

MORROW DESIGNS

Business Plan

(Preliminary)

(Draft May 6, 1982)

(Draft May 22, 1982)

(Draft June 10, 1982)

(Draft July 20, 1982)

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1. Executive Summary

1.1. Business Strategy

- Morrow Designs will achieve sales growth from \$8M (1982) to \$100M within 4 years by introducing a compatible line of small business computer systems, emphasizing low cost, high performance and free software.

- Focus will be on retail sales of entry level single user and advanced multi-user systems through independent sales organizations and OEM dealers.

- Profitable add-on sales of memory and disk systems will be maintained.

- Vertical integration of product design will be maintained to maximize value added and maintain competitive pricing.

- A joint venture with a Japanese company will be pursued to permit introduction of entry-level systems with aggressive prices.

- Bundle substantial free software with every product to enhance sales and discourage entry of competition.

1.2. Product Strategy

- In the business systems area, establish a compatible 4-tier product line to meet the growth needs of small businesses. Emphasize software compatibility, free software, price, dealer training, customer service, and product reliability and serviceability.

Tier 1 (Entry Level User): Introduce a single board, single user computer system retailing for under \$1200 complete with disk, memory, and 5 major software packages. Retail price will fall to under \$1000 within one year. The system will be upward software compatible with the line of Morrow small business systems.

Tier 2 (Entry Level, Small Multi-User Environments): Enhance existing single user and multi-user Decision 1 computer system to promote "distributed intelligence" with separate microprocessors for I/O, disk, and program execution.

Tier 3 (Intermediate Level, Multi-User Environments): Introduce microcomputer-per-user enhancement to the existing multi-user Decision 1 systems for increased performance.

Tier 4 (Advanced Level Users, Multi-User Environments): Introduce a top-end model, the Decision 2, which offers highest performance and greatest addressability of any multi-user micro-computer in the industry.

1.3. Marketing Strategy

- Maintain profitable sales of existing advanced floppy and hard disk systems to OEM companies.
- Minimize on-going product support by establishing network of stocking distributors with training and supplies for repair, and use of "smart" product designs to facilitate maintenance.
- Employ market support people in the field to improve sales, institute training, and monitor stock and service of dealers.

- Utilize aggressive discounts and dealer credits (up to 40%) based upon level of stock and service, volume of sales, and level of complaints to encourage dealer loyalty, user support and prompt payment, and to discourage mail-order sales.

1.4. Manufacturing Strategy

- Emphasize vertical integration in product design to increase value added to the product and maintain margins under expected heavy price competition in the industry.

- Limit in-house production operations to final assembly and testing.

- Utilize off-shore manufacturing economies via joint ventures with Asian countries.

2. Company Description

Morrow Designs began as a sole-proprietorship by George Morrow in 1976 at the start of the micro-computer revolution. The initial objective of the company was to take advantage of the new technology offered by Intel micro-computer devices. Morrow's first designs were licensed to other electronics companies on a royalty basis to provide the financial springboard to launch Morrow Designs, a manufacturer of high technology equipment. Profitable from the start without external funding, Morrow established a leadership position in providing memory boards, buss boards, disk controllers and I/O boards. These items eventually became a major force in establishing the IEEE 696 standard, known worldwide as the S-100 buss. The company supported standardization of this buss and the CP/M operating system from the beginning.

Morrow's products have a reputation for clean design and reliable operation. Company strategy has been to emphasize price competitiveness by innovative designs, which minimize parts count and reduce post-sales support. Until recently, sales were limited to "add-on" components for S-100 systems. Marketing emphasized sales to distributors, OEM's, software development companies, and large knowledgeable end users, who often bought through mail-order distributors. This focus on an essentially narrow "industrial" market has limited Morrow's growth. Recent expansion of the product line to include complete computer systems marked Morrow's entry into the retail market. The last 18 months has seen dramatic growth in distribution

outlets. Today there are over 300 active resalers of Morrow Design equipment.

Incorporated in California in 1979, Morrow Designs spent 1980 and 1981 developing a low cost, high performance multi-processor system, augmenting its line of products supporting the small business community. To date Morrow is the only producer of a system, the Decision 1, which supports both multiple CP/M 2.2 and UNIX Version 6 users concurrently on a single system. Shipments of the Decision 1 began in first quarter 1982.

Today Morrow is a full line manufacturer of small business computer systems. Morrow continues to concentrate its strategy of providing low cost/high performance, high quality products through careful design and low corporate overhead.

Recognizing the highly competitive nature of the low end 8 bit-CP/M market, Morrow has concentrated on vertical integration to control costs and capture maximum value added to production. All systems utilize memory boards, floppy and hard disk controllers, cpu boards, and power supplies which are designed and built by Morrow. Outside suppliers supply only the disk drives and peripherals, such as printers, CRT's, etc. Morrow is well positioned to meet the coming aggressive price competition in entry level computers and small business systems.

Product differentiation in the Decision 1 system has been created by focusing on the emerging market for small multiple terminal business systems by incorporating

a hardware memory map. The map yields high speed memory management and hardware protection of the multiple-user, multi-tasking environments necessary for such systems. Multi-user systems are extremely vulnerable to system crashes and other software "bugs" without mapping facilities to prevent unauthorized user and task interaction. Normally one must acquire a large mini-computer (DEC VAX) or main-frame system (IBM 370) to receive this benefit. No other producer of commercial multi-user, micro-computer systems incorporates the memory management and software/user protection offered by the Decision 1's map.

Supporting the vast amount of CP/M based software available in the marketplace, Morrow's Decision 1 system also provides a low end entry to state-of-the-art systems software for multi-user systems through the Unix operating system. MOS, Morrow's Unix-like operating system, provides full implementation of Unix (Version 6). Consistent with vertical integration, MOS was developed in-house – no commercial license fees are paid to offer the Unix features. Morrow also has unlimited license to CP/M and Microsoft BASIC software.

