competitive update

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Competition in the 16-Bit Marketplace

competitive update

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COMPETITION IN THE 16-BIT COMMERCIAL MARKETPLACE

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X8769 MK1-2/N38
RCS: MK12

EXECUTIVE SUMMARY

The aim of this article is to provide Digital's salesforce with an easy-to-reference, easy-to-use document which outlines major competitive system offerings in the 16-bit commercial marketplace. While the information presented here is commercially oriented, benefit can be derived by those interested in the 16-bit "general use" marketplace as well.

A second objective of this report is to give a perspective of how Digital is doing in relation to its competitors in this space. By means of tables, figures and charts, a graphic overview demonstrates current market share, projected shipment volumes and projected revenues for three product classes: desktop, small business computers and minicomputers.

In addition, statistics from 1981 provide a recent history demonstrating Digital's success as the nation's premier minicomputer manufacturer.

Finally, prices quoting the initial cost of 2, 4, 8 and 16 user/CRT competitive systems are presented. Even though these prices are believed to be accurate, they are understandably subject to change at any time, and therefore may not reflect the "exact" current price at the time of this article's publication. They should, however, give a reasonable measure when comparing competitive offerings.

Note that comparing a competitor's system to one of Digital's is an "inexact science" at best. Due to the enormous amounts of variation in both hardware and software offerings/functionality, configuring "comparable" systems is extremely difficult. To aid in this task, Commercial Marketing has established guidelines which were followed when quoting these competitive system prices. These guidelines are listed in the section entitled "Capacity Band Definitions."

Any comments, feedback, or suggestions for future publications would be greatly appreciated. Please direct any questions regarding clarification of this information to me.

MAJOR COMPETITOR SYSTEMS IN THE SMALL BUSINESS COMPUTER MARKETPLACE

Data General
- CS Series

Datapoint
- 1550
- 1800
- 5500/6600
- 8600/8800

Hewlett-Packard
- HP 250
- HP 3000

IBM
- System/23 Datamaster
- System/34
- Series/1

Texas Instruments
- 990 Series

Wang
- 2200 Series
- VS Series

DATA GENERAL - COMMERCIAL SYSTEMS (CS) FAMILY

General Background

Main Memory:	64KB to 512KB
Disk Capacity:	.63MB to 760MB
Terminal Capacity:	Up to 17
Printer Capacity:	30 cps to 900 lpm
Models:	2 CS/10, CS/20, 2 CS/30, 4 CS/40, 3 CS/50, 2CS/70 (Note: Micro Nova, Nova or Eclipse processors drive the above systems) 17 models available

- Software

Operating System: ICOS - Interactive COBOL Operating System (based on RDOS)

Features:

- multi-tasking
- file management
- schedules and allocates programs in core
- interactive and/or batch capabilities
- spooling
- file sharing
- swapping
- inter-task communication
- memory management (address beyond 64KB)
- foreground and background tasks (larger systems)
- real-time capabilities
- CLI - Command Line Interpreter (DCL)
- checkpointing (swapping)
- interactive spooling
- ISAM
- communications: 2780/3780 protocols, HASP
- sort/merge capabilities

Languages: COBOL, BASIC and PASCAL

- Hardware

Processors/Systems:

CS/10 -- Micro Nova processor, 6KB-128KB, 1.2MB diskette, 12MB disk, 25MB Winchester, COBOL

CS/50 -- Nova 4 processor, 64KB-256KB, 10MB, 20MB, 25MB Winchester, 96MB disks, 800 bpi-1600 bpi magtapes, multi-user COBOL

CS/70 -- Eclipse S/140 processor, 128KB to 512KB, up to 190MB disk, 800 bpi-1600 bpi magtape, COBOL

Disks: .3, 1.2MB floppies
5MB, 10MB, 20MB, 50MB, 96MB, 190MB
12.5MB and 25MB Winchesters

Printers:	340 cps, 240 lpm, 300 lpm, 436 lpm, 600 lpm, 660 lpm, 900 lpm
Magtape:	800/1600 bpi - 9-track

Comments: On the high-end offerings from DG is their MV/8000 (Eclipse), designed to compete with the VAX/VMS systems from Digital. DG introduced their 32-bit machine two years after Digital announced VAX.

DATA GENERAL CS SERIES - DEFICIENCIES

- Limited Software Availability
  - No report writer
  - No screen formatter
  - No data query software
- Upward Growth Limitation
  - Upgrading to the MV/8000 32-bit system will be extremely difficult. COBOL incompatibility now exists, which means massive amounts of rewriting will be necessary.
- Currently there is no word processing capability.
- No DBMS type capabilities.

DATAPOINT 1550/1800/3800/5500/6600/8600/8800

General Background

Main Memory:	32KB to 256KB
Disk Capacity:	10MB-240MB
Terminal Capacity:	Up to 24
CPU Models:	1550, 1-4 users, 32KB-96KB (Z80 based) 1800, 1-4 users, 64KB-120KB 3800 (ARC processor only) 1 user, 60KB 5500, 16 users, 56KB-128KB 6600, 24 users, 256KB 8600, 16 users, 256KB 8800, 24 users, 1MB
Printer Capacity:	45 cps - 900 lpm
Environment:	Business data processing, data communications, DDP

- Software

Operating Systems

1550

DOS.H (diskette operating system), 4KB needed, 32KB to 96KB, 1 to 4 workstations. No ARC capabilities. CP/M available by independent vendors.

