
SUN WORKSTATION INC.

Preliminary Business Plan

February 12, 1982

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Mission

Develop, manufacture, market, and support graphics workstations for OEM CAD/CAM marketplace. Evolve a family of compatible graphics workstations. Maintain lead with the best cost/performance product on the market.

Objectives Over Next Four Month: February 1982 - May 1982

1. **PRODUCT.** Bring SUN workstation, a completely designed and tested product, to market. Make first customer shipments by May 31, 1982.
2. **DEVELOPMENT.** Define a product family for the OEM market, including enhancements, options, and software for OEMs. Begin development of distributed UNIX operating system.
3. **PEOPLE.** Assemble a team of people to lead the company through its rapid growth. Recruit high-level marketing and software expertise.
4. **PLANNING.** The following pages contain a preliminary business plan designed to present the overall picture. A full operating plan and budget will be worked out by May 31, 1982.
5. **FINANCING.** Estimates for seed financing are outlined in Appendix B. Objective is to obtain seed money in February 1982 and full funding by May 31, 1982.

Tentative 2-year Plan

Following the launch in June 1982 we plan to achieve the following objectives:

1. **SALES.** Deliver 500 units in the first year at an ASP of \$8,000 for total sales of \$4M in Fiscal 1983. Ship 1500 units in the second year for sales of \$10M.
2. **OPERATIONS.** Set up an operating company with 50 employees by the end of the first year and 150 employees by the end of the second year. Implement proper manufacturing and testing procedures, financial and accounting controls, and an international marketing and customer support organization.
3. **FINANCING.** Manage company growth to produce break-even cash flow by the end of the first year. At that time it is expected that \$750,000 will be required to finance inventory, \$1,000,000 to finance accounts receivables, and \$500,000 to finance cumulative losses and capital equipment. The balance of the expected \$2,500,000 financing together with receivables financing will provide working capital. Appendixes C and D list the development and staffing requirements over the next year.

Product: The SUN Workstation

SYSTEM. The SUN workstation is a powerful modular network-based graphics workstation. Its primary use is as a single-user computer with high resolution high performance graphics capabilities and substantial local processing power. Its modularity permits it to be reconfigured for a variety of applications, including support for networks of SUN workstations in the form of printer servers, file servers, terminal concentrators, and gateways. Such a system provides a suitable hardware base to support design automation, advanced text processing, office automation, distributed systems, computer aided manufacturing, robotics, and many other interactive graphical computing tasks.

Adhering to popular industry standards - the Motorola 68000, the Intel Multibus, the Xerox Ethernet, Bell Lab's UNIX operating system and standard programming languages, the SUN workstation easily integrates into an OEM environment.

HARDWARE. The SUN workstation consists of a bitmap display, keyboard, network connection, and processor. A "mouse" pointing device may be connected to the keyboard. The display has 1024 by 800 pixel resolution and can show arbitrary raster images, thus permitting variable width fonts, foreign alphabets, mathematical symbols, vectors, curves, shaded regions, and even photographic pictures. The processor is based on the Motorola 68000 CPU and provides full virtual memory management hardware. High performance is achieved by a 10 MHz 68000 operating at full speed without wait states. The SUN workstation uses Ethernet as its local network, although other network technologies can be supported as well. The network connection allows many SUN workstations to be tied together to exchange messages and electronic mail and to share services such as file storage and printing.

SOFTWARE. Three commercial versions of the Bell Lab UNIX operating system are available for the SUN workstation: Microsoft Xenix, Unisoft Unix, and Lucasfilm Unix. Commercially available PASCAL, FORTRAN, and ADA compilers have been demonstrated on the system.

Summary of Key Competitive Advantages

- Low cost graphics workstation for scientific-engineering-CAD marketplace.
- High-resolution, high-speed graphics capability for text and lines.
- Design based on emerging industry standards: 68000, Multibus, Ethernet, UNIX.
- Lowest chip-count, therefore high reliability
- Proven hardware design, available today.

Market: OEM Workstations

The company intends to focus initially on the OEM market for high-performance graphics workstations with computational and networking capabilities. Target customers are all companies serving the turnkey CAD/CAM, robotics, process control, simulation and modeling, and other specialized industrial markets.

Currently most CAD/CAM workstations are priced in the \$40,000 to \$200,000 range. At this price it is difficult to justify one workstation per engineer or professional. The SUN workstation breaks new cost/performance barriers with a hardware price of \$5000 to \$7000 in OEM quantities. This will enable OEMs to sell their workstations at an end-user price of \$10,000 to \$20,000.

The SUN workstation has been reviewed and acclaimed by the scientific community. Literally hundreds of inquiries have been received without any active marketing. Cadlinc, a company licensed to manufacture the SUN workstation for their turnkey CAD system, has expressed a strong interest in entering the OEM market and projected sales of 1500 workstations at \$7500 ASP in the first year.