The current multi-user MOS-CP/M Decision 1 system supports 1 to 15 terminals – adequate for most small business environments.

Morrow Designs continues to supply components to the add-on market for peripherals in S100 buss systems. In addition to a complete line of floppy disk and memory boards, Morrow offers custom designed hard disk controller/systems for

14, 8 and 5.25 inch Winchester disks. All utilize direct memory access (DMA) and interface to a variety of disk manufacturer's products. Morrow's DMA controller based systems offer the highest performance and lowest cost per megabyte of any S100 hard disk in the market.

Morrow markets its products overseas through a domestic international sales corporation, Morrow Designs International. It will operate a wholly owned subsidiary, Memory Merchant, which sells S100 memory boards, a Z80-CP/M card for the Radio Shack Model II computer, and a Z80-8088 card for S100 based systems.

3. Marketing – Products and Strategy

Morrow Designs now focuses its marketing upon two segments in the OEM market for computer products: add-on components for S-100 buss systems, particularly floppy and hard disk systems, and recently, complete S-100 buss multi-user, multi-tasking computer systems via the Decision 1.

The "Drives and Boards" segment, Morrow's historical market, serves the OEM market by offering components compatible with many S-100 based computers. Included in this "add-on" product line are:

- Double density DMA floppy controllers
- DMA hard disk controllers – 14, 8 and 5.25 inch
- Complete floppy and hard disk add-on systems
- Multi I/O controller, clock, and interrupt controller
- Wunderbuss motherboards
- High Speed Static Memories
- Low Cost Dynamic Memories

Add-on components are incorporated into systems made by Cromemco, North Star, Vector Graphic, Dynabyte, Exidy, TEI, Godbout, California Computer Systems and other S-100 buss computers by system integrators and knowledgeable end user customers (universities, research labs, industrial manufacturers).

Complete systems are sold through OEM's and retail outlets under the Decision 1 trademark. The Decision 1 is a multiple Z80 based, S-100 system for both single user and multi-user applications. Complete systems in desktop or rack mount configurations include multiple Z80 microprocessors, memory, the memory map, I/O, and a combination of floppy and hard disk devices.

Morrow's customers include computer stores, independent sales organizations (ISO's), OEM vendors, software development companies, mail order distributors and end user sales to sophisticated customers. Today, the majority of purchases of Morrow products are to system's integrators, who add software and custom hardware for turn-key sales to end users, and to knowledgeable end user customers. The customer base is characterized by knowledgeable purchasers and OEM's who add value to the basic product. However, the Decision 1 is fully configurable as a small business computer system and is also sold, through ISO's, to end users without value-added OEM enhancements other than off-the-shelf applications software.

Consistent with Morrow's policy of enhancing hardware sales by offering free software, CP/M software is provided with all disk and Decision 1 products at no charge. The Decision 1 also includes Microsoft Basic and Wordstar word processing software at no charge. Extensive additional software is offered at discounts by Morrow and independent software companies. Examples of currently supplied compilers and applications packages are:

- Pascal
- C
- Fortran
- Relational Fortran
- Basic (Runs Northstar Basic)
- Spell Star
- Data Star
- Calc Star
- Mail Merge

Morrow maintains and supplies the multi-user operating system for the Decision 1, MOS. MOS is Unix-compatible up to Version 6 and supports CP/M as a subsystem for compatibility with the extensive market of single user CP/M applications software. Future products include sophisticated word processors, telecommunications at 1800 baud, networking, and electronic mail.

Morrow Design's distinctive competence, accounting for its success to date, is the creative application of vertical integration with intelligent product design. Although manufacturing is deliberately limited to final assembly, testing, and shipment operations, vertical integration maximizes value-added to the product by Morrow. This combined with sophisticated, distributed intelligence in product design allows Morrow to be extremely price competitive. The low-end (under

\$10,000) small business market to OEM's and knowledgeable end users is price conscious and price elastic in demand. The market is the fastest growing segment (\$590M in 1980 to \$2.7B by 1985) of the small computer marketplace and has attracted numerous competitors. Morrow is one of the few competitors which manufactures all major assemblies, except bare disk drives, CRT's and printers. This includes power supplies, disk controllers (floppy and hard disk), CPU boards, memories, I/O boards, motherboards, cabinets, etc. In addition Morrow makes extensive use of distributed intelligence in logic design to maximize system performance and reduce parts count. As a result, Morrow consistently delivers the lowest cost per byte of storage for RAM, floppy, and hard disk memories and Decision 1 systems offer the lowest cost per user in the S-100 buss industry. The discipline fostered by years of manufacturing and marketing to "industrial" customers also fosters cost competitive designs and pricing of Morrow's retail oriented products. Furthermore, Morrow's unlimited license to CP/M, Microsoft Basic and other software allows inexpensive inclusion of useful software in every system.

Morrow's sales, \$8M annually, are split 50% to domestic dealers, OEM's and large customers, 30% mail order, and 20% foreign. The company leases 27,000 square feet of space in three buildings in Richmond California: 14,000 for manufacturing, 3,000 for marketing, 2,000 for software, and 8,000 for R and D, engineering and warehousing. In anticipation of expanded sales volume, Morrow moves into a new single facility of 50,000 square feet at San Leandro, California in Fall 1982.

Morrow Designs currently employees 50 people.

4. Financial History

Since its inception, Morrow has financed all growth internally. Except for short term borrowing to manage cash flow, Morrow carries no long term debt and has never had to seek external equity financing. In spite of this constraint on capital, Morrow has enjoyed a cumulative growth since incorporation of 68% annually to 1982 sales of \$8 million.

Comparative financials and industry comparisons follow.

MORROW DESIGNS, INC.