Features:

- controls loading, file creation, file management
- multi-tasking capabilities (up to two)
- ISAM
- communications: 2780/3780 emulation
- spooling
- sort capabilities
- Dataform - forms generator (DECFORM) (single user only)
- overlaying capabilities not mentioned (or batch processing)

Languages: DATABUS-15, BASIC-PLUS, FORTRAN

1800

DOS.G (diskette operating system), 4KB

Features:

- multi-tasking
- virtual memory
- batch, remote or interactive mode
- ISAM
- foreground/background concept
- concurrent job mix
- overlay capabilities not mentioned
- chaining
- spooling not mentioned, no report writer
- sort
- Dataform (screen generator - DECFORM) (single user only)
- communications: 2780/3780, multi-link

Languages:	COBOL, BASIC-PLUS, RPG-PLUS, DATABUS, SNAP/3 (MACRO Assembler)
5500/6600 8600/8800	DOS (Disk Operating System), 4KB ARC (Attached Resource Computer)
Features:	- Datashare: multi-terminal software (24 terminals) - needs DATABUS Language program - interactive and/or batch capabilities - ISAM - concurrent job mix - foreground/background environment - virtual memory mapping - interactive access to remote terminal files - spooling - remote printing - DDP (Distributed Data Processing) - Dataform (DECFORM) and Multiform (at most 3 users) - sort capabilities - swapping, overlaying not mentioned - DS PRINT - report generator - DSGEN - screen/report generator (DATATRIEVE) - communications: 2780/3780 emulation, multi-link (DATABUS program)
Languages:	RPG-II, COBOL, BASIC, DATABUS, SNAP/3

- Hardware/Systems

1550:	32KB-96KB, 1MB diskette storage, 10MB disk, 4 terminals; 30 cps, 45 cps, 230 lpm, 340 lpm printers, no magtape
1800:	64KB-120KB, 1MB diskette storage, no hard disks; 556/800/1600 bpi magtapes; 45 cps, 60 cps, 300 lpm, 600 lpm, 900 lpm printers; 4 terminals
5500/6600:	two different processors with the 6600 able to expand up to 256KB, 24 users; drives: 20MB, 60MB, 120MB; magtapes: 800/1600 bpi; printers: see 1800
8600/8800:	two different processors, newest additions to probably replace the 5500/6600 offerings; 8600 able to expand to 256KB, 16 users, 40MB disk storage; 8800, 1MB memory, 24 users, 1GB storage

DATAPOINT - DEFICIENCIES

- Reported Limited Development Software
  - Datapro states that based on responses from their customer surveys, users complained of inadequate system development tools and utilities.
- Multiform User Number Limits
  - At most, only 3 users can run Multiform (Datapoint's DECform) at one time.
- Memory Limitations for Software
  - AIM (Associative Index Method) will not run on systems that have less than 128KB. This file access method will not be able to run on the low-end machines (1550, 1800).
- Datashare Dependency on Databus
  - The only way advantage can taken of virtual memory mapping (executing programs above 64KB) is to run Datashare. Only programs written in DATABUS have interfacing to Datashare.
- In-House Language Dependency
  - All multi-terminal, virtual-memory environments are geared toward running DATABUS programs. Basically, Datapoint offers a one language at a time per operating system environment.
- No Hard Disk Support
  - For the 1800 and 3800 processor offerings.
- CRT Incompatibility
  - The 8600 Series must use a special CRT, the 8820, which is not compatible on any other system.

HEWLETT-PACKARD - HP 250

General Background

Main Memory:	32KB to 64KB per terminal, 512KB total
Disk Capacity:	13.3MB to 52.5MB; Winchesters available
Terminal Capacity:	System console plus 5 workstations
Printer Capacity:	30 cps, 180 cps, 400 lpm
CPU Models:	HP 9835 and HP 9845
Word Length:	16-bit machine
Environment:	Office Professionals (real estate, business management, accounting firms)

- Software

Operating System:	Limited supervisor (128-160 bytes) hooks in BASIC Interpreter for I/O and system allocation
Features:	- Image/250 - Database Management System patterned after Image/3000; file sharing, record locking - no generalized sort/merge capabilities - Query/250 - maintenance software for Image/250 database - Forms/250 - form generator (DECFORM) - Report Writer/250 - report generator - Text/250 - limited WP capabilities - DSG/250 - business graphics (pie charts) - communications: 2780/3780 emulation
Languages:	HP 250 BUSINESS BASIC
Principal Applicatons:	MFG/250 - inventory control, production and materials information OM/250 - inventory control, AR, OE

- Hardware

Packaged System (45251A):	Processor, CRT, 128KB, 1.2MB floppy, communication controller, operating system with IMAGE, QUERY, FORMS, WRITER
Memory:	32KB, 64KB, 128KB add-ons
Disks:	16MB, 28MB, 65MB Winchesters, 1.2MB floppy, 19.6MB disk; 260MB maximum
Printer:	40 cps, 180 cps, 400 lpm
Communications:	Controllers necessary for 2780/3780 emulation HP 250 to HP 3000 hardware available Remote HP 250 interfacing available

HEWLETT-PACKARD HP 250 - DEFICIENCIES

- No generalized text editor
- No generalized sort/merge capabilities
- Upward Migration Problems
  - Upgrading to an HP 3000 will mean a massive recoding effort. Because of the way I/O is handled, BASIC under the HP 250 is incompatible with BASIC under the HP 3000.
- Language Offering Limitations
  - HP BUSINESS BASIC is the only language offered on the HP 250.
- Largest program is 64KB.

HEWLETT-PACKARD 3000 SERIES

General Background

Main Memory:	256KB to 8MB
Disk Capacity:	20MB to 6.4GB
Terminal Capacity:	56 - Series 40; 56 - Series 40SX; 96 - Series 44B; 128 - Series 64
Printer Capacity:	180 cps to 1,000 lpm
Word Length:	16 bits
CPU Models:	HP 3000 Series 40/40SX/44B/64
Environment:	Accounting, payroll, DP/WP, business applications in general

- Software

Operating System: MPE-IV - Multiprogramming Executive

Features:
- concurrent batch jobs
- timesharing/concurrent job mixing
- transaction processing
- code sharing
- communications: 2780/3780 emulation, 3270
- virtual memory manager
- overlaying
- DDP (DS 3000)
- inter-job communicating
- spooling
- sort/merge capabilities - SORT/3000
- KSAM (similar to RMS-11)
- QUERY/3000 - Report Writer
- IMAGE/3000 - Database
- Decision Support Graphics/3000
- Management System
- HP V/3000 (DATATRIEVE)

Languages: SPL (HP's Systems Programming Language), FORTRAN-66, RPG, BASIC, APL, COBOL

Principal Applications: Accounting, AR, AP, GL, OE, inventory control, payroll, personnel, manufacturing, WP

Application Software:
- Materials Management/3000
- Student Information System

- Hardware/Systems: Series 40 - same processor as 44 Series with Series 30 packaging; 6-25 users, 128MB disk storage (no floppies), up to 2MB memory, up to 3.2GB disk