This tremendous interest is prompting us to launch a new company whose specific mission is to exploit this market. The proposed company, lead by the original designers, is in the best position to take this product immediately to market. Concurrently, a family of hardware configurations and support software will be developed to provide the OEM with a range of options. Support software will be targeted to aid OEM software development. A cost reduction effort is planned to introduce a lower cost product by November, 1982.

Summary of Marketing Approach

- Focus on OEM sales for maximum growth.
- Target initial production at OEM customers for software development.
- Put SUN workstations into selected universities to gain visibility.
- Develop options/cost reductions as market requires.

Competitors

Competitors are:

- Workstation manufacturers: Apollo, Three Rivers, and Xerox.
- Graphics System manufacturers: Genisco, Lexidata, Megatek, RamTek, Tektronix.
- Minicomputer manufacturers: Data General, DEC, HP.
- Personal Computer manufacturers: Apple, Fortune, Tandy.

Primary competitors are the workstation manufacturers. Only workstations with full-page graphics capability and high-speed local area networks are considered in the following brief comparison.

Apollo Computers Inc. The Apollo Domain product has similar capabilities to the SUN workstation: 68000, high-resolution graphics, networking. However, the Apollo is based on a proprietary operating system (DOMAIN) and proprietary network technology, making it less easy to use in an OEM environment. The Apollo does feature virtual memory capabilities that the SUN does not have until the 68010 processor is introduced later this year. The Apollo has a retail price of \$25,000 per workstation without disk.

Three-Rivers Computer Corp. The PERQ workstation product also has similar capabilities to the SUN workstation. It is based on a bit-slice computer architecture and is difficult to use because of the limited software available. Unit price is in excess of \$30,000, with pricing flexibility limited by high manufacturing costs.

Xerox Corp. The Xerox Star workstation has very similar capabilities to the SUN workstation, with identical networking and graphics capabilities. Xerox is marketing the Star to the office automation market turnkey system but might also be selling into the OEM market. The Star system is based on a bit-slice, microcoded processor that is difficult to use for an OEM. The only programming language available is MESA, a Xerox-internal, proprietary language. A Star unit price is \$20,000 including software license.

Summary of Competitive Position

- Primary competitors are the workstation manufacturers.
- Existing competitors have committed themselves to proprietary processors, operating systems, or programming languages that limit their flexibility.
- SUN workstation is 50% to 70% lower cost than competing products currently on market.

Patents, Rights and Other Disclosures

Rights. The original SUN workstation design has been performed by Andy Bechtolsheim while being a student at Stanford University. Subsequently, Stanford has released all their rights to the design to Andy's company, VLSI SYSTEMS INC, which copyrighted the design and maintains it as a trade secret.

Patents. The SUN workstation design includes two novel ideas on which invention disclosures have been filed: the graphics subsystem and the processor memory management. No patents have been applied yet, but need to be filed before April 30, 1982, since the concepts were first published one year ago that day (publication bar). These patents might be useful to deter reverse engineering.

Licenses. Over the last year, a number of companies have been licensed to manufacture parts of the SUN workstation design, usually for a specific turnkey application. All licenses entered are non-exclusive and non-transferable. The companies licensed are: Bridge Communication, Cadlinc, Codata, Forward, Imagen, and Pacific Microcomputer.

Out of these companies, the only ones potentially competing with the company are Cadlinc and Forward, since they also are building the graphics board. The other companies have only licenses to the 68000 Board, which Bridge is using as a network controller, Codata for their UNIX system, Imagen as a laser printer controller, and Pacific as a board-level product.

Cadlinc is a Kleiner-Perkins startup to market mechanical CAD software. Their mission is to offer a CAD turnkey system based on the SUN workstation. The license agreement with Cadlinc was entered with the understanding that they will use the design solely for this purpose. However, with the publicity surrounding the SUN workstation, Cadlinc now sees an opportunity in entering the OEM workstation market, even though they have no marketing or manufacturing in place for this market. The company believes that Cadlinc can be legally delayed from entering the OEM market, but also believes that it will be possible to negotiate a non-competing agreement with Cadlinc.

Forward Technology is a startup Santa Clara company that has been licensed to manufacture the 68000 board and the graphics board. Forward is intending to move into the workstation marketplace and is currently seeking funding for this purpose. However, the company evaluates Forward's technical team and their current market position not as a serious threat to the company.

Summary

The initial product of the company, the SUN workstation, has been designed by one of the company founders while at Stanford University. Stanford has released all rights to the design to the founder. The company plans to obtain patents on aspects of the design, however, no patents have been filed yet. Parts of the design have been licensed to other companies, two of which are potential competitors. However, the company does not consider that its success will depend on its ability to obtain and defend patents or on the licenses made; rather, the company believes that its success will primarily depend on the innovative skills, technical competence, and marketing abilities of its management.

