from products that are sold to another company for resale (OEM revenue).

**total workstations shipped.** The sum of workstations shipped.

**trademark.** The U.S. federal trademark laws define a trademark as "any word, name, symbol or device . . . used by a manufacturer or merchant to identify his goods"; a form of intellectual property.



**turnkey.** A complete CAD/CAM system that includes a computer, a graphics workstation, an operating system, application software, and any applicable peripherals. A turnkey sale also typically provides full system support, including system maintenance, product training, and software for applications support.

**turnkey channels.** The sale of a complete CAD/CAM system, including computers, graphic workstations, operating systems, applications software, and any applicable peripherals. A turnkey sale also typically provides full system support, including system maintenance, product training, and software or applications support. Turnkey vendors essentially act as systems integrators by integrating the various components into complete systems. Examples of turnkey CAD/CAM vendors include Computervision, Daisy Systems, IBM, Intergraph, Mentor, and Prime Computer.

**unbundled software.** See **third-party software**.

**unbundled software revenue.** Revenue derived from the sale of software only, or software that is not sold as part of a turnkey system. (Unbundled software is sold by software-only companies as well as by a growing number of turnkey companies.)

**value-added reseller (VAR).** A product reseller whose primary added value is to the product itself, in the form of software or integration. VARs typically operate from one geographic area, do not maintain a storefront, and sell a specific application solution to end users.

**value-added tax (VAT).** A general tax applied at each point of exchange of goods or services from production to final consumption. The tax is levied on the difference between the sale price of the goods and services and the cost of goods and services bought for use in production. The VAT is a form of indirect taxation applied by the EEC, used as a basis for contributing to the community budget.

**visibles or visible goods.** Tangible items of foreign trade.

**workstation.** Commonly referred to as a "seat," a workstation is where CAD/CAM activities are performed. It may be any one of the three platforms.

**workstation installed base.** The workstation installed base at the end of a given year, less any workstation retirements. (This element takes into account current year workstation shipments and retirements and the previous year workstation installed base.)

**workstation revenue.** Revenue derived from the sale of workstations that are used to graphically create, analyze, or manipulate designs. In the case of technical workstations and personal computers, CPU revenue and workstation revenue are equal.

**workstations shipped.** The total number of workstations shipped as parts of systems. (In the case of technical workstations and personal computer-based workstations, there is a 1:1 ratio of system shipments and workstation shipments.)

**workstations-shipped-to-date.** The cumulative number of workstations shipped by a CAD/CAM vendor. This differs from installed base in that it does not take into account retirements.

**World Bank, The.** International bank with the purpose of encouraging capital investment for the reconstruction and development of its member countries, either by channeling the necessary private funds or by making loans. The bank began operations in June 1946 as a post-war reconstruction effort.

**yen.** Japanese currency.

**yuan.** The externally traded currency of the People's Republic of China.