Series 40SX - 27MB disk, integral cartridge tape, printer, 4-10 users, up to 2MB memory, up to 3.2GB disk storage

Series 44B - 20-50 user system, up to 4MB memory, 6.4GB disk storage

	Series 64 - 64-100 users, up to 6.4GB of disk storage, 8MB memory
Add-On Memory:	up to 2MB for Series 40 up to 2MB for Series 40SX up to 4MB for Series 44B up to 8MB for Series 64
Disks:	20MB, 50MB (up to 8), 120MB, 404MB, 27MB and 64MB Winchesters
Magtape:	80 bpi-1600 bpi
Printers:	40 cps, 180 cps, 400 lpm, 600 lpm, 1,000 lpm

HEWLETT-PACKARD HP 3000 - DEFICIENCIES

- No HP 250 to HP 3000 Compatibility
  - Applications developed on the HP 250 cannot be transported to the HP 3000. Also, HP 3000 programs cannot be transported to HP 250 systems.

IBM SYSTEM/23 DATAMASTER

General Background

Main Memory:	32KB to 128KB
Disk Capacity:	.3MB to 4.4MB (diskettes only)
CRT Capacity:	1 per CPU - 2 workstations can share 2.2MB diskette
Printer Capacity:	3 models - 40 cps, 80 cps, 160 cps (524X)
Word Length:	8 bits
CPU Models:	1 model - 5322 (35 different systems)
Environments:	Desktop Computer - WP/DP - Single User
Market:	First time, unsophisticated user, aimed at replacing IBM 5120

- Software

Operating System: None per se. BASIC Interpreter as well as necessary code to interface peripherals.

Features:
- word processing licensed program
- BASIC Interpreter
- asynch/synch communication program
- interfaces to System/3, Datamaster, System/34, System/38, Series 1
- Business Report/Application Development System (BRADS III), query database capabilities, report generator, screen and form generator
- Business Management Accounting System Applications (DIBS-11)
- sort - no IAM

Languages: BASIC, RPG-II

Typical Applications: DP/WP environments, billing, inventory, AR, AP, payroll, general ledger

- Hardware

Processors with Memory:
5322-110 - 32KB
5322-440 - 128KB
(35 different systems)

Mass Storage:
.3MB integrated diskette
1.1MB up to 4 for a total of 4.4MB
No hard disks are available

Printers: 40, 80, 160 cps matrix printers

Communications: Hardware is built into processor board.

IBM SYSTEM/23 DATAMASTER - DEFICIENCIES

- Upward Compatibility Problems - BASIC on the System/23 is relatively compatible with System/34 BASIC provided that no file sharing is needed. In the case of most OEM applications, file sharing is essential.

- No File Sharing - The Datamaster can have two terminals in use accessing different files - but not the same file.

- No Hard Disks - Diskettes are the only mass storage device (4.4MB maximum) available.

- Limited Program Size Capacity - A BASIC program can be a maximum of 52KB. No overlaying is available. Word processing capabilities require an additional 64KB.

- Hardware Incompatibilities - Terminals are designed for and used exclusively by System/23 configurations.

IBM SYSTEM/34

General Background

Main Memory:	32KB to 256KB
Disk Capacity:	8.6MB to 257MB
Terminal Capacity:	1 to 16 (64 physically possible)
Printers:	160 lpm to 650 lpm; 40 to 120 cps
CPU Model:	1 processor (5340)
Configured Systems:	90 different configurations offered
Environments:	Small Business Computer designed as an upgrade from System/32, System/3. Strictly a business machine as opposed to a Series/1. Mainly an RPG-II system.

- Software

Operating System: System Support Program (SSP)

Features:

- operating system functions are microcoded into firmware task management, storage management, I/O control
- concurrent job support
- disk swapping of programs
- overlaying capabilities
- remote diagnostics
- query and report writer (DFL)
- screen formatting capabilities (SFGR) and SDA - Screen Design Aid
- foreground/background concept
- batch processing
- sort capabilities
- file sharing
- spooling
- no IAM capabilities - unique index file capabilities
- communications: 1200 bps-4800 bps (SNA, Binary Synchronous Communication [BSC])

Languages: BASIC, COBOL, MACRO, FORTRAN-IV, RPG-II

Typical Applications: AR, AP, Sales Analysis, Inventory Control, General Ledger

Software Packages:

- Distributed Management Accounting System (DMAS)
- Food Distribution Management Accounting System
- Distribution Financial Accounting
- Client Accounting and Financial Reporting
- Medical Group Management System
- Hospital Financial Management System
- Manufacturing Management Accounting System
- Construction Management Accounting System
- Lumber and Building Materials Management

- Motor Freight Accounting System
- Law Firm Management
- Student Administration System

- Hardware

Processors with Memory:	5340 - 32KB-256KB
Disks:	8MB, 13MB, 28MB, 64MB, all non-removable; 246KB, 303KB diskettes 4-64MB for a maximum of 257MB can be added
Printers:	650 lpm, 140/95 lpm, 240/175 lpm, 160/300 lpm, 240/175 lpm, 280/195 lpm, 400/290 lpm, 490/355 lpm, 560/420 lpm, 40 cps, 80 cps, 120 cps
Comments:	Even though the System/34 is marketed as the successor to System/3s and System/23s, the software compatibility along the upgrade path can present situations where total rewrites are necessary, especially where file sharing is needed.

IBM SYSTEM/34 - DEFICIENCIES

- No Removable Hard Disks - As in the Series/1, the System/34 has no removable hard disks. Backup is made to floppies.
- Upward Growth Compatibility Problems - Major recoding will have to be implemented due to language differences, I/O handling and file formats in order to expand to a System/38 or any other large IBM system.
- Does not currently support tape drives.
- It can physically support only 256KB of memory.

