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 product to market. Make first customer shipments of the SUN workstation 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, the C, PASCAL and ADA programming languages, the SUN workstation makes it as simple as possible for an OEM to integrate the SUN workstation into his system.

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. The design allows a 10 MHz 68000 to operate at full speed without wait states. The SUN workstation uses Ethernet as its local network. The Ethernet 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

- Lowest 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 $15,000.

The SUN workstation has been reviewed and acclaimed by the scientific community. Literally hundreds of inquires 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

There is external and internal competition. External competitors are:

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

Primary competition is the workstation manufacturers.

Apollo Computers Inc. The Apollo Domain product has similar capabilities to the SUN workstation: 68000, high-resolution graphics, networking. Compared to the SUN workstation, the Apollo has the disadvantage of a non-standard operating system (DOMAIN), non-standard network technology, and a retail price of $25,000 per workstation.

Three-Rivers Computer Corp. The PERQ workstation product again 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 a SUN workstation, with identical networking and graphics capabilities. Xerox is targetting the Star to the office automation market but might also being selling into the OEM market. However, the Star system is based on a bit-slice, microcoded processor that is difficult to use for an OEM. Also, the only software Xerox offers is a proprietary programming language called MESA.

Internal competition are companies that have been licensed to build SUN workstations or SUN workstation components, usually for a special turnkey application. These companies are: Cadlinc, Codata, Forward, Imagen, and Pacific Microcomputer.

Cadlinc is a Chicago-based startup CAD company. The license agreement with Cadlinc was entered with their intention to use the design solely for a turnkey CAD workstation. With the publicity surrounding the SUN workstation, and Cadlinc being the only manufacturer of the workstation so far, Cadlinc is now planning to enter the OEM workstation market since they see an opportunity of selling 1500 SUN workstations in their fiscal 1983. Cadlinc has currently no marketing, sales, or manufacturing in place for this market. It is believed that Cadlinc can be legally delayed from entering the OEM market.

Codata is a $3M Sunnyvale company selling standalone UNIX systems based on the SUN 68000 board. They have no license to other parts of the system.

Forward Technology is a startup Santa Clara company currently selling the SUN 68000 board and the graphics board, but intending to move into the workstation marketplace.

Imagen builds the SUN 68000 board as their laser printer controller. They are not selling the board.

Pacific Microcomputer is a very small San Diego company selling the SUN 68000 board.

Patents and Other 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.

The SUN workstation design includes sufficiently novel ideas that we have filed invention disclosures on two aspects of its design: the graphics subsystem, and the processor memory management.

No patent applications have been filed yet. Patents need to be filed before April 30, 1982, since the concepts were first published one year ago that day (publication bar).

The design itself has been copyrighted, and the engineering documentation is maintained as a trade secret by VLSI SYSTEMS.

Current Team

1. Andreas Bechtolsheim, Ph.D. student at Stanford University, the principal designer of the SUN workstation while at Stanford. Responsibilities: engineering and development, production engineering, system 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.

The team will be expanded over the next few month, concentrating on the areas of marketing and software. In addition, the company can draw on consultants that are currently with VLSI SYSTEMS:

1. 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.

2. Forest Baskett, Professor of Computer Science, Stanford University, Forest started the SUN workstation project and defined some of its key architectural features. Forest is currently with Xerox Corporation.

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	$350	$300
Keyboard	$120	$100	$70
Mouse	$180	$100	$80
Power Supply	$100	$50	$50
Packaging	$600	$300	$200
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	$5000	$4000

Appendix B: Financial Requirements February 1982 - May 1982

Salaries (6 people at $ 2,000/month + benefits)	$ 60,000
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 $3,500)	$ 70,000
Total Cash Requirement:	$ 250,000

390-049

HW Hardware Eng.
ME Manuf. Eng
SW Software Eng
TW Technical writer
AE Applications Eng.
MB Marketing
GA General & Admin.
MO Manufact Operations

Appendix C

(○) EARLIEST REQUIRED

ENGINEERING DEVELOPMENTS REQUIRED

Mouse & keyboard

	START DATE	RESP. INDIV.	COORD. WITH
Hardware (HW)			
Foreign version of SUN-1	6/1	HW2	
10 MB Ethernet & Transceiver	5/1	HW1	
Single disk workstation integration	(2/15)	HW1	SW1
Color graphics	(8/1)	HW3	HW1/MK2
Product family (cost reduction, options etc.)	7/1	HW1	HW2/MK2
File Server / gateway hardware	2/1	HW1	SW2
Floating point processor	7/1	HW2	HW1
Patent filing	3/1	HW1	
Ongoing debug & maintenance	5/1	(HW2)	HW1
Manufacturing Engineering			
EMI/RFI & safety requirements	5/1	ME1	Consultant
Acceptance tests (at all levels)	4/1	ME1	HW2
Primary & second sources "Vendor Selections"	2/15	ME1	HW1
Diagnostics	3/1	HW2	ME1
Documentation	(3/1)	HW2/ME1	HW1
Parts list & standard costs	3/1	ME1	HW1
Packaging	(2/15)	ME1	HW1/MK1
Software (SW)			
Single user UNIX	(2/15)	SW1	SW2/HW1
Distributed UNIX	(2/15)	SW2	SW1/HW1
Software development aids (PWB)	(6/1)	SW5	SW1/SW2
Text editor	(5/1)	SW4	AE1/MS2
Graphics editor	5/1	SW9	AG1/MS2
Benchmarks	(6/1)	AE1	MS2
File server / gateway software	3/15	SW1	HW1/SW2
Documentation	(5/1)	TW1	
Programming languages	(4/1)	SW3	
Software configuration management	(10/1)	SW4	