Current Team

- 1. Andreas Bechtolsheim, Ph.D. student at Stanford University, was the principal designer of the SUN workstation while at Stanford. Responsibilities: engineering and development, production engineering, new product definition.**
- 2. Vinod Khosla, M.S., MBA Stanford University, was a member of the founding team of a successful CAD startup (Daisy Systems). Responsibilities: overall management, finance, strategic planning.**
- 3. Scott McNealy, MBA Stanford University, is currently Director of Operations at Onyx Systems. Responsibilities: Operations.**
- 4. Vaughan Pratt, Professor of Computer Science, Stanford University. Vaughan has managed the SUN project at Stanford over the last year and was the main implementor of the SUN software environment. Vaughan is available to the company as a consultant.**

Appendix A: Costs**Product:**

- SUN-1: Current SUN workstation.
- SUN-2: Single Board Version of SUN-1.
- SUN-3: Custom LSI Version of SUN-2.

Direct Material Costs (qty 1000/year):

	SUN-1	SUN-2	SUN-3
Electronics (ICs):	\$1100	\$1000	\$800
Other Parts:			
Monitor:	\$400	\$360	\$300
Keyboard	\$120	\$100	\$70
Mouse	\$180	\$100	\$80
Power Supply	\$100	\$60	\$60
Packaging	\$800	\$300	\$200
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Subtotal	\$1400	\$800	\$700
Total Material Cost:	\$2500	\$1800	\$1500
Direct Labor (10%)	\$250	\$180	\$150
Indirect Labor (10%)	\$250	\$180	\$150
Total Manuf. Cost	\$3000	\$2240	\$1800
Average Selling Price:	\$7000	\$6000	\$4000

Appendix B: Financial Requirements February 1982 - May 1982

Salaries (6 people at \$ 2,000/month + benefits)	\$ 80,000
Marketing, Advertising, and Sales	\$ 15,000
Hardware Development	\$ 25,000
Software Development (UNIX license fees)	\$ 60,000
G & A (including travel and legal)	\$ 15,000
Rent & Utilities	\$ 5,000

Total Expenses:	\$ 180,000
Inventory (20 systems at \$3,600)	\$ 70,000

Total Cash Requirement:	\$ 250,000

Appendix C: Developments Required

Hardware:	Start	Resp.
Color Graphics	2/1	HW2
10 MBit Ethernet Interface	5/1	HW1
Disk Controller	6/1	HW1
SUN-2 Development	7/1	HW1
Floating Point Processor	7/1	HW2
Packaging	2/16	HW1
Vendor Selection	2/16	HW1
Diagnostics	3/1	HW3
Software:		
Single User Unix	2/16	SW1
Mouse Programming	3/1	SW2
Graphics Library	2/16	SW2
Distributed Unix	2/16	SW1
Network Software	4/1	SW3
Software Development Aids	6/1	SW4
General & Administration:		
Form Corporation	2/1	ALL
Seed Financing	2/16	ALL
Full Financing	4/16	ALL
Business Licenses	2/16	GA1
Establish Payroll	3/1	GA1
Investor Relations	2/8	GA1
Recruiting	2/16	ALL
Accounting System	3/1	GA1
Budgets, Control & Planning	2/16	GA1
Facilities	2/16	GA1
Banking	2/16	GA1
Marketing & Sales:		
Evaluation & Development Units	3/16	MS1
Brochures and Advertising	3/16	MS1
OEM sales	5/1	MS1
Competitive Analysis	5/1	MS1
Sales Training	4/1	MS1
Public Relations	4/1	CONS.
Trade Shows	6/1	MS2
Sales Offices	7/1	MS.

Appendix D: Stuffing Plan 1982-1983

Function	FEB 82	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN 83	FEB	MAR
Hardware														
Engineers	1	1	1	2	2	3	3	3	3	3	3	3	3	3
Support	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Software														
Engineers	2	2	3	4	5	5	5	5	5	5	6	7	7	7
Support	0	0	1	1	1	1	1	1	2	2	2	2	2	2
Mkt. & Sales:														
Management	0	1	1	1	2	2	2	2	2	2	2	3	3	3
Sales	0	0	0	0	0	2	2	2	3	3	3	4	4	4
Appl Eng.	0	0	0	0	0	1	1	1	2	2	2	2	2	2
Support	0	0	0	0	0	1	1	1	2	2	2	3	3	3
Gen. & Admin.:														
Management	1	1	1	1	1	1	1	1	1	2	2	2	2	2
Finance	0	0	0	0	0	1	1	1	1	1	1	2	2	2
Personnel	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Support	0	1	1	1	1	1	1	1	3	3	3	4	4	4
Manuf. Oper:														
Management	0	1	1	1	1	2	2	2	3	3	3	3	3	3
Buyer	0	0	0	0	1	1	1	1	2	2	2	2	2	2
Technician	0	0	1	1	1	1	1	1	2	2	2	4	4	4
Hourly	0	0	0	0	0	1	2	2	3	4	4	4	4	5
Clerical	0	0	0	0	0	1	1	1	1	2	2	2	2	2
QA Eng	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Total Employ:	5	8	11	13	18	26	27	27	36	40	40	50	50	51
Units Produced:	-	-	-	-	-	5	15	25	30	35	40	45	50	55