IBM SERIES/1

General Background

Main Memory:	16KB to 512KB
Disk Capacity:	Up to 4 - 64MB drives - 257MB total, including a 9.3MB Winchester
CRT Capacity:	Up to 24 (16 comfortably)
Printer Capacity:	160 cps; 80 to 414 lpm
Word Length:	16 bits
CPU Models:	4952 (A,B,C) (1979) 4953 (A,B,C,D) (1976) 4954 (A,B,C) (1982) 4955 (A,B,C,D,E,F) (1976)
Environments:	Traditional DP, DDP, scientific programming, sensor-based (real-time environments)

- Software

Operating Systems:	1. Event Drive Executive (EDX) 2. Real-time Programming Systems (RPS)
Features:	- concurrent job support - multitasking on individual terminals - overlay capabilities - batch processing as well as interactive applications - IAM - Index Access Method - Sort/Merge Capabilities - Communications - SNA, 2780/3780/3271 - re-entrant programs (code sharing) - inter-task communications - cluster control capabilities (IBM/370) - spooling - DDP - remote diagnostic capabilities (VTAM) - graphics
Languages:	COBOL, FORTRAN-IV, PL/I, MACRO Assembler (No RPG)
Typical Applications:	Accounting/billing, order processing, inventory control, payroll, sales distribution, manufacturing

- Hardware

Processors with Memory:	4952B - 32KB 4955F - 128KB (up to 512KB)
Add-On Memory:	63XX - 16KB-128KB, up to 512KB
Magtape:	154X - 800 bpi-1600 bpi
Disks:	496X-XXX, 9MB, 14MB, 23MB, 29MB, 58MB, 64MB (all non-removable) 606KB and 1.2MB floppies

Printers:	497X-XXX, 132 col., 80 cps, 120 cps, 160 cps, 80/120/150 lpm, 235/300/414 lpm
Communications:	1200 bps, asynch/synch offerings 2780/3780/3271, SNA, X.25

IBM SERIES/1 - DEFICIENCIES

- No Removable Disk Packs - IBM Series/1 mass storage devices are fixed media only. Disk-to-disk backup is not possible.
- Poor Performance - Series/1 system software (i.e., FORTRAN compiler, MACRO Assembler, task builder, I/O handlers) is highly inefficient. RPS is a batch-oriented operating system. Even though interactive capabilities exist, due to the overlapping of software on software, terminal I/O response times are greatly affected.
- No Upward Compatibility Path - File structure and language implementations not compatible with Series/38 or 4300 Series.
- Tremendous System Overhead - Minimum processor storage required by a standard development system is 192KB. A typical RSTS/E monitor will run between 80KB-90KB.
- Benchmark Results - On benchmarks carried out executing FORTRAN computational programs on Series/1 4955 models A-D processors, Digital's 11/34 without cache performed from 1.6 up to 4.6 times faster.
- No Report Generator.
- No Data Query Capability.
- No Easy Spooling Facility - Only through the job stream processor.
- RPS does not support privileged/non-privileged user operations.
- RPS does not provide adequate user file protection/security.
- RPS does not support round robin scheduling of tasks or time slicing. Everything is event driven.

TEXAS INSTRUMENTS 990 SERIES

General Background

Main Memory:	64KB to 2MB
Disk Capacity:	256KB to 96MB
Terminal Capacity:	Up to 24
Printer Capacity:	30 cps to 600 lpm
Word Length:	16-bit word
CPU Models:	990/5 (low end), 990/10, 990/12 (high end) 10 packaged systems

- Software

Operating Systems:

DNOS - 990/10-12, 256KB-2MB systems, COBOL

DX10 - 990/10-12, 128KB-2MB systems, BASIC

DX7 - 990/10, 96KB-352KB, 4 user maximum, COBOL

DX5 - 990/5, 64KB, single-user system, COBOL

DNOS: Distributed Network Operating System

- multi-keyed indexed file support (RMS-11)
- multi-job/concurrent development
- DDP
- batch processing
- spooling, swapping, overlaying
- inter-job communication
- file management (DBMS) memory management
- communications: 2780/3780 emulation
- TIFORM (form generator)
- sort/merge capabilities
- QUERY (report generator)
- designed to be compatible with DX10
- database manager (DBMS)
- languages: COBOL, COBOL PLUS, PASCAL, ASSEMBLER

DX10:

- most widely used operating system
- shared code capabilities
- memory management
- multi-tasking
- file sharing
- swapping
- TIFORM, QUERY, DBMS, Sort/Merge, TIPE-900 (WP), PROM programming
- communications: 2780/3780/3270, remote terminal capabilities
- languages: BASIC, COBOL, FORTRAN, PASCAL, RPG-II, TPL

DX7:

- multi-user (4)
- multi-tasking
- batch
- file sharing

- spooling
- foreground/background capabilities
- sort/merge
- 2780, 3780 emulation
- swapping
- memory management
- file management package (RMS-11 not DBMS)
- language: COBOL only

DX5:

- overlaying available
- file management available (multi-key)
- single user COBOL environment
- both interactive and batch mode available
- sort/merge capabilities
- single task
- 2780/3780 emulation

- Hardware/Systems: 3 processors: 990/5, 990/10, 990/12

  990/5 - Model 2 (64KB, 14MB disk)

  990/10 - Models 3, 4, 5, 7, 8, 9, 16 (96KB-2MB, 18MB to 178MB disk)

  990/12 - Models 20, 26, 29, 30, 36 (256KB-2MB, 178MB to 677MB)

  Add-On Memory: 64KB, 128KB, 192KB, 256KB

  Disks: 256KB floppies, 9.4MB, 32MB, 44.6MB, 63MB, 96MB, 169MB, 5MB Winchester

  Printers: 30 cps, 150 cps, 300 lpm, 600 lpm, letter quality (45 cps)

  Magtape: 800 bpi-1600 bpi

  Communications: Communication controllers available for 2780/3780/3270 emulation

TEXAS INSTRUMENTS 990 SERIES - DEFICIENCIES

- COBOL Limitations
  - COBOL PLUS will only run on DNOS 990/12-based systems. It will not run on 990/5 or 990/10 systems. DX5 COBOL (single user) will need source code modification when upgrading to multi-user systems.
- DBMS Limitations
  - DBMS functionality requires a minimum of 192KB of memory.