INCOME STATEMENT

	1979	1980	1981	1982
SALES	1670	2893	5838	7936
C.O.G.S.	1070	1987	3743	5450
	-----	-----	-----	-----
GR. PROFIT	600	906	2095	2486
	-----	-----	-----	-----
SELL. EXP.	88	144	349	474
G&A EXP.	250	378	885	833
	-----	-----	-----	-----
TOT. EXP.	338	522	1234	1307
	-----	-----	-----	-----
E.B.I.T.	262	384	861	1179
INTEREST	-3	4	14	30
	-----	-----	-----	-----
E. BEF. TAX	265	380	847	1149
TAXES	0	139	410	551
	-----	-----	-----	-----
E. AFT. TAX	265	241	437	598
DIV-PFD	0	0	0	0
	-----	-----	-----	-----
E. TO COMMON	265	241	437	598
DIV-COM	0	0	0	0
	-----	-----	-----	-----
ADD TO R.E.	265	241	437	598
	-----	-----	-----	-----

MORROW DESIGNS, INC.

BALANCE SHEET
ASSETS

	1979	1980	1981	1982
CASH	71	5	104	10
ACC. REC.	131	157	354	740
MKT. SEC.	50	0	0	0
INVENTORY	151	422	1494	2902
OTHER C.A.	0	0	4	2
	-----	-----	-----	-----
CURR. ASSETS	403	584	1956	3654
	-----	-----	-----	-----
FIX. ASSETS-NET	38	46	95	156
OTH. L/T ASSETS	0	2	2	3
	-----	-----	-----	-----
L/T ASSETS	38	48	97	159
	-----	-----	-----	-----
TOTAL ASSETS	441	632	2053	3813
	-----	-----	-----	-----

LIABILITIES AND EQUITIES

	1979	1980	1981	1982
ACC. PAY.	61	158	643	1836
NOTES PAY.	0	139	332	124
OTHER C.L.	4	6	364	4
	-----	-----	-----	-----
CURR. LIAB.	65	303	1339	1964
L/T DEBT	0	76	25	239
	-----	-----	-----	-----
TOTAL LIAB.	65	379	1364	2203
	-----	-----	-----	-----
PFD. STOCK	0	0	0	0
	-----	-----	-----	-----
COMMON STOCK	0	100	100	100
CAP. SURPLUS	0	0	0	0
RET. EARN.	376	153	589	1510
	-----	-----	-----	-----
COMM. EQ.	376	253	689	1610
	-----	-----	-----	-----
TOTAL L & E	441	632	2053	3813
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MORROW DESIGNS, INC.

COMMON SIZE INCOME STATEMENT

	1979	1980	1981	1982
SALES	100.0	100.0	100.0	100.0
C.O.G.S.	64.1	68.7	64.1	68.7
GR. PROFIT	35.9	31.3	35.9	31.3
SELL. EXP.	5.3	5.0	6.0	6.0
G&A EXP.	15.0	13.1	15.2	10.5
TOT. EXP.	20.2	18.0	21.1	16.5
E.B.I.T.	15.7	13.3	14.7	14.9
INTEREST	-0.2	0.1	0.2	0.4
E. BEF. TAX	15.9	13.1	14.5	14.5
TAXES	0.0	4.8	7.0	6.9
E. AFT. TAX	15.9	8.3	7.5	7.5
DIV-PFD	0.0	0.0	0.0	0.0
E. TO COMMON	15.9	8.3	7.5	7.5
DIV-COM	0.0	0.0	0.0	0.0
ADD TO R.E.	15.9	8.3	7.5	7.5

MORROW DESIGNS, INC.

COMMON SIZE BALANCE SHEET
ASSETS

	1979	1980	1981	1982
CASH	16.1	0.8	5.1	0.3
ACC. REC.	29.7	24.8	17.2	19.4
MKT. SEC.	11.3	0.0	0.0	0.0
INVENTORY	34.2	66.8	72.8	76.1
OTHER C.A.	0.0	0.0	0.2	0.1
	-----	-----	-----	-----
CURR. ASSETS	91.4	92.4	95.3	95.8
	-----	-----	-----	-----
FIX. ASSETS-NET	8.6	7.3	4.6	4.1
OTH. L/T ASSETS	0.0	0.3	0.1	0.1
	-----	-----	-----	-----
L/T ASSETS	8.6	7.6	4.7	4.2
	-----	-----	-----	-----
TOTAL ASSETS	100.0	100.0	100.0	100.0
	-----	-----	-----	-----

LIABILITIES AND EQUITIES

	1979	1980	1981	1982
ACC. PAY.	13.8	25.0	31.3	48.2
NOTES PAY.	0.0	22.0	16.2	3.3
OTHER C.L.	0.9	0.9	17.7	0.1
	-----	-----	-----	-----
CURR. LIAB.	14.7	47.9	65.2	51.5
L/T DEBT	0.0	12.0	1.2	6.3
	-----	-----	-----	-----
TOTAL LIAB.	14.7	60.0	66.4	57.8
	-----	-----	-----	-----
PFD. STOCK	0.0	0.0	0.0	0.0
	-----	-----	-----	-----
COMMON STOCK	0.0	15.8	4.9	2.6
CAP. SURPLUS	0.0	0.0	0.0	0.0
RET. EARN.	85.3	24.2	28.7	39.6
	-----	-----	-----	-----
COMM. EQ.	85.3	40.0	33.6	42.2
	-----	-----	-----	-----
TOTAL L & E	100.0	100.0	100.0	100.0
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MORROW DESIGNS, INC.