Mouse Programming.
Networking Software
Graphics Software
(UNIX (single user/diri.)
Fileserver

Exhibit 3 (continued)

ORGANIZATIONAL DEVELOPMENTS REQUIRED

	START DATE	RESP. INDIV.	COLLAB. WITH
General & Administrative (GA)			
Form corporation - (select names, lawyers, auditors, bankers, sort licenses)	(2/8)	GAI/HWI	
Seed financing	2/15	GAI/HWI	
Full financing	4/15	GAI/HWI	
Business licenses ... (county, State, Federal, sales) & filings (taxes etc).	2/15	GAI	Consultant
Establish payroll, benefit, & insurance programs	3/1	GA--	GAI
Investor relations / reports	2/8	GAI/HWI	
Recruiting	2/8	GAI/HWI	
Accounting system (cost / general)	(3/1)	GA---	GAI/MOI
Budgets, controls, & planning (cash flows, forecasts, staffing)	2/15	GA---	All others
Facilities	2/15	GAI	MO
Banking (cash mgmt., credit lines, etc.)	2/15	GAI	
Marketing & Sales (MS)			
Sell sample evaluation & development units	(3/15)	MSI	
Brochures & advertising material	3/15	MSI	Consultant
OEM, research & university sales	5/1	MS--	
Sales training & tools (slide presentation etc)	4/1	MS.	MS2
Competitive analysis (pricing, new products etc)	6/1	MS3	MSI
Public relations & exposure (announcements, articles, conferences)	6/1	MS3	Consultant
Sales program (OEM contracts, licenses, sales compensation plan etc)	4/1	MSI	
Trade shows	4/1	MS3/MSI	
Establish sales offices (national, european, Japan trading Co.)	7/1	MSI	MS--
Order administration (schedul., credit check, etc.)	7/1	MSI	GAI/MCI

Exhibit 3 (continued)

Manufacturing Operations	START DATE	RESP. INDIV.	COLLABORATN
Production line organiz. (work orders, assembly flow, scheduling etc)	3/1	MO1	MEI
Vendor qualification	3/1	MO1	MEI
Quality assurance (test & accep. procedures, ECO's etc.)	5/1	MO1	MEI
Materials systems (part no., inventory control & stockroom orgz., returns etc)	4/1	MO1/MO2	GAI
MRP	4/1	MO1/MO2	
Purchasing procedures & operations	4/1	MO1/MO3	GAI
Shipping/receiving procedures & operations	5/1	MO1/MO4	
Board debug/repair			
System assembly			

Exhibit 3 (continued)

Appendix D

STAFFING PLAN 1982-83

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Software	Engineers		2	2	3	4	5	5	5	5	5	5	5	7	7	7	10.	10	10
	Support		0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
														↑ New projects →					
Hardware	Engineers		1	1	1	2	2	3	3	3	3	3	3	3	3	3	3	3	3
Manuf. Eng.	Engineers		1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
Mkt. & Sales	Management		0	1	1	1	2	2	2	2	2	2	2	3	3	3	5	5	5
	Sales		0	0	0	0	0	2	2	2	3	3	3	4	4	4	7	7	7
	Applicat. Eng		0	0	0	0	0	1	1	1	2	2	2	2	2	2	3.	3	3
	Support		0	0	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4
														↑ start European oper.					
Gen. & Admin.	Management		1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
	Finan./Acctg		0	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2
	Personnel		0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Support		0	1	1	1	1	1	1	1	3	3	3	4	4	4	5	5	5
Manuf. Oper.	Management		0	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3
	Buyer/Planner		0	0	0	0	1	1	1	1	2	2	2	2	2	2	3	3	3
	Technicians		0	0	1	1	1	1	1	1	2	2	2	4	4	4	5	5	5
	Hourly		0	0	0	0	0	1	2	2	3	4	4	4	4	5	5	5	5
	Clerical		0	0	0	0	0	1	1	1	1	2	2	2	2	2	3	3	3
	QA Eng							1	1	1	1	1	1	1	1	1	1	1	1
TOTAL EMPLOYEES			5	7	9	11	17	26	27	27	38	40	40	49	50	51	66	66	66
# OF UNITS INSTALLED			—	—	—	—	—	5	15	25	30	35	40	45	50	55	60	65	75