WANG 2200 SERIES

General Background

Main Memory:	32KB to 512KB
Disk Capacity:	143KB to 483MB
Terminal Capacity:	Up to 16 on the 2200 MVP, 16 on the 2200 LVP, 1 on the SVP
Printer Capacity:	30 cps to 600 lpm
Models:	2200 MVP, 2200 LVP, 2200 SVP The MVP may be phased out soon with the LVP being upgraded to .5MB or 1MB memory.
Environments:	Small Business Computer Space - DP/WP

- Software

Operating System:	None - BASIC Interpreter controls all I/O
Features:	- Integrated Support System (ISS) provides system support utilities (PIP, DUP, etc.) - concurrent job/development mix - chaining - no overlaying - file sharing (through KFAM) - file management capabilities (KFAM) - Sort-4, free-standing sort - IDEAS - Inquiry Data Entry Access System (similar to DATATRIEVE) - communications available: 2780, 3780, 2741, 3271, X.25
Languages:	BASIC, COBOL
Typical Applications:	Invoicing, AR, AP, GL, Inventory Control
Application Software:	- Automobile Parts Inventory Control System - Patient Billing System - Public Accountant System - Automobile Dealers Accounting System - Time and Record-Keeping System - Mortgage Management Systems - Insurance Sales Management Systems

- Hardware

Systems:	2200 MVP - 32KB to 512KB (12 users - 16 jobs) 2200 LVP - 32KB to 512KB (12 users - 16 jobs) 2200 SVP - 32KB to 64KB (single user)
Disks:	2.5MB, 5MB, 10MB, 20MB, 27MB, 54MB, 81MB disks .25MB diskette, 483MB maximum Winchester disks available
Magtapes:	9-track, 800 bpi, 1600 bpi
Printers:	70 cps, 100 cps, 120 cps, 200 cps 30 cps daisy wheel 250 lpm, 400 lpm, 430 lpm, 600 lpm

Add-On Memory:	64KB to 256KB
Communications:	Various controllers to emulate several IBM protocols (2780, 3780, 2741)

Comments: Wang also provides their VS offerings on the high end of commercial systems. For office products, they offer their OIS systems (Office Information Systems).

WANG 2200 SERIES - DEFICIENCIES

- Expensive Upgrades
  - 128KB memory costs $8,000
  - WP/DP terminals cost $3,500
  - Remote terminals with controller and no modem cost $3,600 to $5,000
- Terminal Limitation
  - 16 terminals maximum. DEC Datasystems can offer a far superior range.
- Language Incompatibility
  - BASIC on the 2200 Series is not compatible with BASIC on the VS Series or the OIS Systems.
- Limited Language Availability
  - Only BASIC and COBOL are offered on the 2200.
- COBOL Limitations
  - COBOL will only run on two of the models offered -- LVP and MVP. Must have BASIC coresident to handle file I/O.
- Terminal Limitation
  - 2200 terminals cannot be used as virtual terminals to any other type system.
- Maximum program size is 64KB. NO OVERLAYING CAPABILITIES - ONLY CHAINING.

WANG VS SERIES

General Background

Main Memory:	128KB to 8MB
Disk Capacity:	308KB to 4.6 billion bytes
Terminal Capacity:	VS-50 up to 32 (VS-100 up to 128)
Printer Capacity:	40 cps to 600 lpm
Environment:	Interactive, commercially oriented, multi-user, where DDP and office automation are required

- Software

Operating System: VSOS - Virtual Storage Operating System (13K to 35K)

Features:
- interactive, multi-user
- virtual memory addressing
- paging (similar to VAX)
- file sharing
- VS-ADMS (Advanced Data Management System)
- REPORT - report generator
- sort/merge capabilities
- Data Entry (screen generator)
- communications: 2780/3780 emulators, remote OIS cluster

Languages: COBOL, RPG-II, BASIC, FORTRAN-66, ASSEMBLER

Typical Applications: Invoicing, AR, Sales Analysis, OE, Inventory, AP, GL

Application Software:
- General Business System (GBS) (Similar to DIBS-11)
- Invoicing System
- Accounts Receivable
- Accounts Payable
- Sales Analysis
- Order Entry
- Inventory Control
- General Ledger
- Payroll/Personnel/Pension

- Hardware

CPUs:
VS-50, 128KB to 512KB, 8 users

VS-80, 128KB to 512KB, 24 users

VS-90, 256KB to 4MB, 64 users

VS-100, 256KB to 8MB, 128 users

Add-On Memory: 128KB, 256KB, 384KB

Disks: 30MB, 60MB, 75MB, 90MB, 288MB, 1.2MB floppy

Magtapes:	800 bpi/1600 bpi
Printers:	40 cps (daisy wheel), 120 cps, 200 cps, 250 lpm, 430 lpm, 600 lpm

WANG VS SYSTEM - DEFICIENCIES

- Expensive Upgrades
  - 128KB memory costs $7,000
  - DP/WP terminal costs $4,300
- Non-Transportable Software
  - BASIC on the 2200 is incompatible with VS System. This is due to the way I/O is handled in both systems.
- Software/Language Problems
  - DBMS was committed for September 1980. After being released it was taken off the market due to numerous bugs. Recently it was removed from Wang's price list.
  - Layering OIS word processing requires 256KB of dedicated memory.
  - Remote OIS WP terminal costs $20,000 (without a printer).

CAPACITY BAND DEFINITIONS

System Class	CRTs/ Users	Batch Jobs	Disk Space	Tapes Drives	Printer Capacity
A2W	2	0	5MB	0	30 cps
B	4	0	20MB	0	100 cps
C	8	0	50MB	0	300 lpm
D	16	1	100MB	1	300 lpm

Usage: These "System Classes" have been established to facilitate the task of comparing competitor's systems in a meaningful way. These are guidelines (not absolute measures) that Commercial Marketing feels constitute minimum requirements needed to provide satisfactory system performance. All systems configured for pricing on the following pages meet these guidelines. It should be noted that in certain configurations a particular vendor may have to offer substantially more capacity (due to limited offerings) in order to meet minimum band specifications. This will obviously be reflected in a higher price for that system.

Note: Commercial systems quoted were configured with the following software: an operating system and one commercial language.