BALANCE SHEET AS PERCENT OF SALES
ASSETS

	1979	1980	1981	1982
CASH	4.3	0.2	1.8	0.1
ACC. REC.	7.8	5.4	6.1	9.3
MKT. SEC.	3.0	0.0	0.0	0.0
INVENTORY	9.0	14.6	25.6	36.6
OTHER C.A.	0.0	0.0	0.1	0.0
	-----	-----	-----	-----
CURR. ASSETS	24.1	20.2	33.5	46.0
	-----	-----	-----	-----
FIX. ASSETS-NET	2.3	1.6	1.6	2.0
OTH. L/T ASSETS	0.0	0.1	0.0	0.0
	-----	-----	-----	-----
L/T ASSETS	2.3	1.7	1.7	2.0
	-----	-----	-----	-----
TOTAL ASSETS	26.4	21.8	35.2	48.0
	-----	-----	-----	-----

LIABILITIES AND EQUITIES

	1979	1980	1981	1982
ACC. PAY.	3.7	5.5	11.0	23.1
NOTES PAY.	0.0	4.8	5.7	1.6
OTHER C.L.	0.2	0.2	6.2	0.1
	-----	-----	-----	-----
CURR. LIAB.	3.9	10.5	22.9	24.7
L/T DEBT	0.0	2.6	0.4	3.0
	-----	-----	-----	-----
TOTAL LIAB.	3.9	13.1	23.4	27.8
	-----	-----	-----	-----
PFD. STOCK	0.0	0.0	0.0	0.0
	-----	-----	-----	-----
COMMON STOCK	0.0	3.5	1.7	1.3
CAP. SURPLUS	0.0	0.0	0.0	0.0
RET. EARN.	22.5	5.3	10.1	19.0
	-----	-----	-----	-----
COMM. EQ.	22.5	8.7	11.8	20.3
	-----	-----	-----	-----
TOTAL L & E	26.4	21.8	35.2	48.0
	-----	-----	-----	-----

MORROW DESIGNS, INC.

RATIO ANALYSIS

	1979	1980	1981	1982
CUR. RATIO	6.200	1.927	1.461	1.860
ACID TEST	3.877	0.535	0.342	0.382
DEBT/TOT. D+E	0.147	0.600	0.664	0.578
L/T D/TOT.L/T CAP.	0.000	0.231	0.035	0.129
DAYS RECEIV.	28.632	19.808	22.133	34.035
COGS/Y.E. INV.	7.086	4.709	2.505	1.878
SALES/NET F.A.	43.947	62.891	61.453	50.872
EBIT/TOT. CAPITAL	0.697	0.821	0.823	0.598
E. TO COM./COM.EQ.	0.705	0.953	0.634	0.371
COGS/AVE. INV.	0.000	6.935	3.907	2.480
SALES/AVE.NET F.A.	0.000	68.881	82.809	63.235
EBIT/AVE. CAP.	0.000	0.910	1.137	0.781
E.TO COM/AVE.C.EQ.	0.000	0.766	0.928	0.520

RATES OF GROWTH IN PERCENT:

SALES - ANNUAL	73.23	101.80	35.94
- COMPOUND	73.23	86.97	68.12
GR. PROFIT-ANNUAL	51.00	131.24	18.66
-COMPOUND	51.00	86.86	60.61
EBIT - ANNUAL	46.56	124.22	36.93
- COMPOUND	46.56	81.28	65.10
EARN./COMMON-ANNUAL	-9.06	81.33	36.84
-COMPOUND	-9.06	28.42	31.17
A/R+INV.-ANNUAL	105.32	219.17	97.08
-COMPOUND	105.32	155.99	134.62
TOT. ASSETS-ANNUAL	43.31	224.84	85.73
-COMPOUND	43.31	115.76	105.25

INDUSTRY COMPARISONS

	Morrow -----	Corvus -----	Vector -----	Apple -----	DEC ---	Tandem -----
Current Ratio, CA/CL	1.86	1.01	1.74	3.23	4.24	3.9
Inventory Turns, S/E.Inv	1.88	.82	2.63	3.22	1.61	5.2
Gross Profit Margin	.31	.35	.39	.46	.44	.63
Oper.Exp./Sales	.16	.18	.19	.26	.20	.37
Asset Turns, S/A	2.08	1.65	1.88	1.13	.92	1.13
Earn. Power, NI/A	.16	.11	.21	.15	.10	.11
Assets/Employee	76	47		149	58	69
Sales/Employee	158	78		196	54	79
R&D/Sales	.02	.04	.05	.06	.08	.08
COGS/Sales	.68	.65	.61	.53	.56	.37
NI/Sales	.08	.07	.11	.12	.11	.10
Asset Breakdown (%):						
Prop, Eq, Build.	.04	.09	.14	.09	.31	.15
Inventory	.76	.42	.43	.40	.30	.22
Acct. Rec.	.19	.41	.36	.17	.21	.45
Cash	.01	.04	.05	.29	.19	.17

5. Ownership

Morrow Designs is owned primarily by four principals: George and Jean Morrow, Robert Dilworth, and Norm Towson. George, company president and chief designer, and his wife Jean, Board Chairman, collectively own 83% of the company. Robert Dilworth, CEO, owns 4%, Norm Towson, general manager and head of marketing, owns 8% . Howard Fullmer, director of engineering, owns 1%. The remaining 4% is owned by 2 outside founders¹ .

6. Management

The Morrow Designs team have had extensive experience in the market and design areas involved.

George Morrow – President

Best known for his design of the S100 buss and related hardware, Mr. Morrow has been involved with mini- and micro-computers since the late 1960's when he worked as a programmer at the University of California at Berkeley. Self-trained as a logic designer, he combines uniquely the skills to effectively integrate both hardware and software concepts necessary to produce cost/effective systems. His active involvement in the emerging micro-computer industry began with two companies, Thinker Toys and Morrow's Micro Stuff, which he founded. Since

¹The principals have negotiated to buy back the stock of non-active owners.

folding these companies into Morrow Designs, he has been responsible for the design of CPUs, static memories, rigid and floppy disk controllers and mother boards. Previously he was an instructor of mathematics at the University of California, Berkeley. Mr. Morrow holds a BS degree in Physics from Stanford University, an MS degree in Mathematics from the University of Oklahoma, and has completed the PhD program in Mathematics at the University of California, Berkeley.