CAPACITY BAND CLASS A2W

Band Components:

2 CRTs/Users
5MB Disk Storage
100 cps Printer
System Software

Digital's Offering: D336C-CA

System Components:
- 11/23 CPU with 128KB
- Two RL02 10MB Drives
- 1 CRT VT100-NA
- 4 Line MUX
- LA120 180 cps Printer
- System Software - CTS-300

Additional Components:
- 1 CRT VT100-NA

Total Cost: $28,250

Monthly Maint: $368

Data General's Offering: CS/10 - Model C3

System Components:
- Micro Nova Processor 80KB
- CRT Console
- 4 Line MUX
- 1.2MB Floppy Storage
- 12.4MB Winchester
- Interactive COBOL

Additional Components:
- 6053 Dasher CRT, 16KB Memory
- Dasher tpi Printer

Total Price: $23,280

Monthly Maint: $192

Datapoint's Offering: 1550-1554

System Components:
- 1550 CPU with 64KB
- 1MB Floppy Storage
- 10MB Disk (mandatory)
- (4 Line Serial MUX included)

Additional Components:
- 30 cps Printer, 8200 CRT
- DATABUS Language

Total Price: $25,635

Monthly Maint: $219

Comment: The 9320 10MB disk must be included on configurations requiring more than 1 workstation. Price: $10,900.

Hewlett-Packard's Offering: HP 250/30

System Components:
- CPU with 160KB System, 32KB User Memory
- 16MB Winchester Drive
- 67MB Tape Cartridge
- 1 Workstation (CRT)
- System Software

Additional Components:
- HP 250 Workstation
- 180 cps Printer
- 32KB Add-On Memory
- 5 Line MUX

Total Price: $32,300

Monthly Maint: $205

Comments: The 16MB Winchester Drive and the 67MB tape cartridge are integral components of the system. 32KB memory is required for each additional CRT.

IBM's Offering: System/34

System Components:
- 5340 CPU with 64KB (C21)
- 1.2MB Floppy Disk
- 8.6MB Disk Storage
- 2 CRTs/2 Interfaces
- 2 Keyboards
- 120 cps Printer
- Software

Total Price: $30,424

Monthly Maint: $518.50

Comments: The 8.6MB disk drive is an integral part of the system. Included in the Monthly Maintenance Fee are software lease prices.

Series/1

System Components:
- 4952B CPU with 32KB
- 32KB Add-On Memory
- 1.2MB Diskette, 23.4MB Disk
- Two 3101 CRTs/Controllers
- 120 cps Printer/Controller
- Rack Enclosure
- Software (op. sys., language, utils.)

Total Price: $37,226

Monthly Maint: $467

Texas Instruments' Offering: 990/10 Model 3

System Components:
- 990/10 Processor with 96KB
- FD1000 Dual-Drive Floppy System
- One 911 VDT/Controller

Additional Components:
- Model 810 150 cps Printer
- One 911 VDT/Controller
- DX7 COBOL
- DX7 Printer Interface
- DS10 9.4MB Disk/Controller

Total Cost: $36,160

Monthly Maint: $510

Wang's Offering: 2200 LVP-16D

System Components:
- 2200 CPU with 64KB
- 1MB Diskette, 8MB Disk
- BASIC

Additional Components:
Two 2236DE CRTs
120 cps Printer/Controller
4 Line MUX

Total Cost: $28,700

Monthly Maint: $293

CAPACITY BAND CLASS B

Band Components:

4 CRTs/Users
20MB Disk Storage
100 cps Printer
System Software

Digital's Offering:

D336C-CA

System Components:
- 11/23 CPU with 128KB
- Two RL02s 10MB Drive
- One CRT VT100-NA
- LA120 180 cps Printer
- System Software CTS-300

Additional Components:
- One CRT VT100-NA

Total Cost: $32,550

Monthly Maint: $394

Data General's Offering:

CS/30 Model C3 9253

System Components:
- Micro Nova Processor 64KB
- One CRT, 4 Line MUX
- 1.2MB Floppy, 25MB Drive
- Interactive COBOL

Additional Components:
- Three 6053 Dasher CRTs
- Dasher LP2 Printer/Controller 180 cps
- Three 16KB Memory Boards

Total Price: $39,950

Monthly Maint: $315

Datapoint's Offering:

8600-4630

System Components:
- 6600 CPU, 120KB Memory
- 20MB Disk Storage
- 8 Line MUX
- System Software

Additional Components:
- 4 Datashare Datastations
- 1 160 cps Printer (9621)

Total Price: $48,055

Monthly Maint: $463

Hewlett-Packard's Offering: Series 40SX

System Components:
- Series 40 CPU, 256KB Memory
- 27MB Disk Storage
- Tape Cartridge
- Software (op. sys., lang., DBMS)

Additional Components:
- Four 2382A CRTs
- One 4 Line MUX
- One 2631B Printer
- 180 cps/Controller

Total Price: $54,480

Monthly Maint: $457

IBM's Offering: System/34, 5340-E13
- 5340 CPU with 128KB
- Four 5251-M11 CRTs
- 4 Keyboards
- 27.4MB Disk
- One 2MB Floppy
- One 120 cps printer
- System Software

Total Price: $46,133

Monthly Maint: $626

Note: Included in the Monthly Maintenance Fee is the software rental (Operating System, Utilities, COBOL).

Series/1, 4955

System Components:
- 4955 CPU, 64KB
- 64KB Add-On Memory
- 23MB Disk Storage/Controller
- Four 3101 CRTs/Interfaces
- 120 cps Printer/Controller
- Rack Enclosure
- Software

Total Price: $46,504

Monthly Maint: $445

Texas Instruments' Offering: DS990 Model 4

System Components:
- 990/10 CPU with 128KB
- One 911 VDT
- Two DS10 9.4MB Drives

Additional Components:
- Three 911 VDTs
- One 810 150 cps Printer
- Oper. Sys. plus COBOL

Total Price: $43,655

Monthly Maint: $406

Note: Sort/Merge Software: $2,500 one-time license fee

TIFORM: $2,500 one-time license fee

DBMS: $3,350 one-time license fee

TI software is expensive.

Wang's Offering: 2200 LVP-32D

System Components:
- 2200 LVP - 16 CPU with 128KB
- 1MB Floppy/8MB Drive
- BASIC

Additional Components:
- Four 2236DE CRTs
- One 4 Line MUX
- One 2231W-2 Printer 120 cps with Controller
- Two 5MB Drives

Total Price: $44,800

Monthly Maint: $475

Note: This system does not include WP software ($2,000) or WP terminals ($3,500/WP CRT). Also, IDEAS (screen format, report generator and ISAM) is not included ($1,000).

CAPACITY BAND CLASS C

Band Components:

8 CRTs/Users
50MB Disk Storage
300 lpm Printer
System Software

Digital's Offering:

D348A-JA

System Components:
- 11/24 CPU, 256KB
- 2 RK07 Disks 56MB
- LP11-AA 285 lpm Printer
- 1 VT100 CRT
- CTS-300 Software

Additional Components:
- 1 Pack of 8 VT100s
- 8 Line MUX

Total Price: $79,500

Monthly Maint: $726

Data General's Offering:

CB/50 Model C5

System Components:
- Nova 4X CPU, 256KB
- 25MB Fixed Disk/Controller
- 1.2MB Floppy (Mandatory)
- Interactive COBOL
- Console Interface

Additional Components:
- 8 Dasher CRTs
- Two 4 Line MUX
- One 300 lpm Printer/Controller (4218)
- 25MB Fixed Disk

Total Price: $84,055

Monthly Maint: $607

Datapoint's Offering:

8600-8630

System Components:
- 8600 CPU with 128KB
- 20MB Disk Storage (Fixed)

Additional Components:
- Eight 8211 CRTs
- One 8 Line MUX
- 9302 40MB Disk
- 9257 300 lpm Printer
- DATABUS and Datashare
- 128KB Memory

Total Price: $81,660

Monthly Maint: $733

Hewlett-Packard's Offering: Series 40SX

System Components:
- Series 40 CPU, 256KB Memory
- 64MB Fixed Disk/Controller
- Tape Cartridge (Mandatory)
- Software (op. sys., lang, DBMS)

Additional Components:
- Eight 2382A CRTs
- Two 4 Line MUX
- One 2608A 400 lpm Printer/GIC Controller

Total Price: $73,850

Monthly Maint: $642

IBM's Offering: System/34

System Components:
- 5340 F34 CPU with 256KB
- 63.9MB Disk Storage
- 1.2MB Floppy
- Eight 5251 CRTs
- 8 Keyboards
- 300 lpm Printer 5211-5811
- Printer Belt
- Software (op. sys., utilities, lang.)

Total Price: $85,656

Monthly Maint: $814

Series/1

System Components:
- 4955E CPU with 64KB
- Three 64KB Memory Boards
- 64MB Disk/Controller
- Diskettes 1.2MB
- 9 CRTs
- 8 Line MUX/Adapters
- Expansion Box
- 400 lpm Printer/Controller
- Rack Enclosure
- Software (op. sys., lang., utilities)

Total Price: $81,413

Monthly Maint: $783

Texas Instruments' Offering: DS990 Model 7

System Components:
- 990/10 CPU with 256KB
- Console CRT 911 VDT
- 32MB Disk Storage/Controller

Additional Components:
- Software (op. sys., lang.)
- Seven 911 VDTs, Controller included
- 32MB Disk Drive/Controller
- 300 lpm Printer (LP300)

Total Price: $86,350

Monthly Maint: $854

Wang's Offering: 2200 MVP-64

System Components:
- CPU with 256KB
- BASIC

Additional Components:
- Eight 2236DE
- Two 4 Line MUX
- One 53MB Drive/Controller
- Two .25MB Floppies/Controllers
- One 2263-1 400 lpm Printer

Total Price: $81,600

Monthly Maint: $866

CAPACITY BAND CLASS D

Band Components:

16 CRTs/Users
1-2 Batch Jobs
100MB Disk Storage
1 Tape Drive
One 300 lpm Printer
System Software

Digital's Offering:

D546E-BA

System Components:
- 11/44 CPU with 512KB
- Dual TU58s
- One 67MB RM02 Disk Drive
- CIS
- LA120 180 cps Printer
- CTS-500 with COBOL

Additional Components:
- One 16 pack of VT100s
- One 16 Line MUX (DZ11E)
- One 67MB RM02
- One 285 lpm Printer LP11
- TS11 Magtape (1600 bpi)

Total Price: $181,500

Monthly Maint: $1,082

D358D-AA

System Components:
- 11/34A 256KB
- 2 RK07, 56MB Drives
- One VT100 CRT
- CTS-300

Additional Components:
- One 16 Pack of VT100s
- 2 RK07 56MB Drives
- One 285 lpm Printer LP11
- TS11 Magtape (1600 bpi)
- One 16 Line MUX

Total Price: $151,000

Monthly Maint: $1,144

Data General's Offering: CS/70 Model C6

System Components:
- Eclipse 140 CPU with 512KB
- 50MB Drive/Controller
- 800 bpi Tape Unit
- Interactive COBOL

Additional Components:
- 16 Dasher CRTs
- 50MB Add-On Drive/Controller
- 4218 300 lpm Printer
- Four 4 Line MUX
- 1 Expansion Cabinet

Additional Software
- (Data query, report, screen)

Total Price: $167,950

Monthly Maint: $1,165

Datapoint's Offering: 8800-8830

System Components:
- 8823 CPU with 256KB
- Peripheral Processor
- Operating System Software
- File Management Software

Additional Components:
- Two 128KB Memory Boards
- 135MB Single-Disk Drive
- 1600 bpi Magtape
- 16 Datashare terminals
- Two 8 line MUX
- One 300 lpm Printer
- Datashare and DATABUS Software

Total Price: $137,270

Monthly Maint: $1,058

Note: Datapoint has been able to sell its basic system (i.e., CPU with 256KB with system software) for a low $40,100.

Hewlett-Packard's Offering: HP3000 Series 40

System Components:
- Series 40 CPU with 512KB
- Software (op. sys., lang., DBMS)

Additional Components:
- Two 4 Line MUX
- Two 4 Line Extenders
- 1 Printer I/F
- Two 50MB Drives/Controller
- Fourteen 2382 CRTs
- Two 2624 CRTs (Communications)
- 1600 bpi Magtape
- One 400 lpm Printer

Total Price: $137,820

Monthly Maint: $941

IBM's Offering: System/34

System Components:
- 5340 CPU with 256KB
- 128KB Disk Storage
- 5MB Floppy Storage

Additional Components:
- 16 CRTs/Keyboards
- 2 Communications Lines
- 300 lpm Printer
- System Software (lang., util.)