Robert Dilworth – Chief Executive Officer

Mr. Dilworth has been involved with the minicomputer industry since 1967. He worked for 10 years at Varian Data Machines where he rose to Vice-President, Finance and Administration. He was chief financial officer in taking Varian from \$4 million to \$80 million in sales and was responsible for the design and implementation of all administrative systems used by the company. When Varian was acquired by Sperry Univac, he became Director, Systems Minicomputer Operations. At Sperry he managed a department of over 400 people involved in design, manufacture and marketing of minicomputer systems. In 1979 he moved to Varian Associates as Marketing Manager, Instrument Group to manage a group of 300 professionals and was responsible for sales, service and parts for four analytical instrument divisions' products. He was Group Controller, responsible for all financial, MIS and planning activities for six profit centers with annual sales of \$165 million. Mr. Dilworth has strong financial management in high technology industries and experience in managing both small and large marketing organizations. He was directly involved

at a senior management level in the start-up and rapid growth phase of the mini-computer industry and has extensive international business experience. He has a B.A. degree in Business Administration from Los Angeles State College.

Norm Towson – General Manager and Director of Marketing

Mr. Towson began his computer career while at Cincinnati Milicron where he was involved in both the marketing and manufacturing of mini-computers. He has extensive experience in the semiconductor industry and has marketed wafer technology to major silicon valley firms. Prior to joining Morrow Designs he was Regional Sales Manager at ExCello/Remex in charge of OEM floppy disk sales. He has a BS degree in Math and Business.

Howard Fullmer – Director of Engineering

Prior to joining Morrow Designs, Mr. Fullmer was President of Parasitic Engineering and was involved in the design and marketing of add on boards for micro-computers and consulting in the design of micro-computer products. He has B.S. and M.S. degrees in Electrical Engineering from the University of California at Berkeley.

7. Business Analysis

The market for 8 bit small business systems is the largest growing segment of the micro-industry. The availability of CP/M and the widespread development of CP/M software encourages and maintains this growth. However, micro-processor developments in the hybrid 8/16 bit, 16 bit and 32 bit area suggest that future systems will have greater speed and addressability. Furthermore, the rapidly declining price of small hard disks suggests that they will dominate as the secondary storage media. However, a systematic growth path is needed to allow OEM's and end users to continue to utilize existing software and to smoothly incorporate hard disks and their software. Morrow will require additional financing to develop its base products, the Decision 1 and its add-on hard disk products, and to launch a new entry-level single user micro-computer system.

Morrow seeks to become a full line manufacturer of small business computer systems. Increasing competitiveness at the low end and demand for high performance 16/32 bit multi-tasking, multi-user systems at the middle and upper end of the small business market will favor full line manufacturers. OEM's and ISO's selling entry level, personal computer oriented, systems to first time users need a rigorously compatible product line to accommodate individual customer growth. The pattern has historically characterized mainframe and mini-computer markets and will repeat in the micro market. Morrow will focus on a four tier product line of compatible products to meet the growth needs of small businesses. All will em-

phasize software compatibility, price, dealer training and support, customer service, and product reliability and serviceability:

- Tier 1 (Entry Level User): Morrow will introduce a single board, single user computer system retailing for under \$1200 complete with disk, memory, and 5 major software packages. Retail price will fall to under \$1000 within one year. The system will be upward software compatible with the line of Morrow small business systems. At the low end, there is strong price competitiveness among personal computer vendors for entry level markets: Osborne, Atari, Apple, etc. In the CP/M market Osborne has captured significant market share by focusing upon entry level hardware with attractive pricing and inclusion of substantial free software. No vendor of multi-user/networking board systems, however, has attempted to market a single board computer system at competitive prices which, in addition, offers an upward compatible product line for growth into hard-disk based, multi-tasking multi-user systems.

Morrow has entered into a joint venture with a Japanese firm to incorporate a single board Z80 CPU into a Morrow designed floppy disk system and cabinet. Called the Micro-Decision, it will consist of a single board, single user CP/M system retailing for under \$1200 plus CRT cost. The system will have 204K (formatted) of floppy disk storage, 65K memory and 4 MHz Z80 microprocessor. Included in the price will be CP/M, Microsoft Basic, Wordstar, Calcstar, and Spellstar. With volume shipments and pre-payment of software licenses the retail price can

fall to \$995 within 12 months. Design work is complete. Working capital will be needed to finance the ramp of production and marketing/distribution costs and to undertake design of follow-on systems. Initial shipments are scheduled to begin in August, 1982. The follow-on products will incorporate existing Morrow designs for DMA hard disks, fast networking ports, and added I/O for telecommunications and instrumentation. They will be available within 12 months. Another joint venture to market a low cost compatible CRT terminal for under \$500 retail is in negotiation.

- Tier 2 (Entry Level, Small Multi-User Environments): The existing single user and multi-user Decision 1 computer system has been enhanced to promote "distributed intelligence" with separate microprocessors for I/O, disk, and program execution. Shipments of this product started in Winter 1982 and the Decision 1 successfully supports at least three users in heavy compute environments and up to 16 users in simple, data entry tasks. Decision 1 supports M/OS (UNIX) and CP/M software and applications. Planned enhancements to the Decision 1 are the addition 256K dynamic ram board to augment the static memory board option and thereby reduce the price of multi-user versions of the Decision 1 by \$1000 retail. Acquisition of the memory board enhancement is complete and the 256K ram board will be in production by late Summer 1982.

- Tier 3 (Intermediate Level, Multi-User Environments): Morrow will introduce a "microcomputer-per-user" networking enhancement to the existing multi-user Decision 1 systems for increased performance. Design is underway to enhance the

Decision 1, by developing a single board which contains a Z80, Floppy Controller, 64K Memory, and 2 I/O ports. This will become the foundation of a CPU per user system to enhance responsiveness and reduce system cost for larger multiple-user versions of the Decision 1. This will permit each user of the multiple-user Decision 1 to have the same processing power of a single user Decision 1 without mutual interference and at prices substantially less than multiple single user stand-alone systems. This option for the Decision 1 will permit up to 16 users of the system without system degradation under heavy compute load caused by user congestion.

Because of its buss structure and use of a hardware map, the Decision 1 can be enhanced to incorporate the new board without system re-design or major changes to software. Design of the new board is complete and production is scheduled for late Fall 1982.

- Tier 4 (Advanced Level Users, Multi-User Environments): Increasing competitiveness in the higher performance 16 and 32 bit market will be met by a generation skipping strategy. Morrow will introduce a top-end model, the Decision 2, which offers highest performance and greatest addressability of any multi-user micro-computer in the industry. Financing will be used to develop a high-end Decision 1 CPU board based upon the announced Intel 80286 chip, allowing Morrow to leapfrog one generation of micro-processor systems, which currently utilize the 8088 and 8086 chips. This will give Morrow a system offering speed and addressing better than the current leader in the 16/32 bit micro-processor industry, the Motorola

68000, while providing a growth path for existing CP/M based systems — which no 68000 systems do. The 286 chip is a substantial extension to the popular 8086/8088 line of 16 bit processors. It includes all memory management, supervisor, and virtual address operations on board the chip, eliminating the need for separate chip sets for time consuming and cumbersome data management and supervisory logic. It is completely upward compatible with the 8086/8088, runs at 10MHz, and has addressability to 1 Gbyte. This will deliver, conservatively, a six-fold throughput improvement over the popular 8088 microprocessor with a 1000-fold increase in addressability.

The speed improvement will permit, for the first time, development of a software based emulator for the Z80 which will run at no speed penalty, 4MHz minimum. This will allow upward compatibility with the extensive existing Z80-CP/M market without expensive and cumbersome use of dual processor boards and the increased logic and reliability problems they produce. It will also permit the Decision 2 to directly execute 8088 and 8086 based software developed on, for example, the IBM Personal Computer. The 286-based CPU is a straightforward design and permits development of a powerful multi-user system with no critical software changes to the existing Decision 1 system, which already utilizes external memory mapping. Prototypes of the 286 will be available from Intel in Fall 1982 and Intel will begin volume shipments of it by 2nd quarter 1983. Design of the 286 board is underway and limited shipments of the Decision 2 (Decision 1 system with 286 CPU board) is

scheduled for Summer 1983.

8. Product Summary and Schedule

- Tier 1 — Micro-Decision
 1. Hardware Design: Complete for version 1; design of version 2 for hard disk and telecommunications options begins Fall 1982.
 2. Software: Standard CP/M and Applications Software to be Used
 3. Production: Scheduled for August 1982 for version 1; scheduled for Winter 1983 for version 2

- Tier 2 — Decision 1
 1. Hardware Design: Completed Fall 1981
 2. Software: M/OS (UNIX): Completed Fall 1981
 3. Production: Began Fall 1981

- Tier 3 — Enhanced Decision 1 Board-Per-User
 1. Hardware Design: Complete Summer 1982
 2. Software: Complete Fall 1982
 3. Production: Winter 1983

- Tier 4 — Decision 2
 1. Hardware Design: Begin Summer 1982
 2. Software: Begin Summer 1982
 3. Production: Begin Spring 1983

9. Competitive Analysis

Morrow's primary competitors in the multi-user system's market are:

- Altos – single board, non expandable multi-user systems
- North Star Horizon, S-100 buss
- Dynabyte, S-100 buss
- Vector Graphic, S-100 buss
- Cromemco, S-100 buss
- Televideo
- TEI, S-100 buss
- Godbout, S-100 buss
- Ithaca Systems, S-100 buss

In the single user market Morrow also competes with

- Apple
- IBM
- Osborne
- Fortune
- Digital Equipment Corp.

- Xerox
- Hewlett Packard
- A host of smaller manufacturers

In the add on market Morrow competes with

- Corvus
- Lobo – floppies
- Many small S100 floppy producers

Morrow products overlap some areas served by these competitors. However, Morrow's marketing will emphasize price, performance, free software and a four tier product line of upward compatible multi-user business system products. Morrow specifically will NOT compete in the increasingly crowded high performance, high end, single user workstation segment. Specific comparisons with the major competitors follow:

1. Apple: Single user systems, non-CP/M — \$300M Sales 27% pretax margin — Committed to single user philosophy — Expected to offer high end bit-mapped graphics Unix-like 68000-based networking workstation system (Lisa) for office environments at prices greater than \$8000 by Fall 1982 — Expected to offer lower-end Apple II (Apple Super) to compete with Osborne and Atari, essentially a stripped Apple II with fewer parts, selling for under \$1000 by Fall 1982 — Expected to offer replacement for Apple II (Macintosh) by Winter 1983 at prices under \$1500.

Apple will sell Lisa to Fortune 1000 companies utilizing local area networks. Morrow's high-end segment will be small business/industrial/retail users of multi-user systems and

already markets Unix-like multi-user systems – Decision 1. Apple will sell the Super for home and educational use and Macintosh as a personal computer for home and office use. Macintosh will be the entry level version of the Lisa and be highly portable. Morrow's Micro Decision will be well established and priced under the Macintosh when it is introduced. It will not compete with the Super, which will be aimed at home and educational uses. It will offer CP/M and free applications software, which Apple has elected not to pursue.

2. Osborne: Single user systems, low price — \$70M Sales ?% pretax margin — Expected to offer low end Z80/8088 system within 6 months and is expected to offer a higher end 8086 system in 12 to 18 months.

Morrow will compete at the low-end entry level and share the market. Morrow will offer hard disk and larger multi-user system growth path already in place with Unix-like software. Osborne will have to develop both segments and will not compete in multi-user area.

3. Northstar: Single user systems — \$36M Sales 12% pretax margin Positioning against high end Apple and IBM Personal with Advantage computer. Sells the Horizon multi-user system.

Morrow has elected not to compete in the high end single user market segment. The Horizon is an aging product with non-standard operating system software, Northstar does not officially support CP/M and uses non-standard applications software. Floppy disk system is also non-standard. Horizon has no DMA hard disk and is incompatible with the Advantage. Morrow Decision 1 and 2 will compete effectively with Horizon by offering better hardware and standard CP/M and Unix-like software. Unlikely that Northstar will offer a competitor to Micro Decision.

4. IBM Personal — Single user systems — \$200M Sales ?% pretax margin — Expected to offer higher performance 186/8086/8088 model within 12 months, and micro-mainframe emulation of 370 series via 68000 within 2 years.

Morrow will precede IBM into the low end market and compete with low end IBM on price and free software. At the high end Morrow will compete in the S-100 multi-user market, a different market segment.

5. Vector Graphic: Single user systems — \$36M Sales 20% pretax margin — Abbreviated S-100 buss systems, CP/M. Has announced high performance, single user system. Expected to develop systems for either multi-user applications or low end, entry level users, but not both.

Morrow already markets standard S-100 buss, multi-user systems with both CP/M and Unix-like operating system software. Decision 2 and Micro-Decision will bracket both segments open to Vector and compete on free software and price. Morrow will offer entry level system with standard CP/M software and not compete in the high/performance single user segment.

6. Cromemco: Industrial sales emphasis — \$48M Sales ?% pretax margin — S100 buss systems — Emphasizing high end industrial and graphics markets — has announced a low end single user system.

Does not support CP/M or Unix-like operating system, uses non-standard operating software. Has no DMA hard disk or single board entry-level system. Morrow will not compete in the high end industrial graphic area and competes below Cromemco on price and entry level segment. Morrow offers more aggressive discounts to dealers (up to 40%verses Cromemco's 25%) and the Micro Decision will be lower priced than the low end machine from them.

7. Dynabyte: Single board, Multi-user systems — \$12M Sales 0% pretax margin — Shifting to high end/high performance systems focus — Expected to drop S-100 buss systems. Expected to announce high end multi-user product supporting 5 major operating systems. No Unix-like software.

Morrow will offer lower price, entry-level systems and maintain S-100 buss systems for multi-user applications. Morrow will compete at the high end with Decision 2.

8. Altos: Single board, Multi-user systems — \$48M Sales 20% pretax margin — Shifting to high performance/high end systems. No Unix-like software.

Morrow will offer lower price, entry-level systems and maintain S-100 buss systems for multi-user applications. Morrow will compete at the high end with Decision 2.

9. Fortune: Single user, high end systems — \$0 Sales 0% pretax margin — Startup company, 68000 based Unix-like office oriented system — Non-standard, custom applications software — Entry level price greater than \$5000 plus software.

Morrow will offer entry level system with standard CP/M software and not compete in the high/performance single user segment.

10. Godbout: S-100 buss, Single user/high performance systems — \$? Sales ?% pretax margin — Emphasizing multi-processor boards aimed at system developer market.

Morrow will compete by offering multi-user high end systems to system developers in the S-100 buss area. Lower price per user, free software, and Unix-like operating system will distinguish the Decision 1 and 2 products.

11. Digital Equipment Corporation: Single board, Single-user systems — \$0 Sales 22% pretax margin — Announced, but not shipping, three personal computers, all mutually incompatible — Decmate II, based upon 12 bit technology (PDP-8) is aimed at word processing; Models 325 and 350, based upon 16 bit technology (PDP-11) are aimed at high/performance, single user workstation segment; and Rainbow 100, based upon 8 bit technology (Z80/8088) is aimed at entry level personal computing.

Morrow will not compete in either the high/performance single station segment or the dedicated word processing system segment. Morrow already offers CP/M, S-100 buss, Z80 based 8 bit systems at prices below DEC's Rainbow, which will sell for \$3,250 stripped. The Micro-Decision will be price competitive with the Rainbow, selling for one third its price at retail. The Decision 2 will offer the same Z80/8088 compatibility as the Rainbow, but will also support multiple users for less than the Rainbow's price.

10. Business Forecasts

Attached are forecasts of Morrow Designs' current business, financial forecasts for the entry-level single board system and consolidated statements.

Single Board Entry Level Computer – Micro Decision

Assumptions

1. Payables: 30 days domestic components and 60 days international components
2. Receivables: 45 days
3. Inventory Turns 8 times per year
4. S, G&A are 20% of sales

MICRO DECISION	INCOME STATEMENT (\$ IN 000's)												1983 TOTAL	1984	1985
	JULY	AUG	SEPT	OCT	NOV	DEC	FISCAL 1983								
							JAN	FEB	MAR	APR	MAY	JUN			
UNIT SLS	0	250	500	750	1000	1250	1500	1750	2000	2000	2000	2000	15000	30000	60000
PRICE	.8	.8	.8	.8	.8	.8	.72	.72	.72	.72	.72	.72	15000	.6	.5
SALES	0	200	400	600	800	1000	1080	1260	1440	1440	1440	1440	11100	18000	30000
COST (\$)															
BOARD -	173	173	173	173	173	173	160	160	160	160	160	160	160	160	160
FLOPPY	100	100	100	100	100	100	55	55	55	55	55	55	55	55	55
CABINET	55	55	55	55	55	55	35	35	35	35	35	35	35	35	35
MAN, DSK,	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
SHIPPING	16	16	16	16	16	16	10	10	10	10	10	10	10	10	10
ROYALTY	80	80	80	80	80	80	60	60	60	60	60	60	60	30	20
TST/ASSE	10	10	10	10	10	10	12	12	12	12	12	12	12	12	14
UNIT COS	.453	.453	.453	.453	.453	.453	.351	.351	.351	.351	.351	.351	.351	.321	.299
COGS	0	113.25	226.5	339.75	453	566.25	526.5	614.25	702	702	702	702	5648	9630	17940
GROSS MA	0	86.75	173.5	260.25	347	433.75	553.5	645.75	738	738	738	738	5453	8370	12060
EXPENSES															
SELLING	0	20	40	60	80	100	108	126	144	144	144	144	1110	1800	3000
G & A	0	20	40	60	80	100	108	126	144	144	144	144	1110	1440	2400
SOFTWARE	0	10	10	10	10	10	83	83	83	83	83	83	548	1000	1000
TOOLING	0	0	0	0	0	100	100	0	0	0	0	0	200	0	0
INTEREST	0	0.58	1.15	1.73	2.31	2.88	3.20	3.73	4.27	4.27	4.27	4.27	33	64	128
TOTAL	0	50.58	91.15	131.73	172.31	312.88	402.20	338.73	375.27	375.27	375.27	375.27	3001	4304	6528
PROFIT	0	36.17	82.35	128.52	174.69	120.87	151.30	307.02	362.73	362.73	362.73	362.73	2452	4066	5532
TAXES	0	18.09	41.17	64.26	87.35	60.43	75.65	153.51	181.37	181.37	181.37	181.37	1226	2033	2766
INCOME	0	18.09	41.17	64.26	87.35	60.43	75.65	153.51	181.37	181.37	181.37	181.37	1226	2033	2766
INCOME %	0	9	10	11	11	6	7	12	13	13	13	13	11	11	9

Micro Decision Cash Flow Forecast

MICRO DECISION	CASH FLOW STATEMENT											
	FISCAL 1983											
	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	----	----	----	----	----	----	----	----	----	----	----	----
BEG CASH	0	0.00	-219.61	-449.79	-693.06	-830.89	-1023	-1200	-1133	-1043	-1141	-778.46
INCOME	0	18.09	41.17	64.26	87.35	60.43	75.65	153.51	181.37	181.37	181.37	181.37
ADJ TO WORK CAP -----												
ACC REC	0	-200	-300	-300	-300	-300	-180	-220	-270	-90	0	0
INVENTORY	0	-169.03	-169.03	-169.03	-169.03	-169.03	59.33	-130.97	-130.97	0.00	0.00	0.00
ACC PAY												
DOMESTIC	0	70	70	70	70	70	-63.5	47.75	47.75	0	0	0
INTERNTL	0	43.25	86.5	86.5	86.5	86.5	67	63.75	80	40	0	0
TAXES PAY	0	18.09	41.17	5.00	87.35	60.43	-136.39	153.51	181.37	-229.16	181.37	181.37
TOTAL ADJ	0	-237.69	-271.36	-307.53	-225.18	-252.10	-253.56	-85.96	-91.85	-279.16	181.37	181.37
END CASH	0	-219.61	-449.79	-693.06	-830.89	-1023	-1200	-1133	-1043	-1141	-778.46	-415.73

Decision 1 and Add-On Sales Forecast

Assumptions:

1. Sales growth 50-55%
2. Selling Expense is 10% of sales
3. G&A is 11% of sales

DECISION 1 & ADD ON

	1982	1983	1984	1985
	-----	-----	-----	-----
SALES	8612	13000	20000	32000
COGS	5939	8450	12600	19840
	-----	-----	-----	-----
GROSS PROFIT	2673	4550	7400	12160
SELLING EXP	560	1300	1900	2800
G&A EXP	695	1430	2090	3080
OTHER EXP	26	31	37	45
	-----	-----	-----	-----
TOTAL EXP	1281	2761	4027	5925
PROFIT	1392	1789	3373	6235
TAXES	668	894	1686	3118
NET INCOME	724	894	1686	3118
NI %	0.08	0.07	0.08	0.10

Consolidated Income and Balance Sheet Forecast

CONSOLIDATED STATEMENT

	1982	1983	1984	1985
	-----	-----	-----	-----
SALES	8612	24100	38000	62000
COGS	5939	14098	22230	37780
	-----	-----	-----	-----
GROSS PROFIT	2673	10003	15770	24220
SELLING EXP	560	2410	3700	5800
G&A EXP	695	2540	3530	5480
OTHER EXP	26	812	1101	1173
	-----	-----	-----	-----
TOTAL EXP	1281	5762	8331	12453
PROFIT	1392	4241	7439	11767
TAXES	668	2120	3719	5884
NET INCOME	724	2120	3719	5884
NI %	0.08	0.09	0.10	0.09

11. Implementation Plan

Summary:

1. Organization chart

George Morrow, President and Chief Designer

Jean Morrow, Chairman

Chief Executive Officer — Robert Dilworth

Director of Marketing and Sales, General Manager — Norm Towson

Director of Engineering — Howard Fullmer

Director of Manufacturing — Herb Maranda

2. Dealer Support

Open Sales and Support offices to enhance market differentiation:

- 1st Q 1983, East Coast office
- 2nd Q 1983, European office
- 3rd Q 1983, Southern/Western office
- 4th Q 1983, Midwest office
- 1st Q 1984, Southern Ca office

Function will be to call on area computer stores and OEM's. Facilities to be staffed with a marketing person and a technical person to provide marketing support, dealer training, and technical support. Offices will also serve as regional distribution centers.

3. Contract with TRW, WU, Sorbus, or similar company to provide on-site and depot service and contract maintenance. Late 1982.
4. Establish aggressive discount structure to encourage prompt payments, and dealer loyalty. Staged discounts will be offered at 30% normal trade plus 5% credit for cash plus 5% credit to future purchases based on volume.

5. Differentiate through discount structure ISO's providing sales support, repairs and parts stocking for board swap from mail order dealers providing no customer support. This will limit mail-order discounts to about 10% below retail prices.
6. Implement board swapping service policy for stocking dealers.
7. Establish larger production facilities by December 1982 of approximately 50,000 square feet — 8,000 for sales/administration, 2,000 for engineering, 10,000 warehousing, 30,000 for production.
8. Personnel growth will aim at \$100M company with 500-600 employees. Personnel will comprise 80% manufacturing and customer service, 10% marketing, 5% administration, 5% R and D, including software and engineering. Average span of control will be 1 to 6.
9. Access to software will increasingly become the barrier to entry for small "cottage level" firms producing micro-computer systems. Barriers to entry will be erected by budgeting in excess of \$1 million per year for acquiring licenses to software packages which will be bundled into the hardware purchase price.