Total Price: $132,380

Monthly Maint: $1,269

Note: The System/34 only supports up to 256KB. Realistically, this would never be offered as an acceptable 16-user system.

Series/1

System Components:
- 4955F CPU with 128KB
- Three 128KB Memory Boards
- Two 64MB Disks/Controller
- 1600 bpi tape
- 5MB Floppy
- 18 CRTs
- Two 8 Line MUX
- 4 line MUX adapter
- One 400 lpm Printer/Controller
- Software

Total Price: $122,633

Monthly Maint: $1,115

Note: Again, as in the case of the System/34, the Series/1 with 16 users will be an unacceptable offering. The Series/38 begins to enter into this space.

Texas Instruments' Offering: DS990 Model 29

System Components:
- 990/12 CPU with 256KB
- Two 911 VDTs/Controllers
- 96MB Disk Storage

Additional Components:
- Operating Systems DX10
- DX10 COBOL
- One 800/1600 bpi 979A Magtape
- Fourteen 911 VDTs/Controllers
- One 300 lpm Printer LP300
- One 256KB Memory Board

Total Price: $131,150

Monthly Maint: $1,126

Wang's Offering: VS-50-16S

System Components:
- VS-50 CPU with 512KB
- 30MB Disk Storage
- 300KB Floppy
- 1 Console CRT
- Operating System, Utilities

Additional Components:
- One 75MB Drive
- 1 Drive I/F
- One 1600 bpi Magtape
- Magtape I/F
- Sixteen 2246P DP CRTs
- One 16 line MUX for DP CRTs
- One 5573 250 lpm Printer
- One Controller for Printer

Total Price: $148,800

Monthly Maint: $839

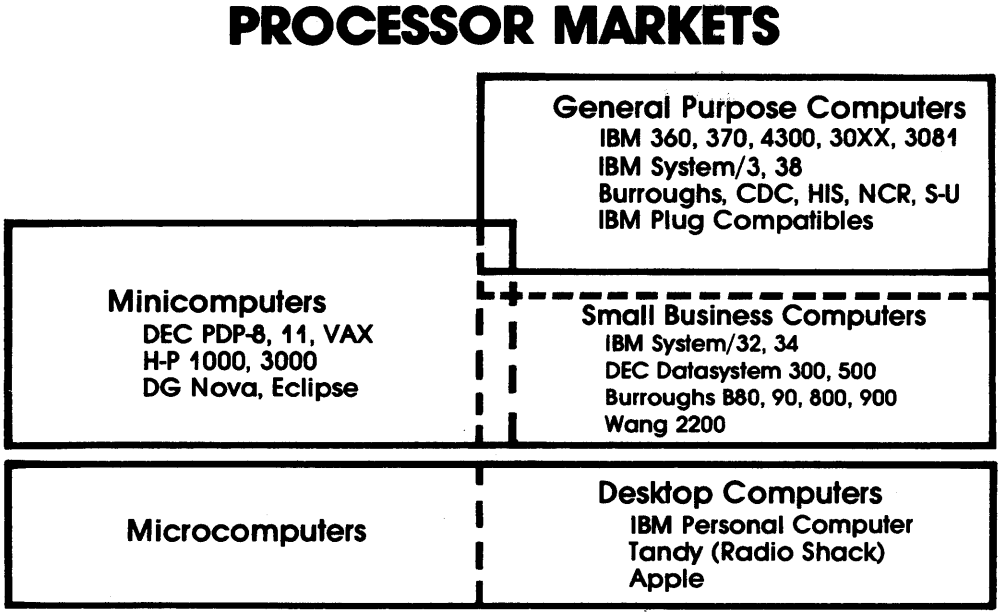

FIGURE 1. DEFINING PROCESSOR MARKETS REFERRED TO IN THIS ARTICLE.*

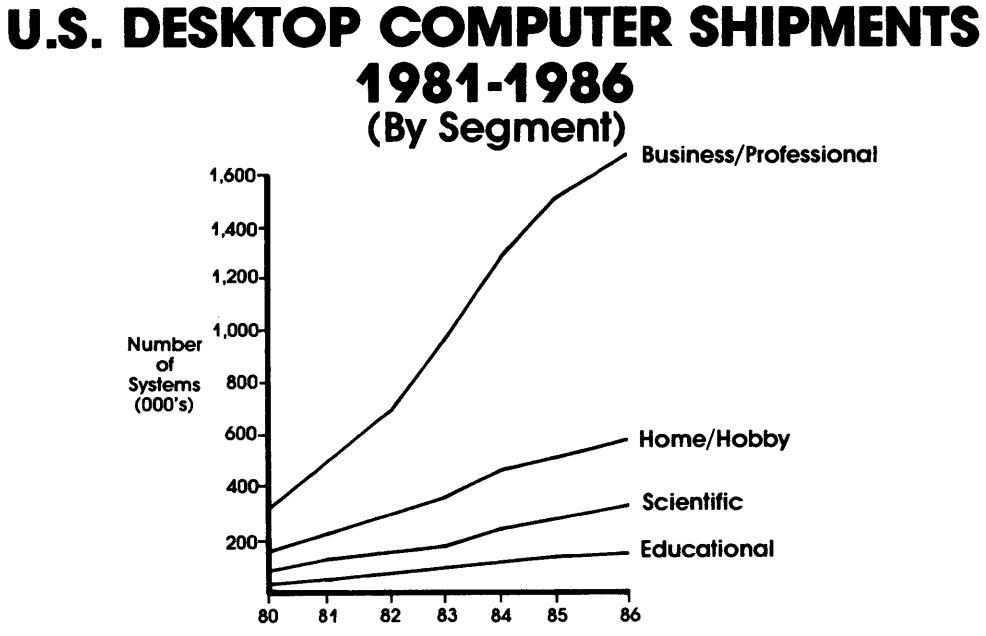

FIGURE 2. U.S. DESKTOP SHIPMENT PROJECTIONS THRU 1986.*

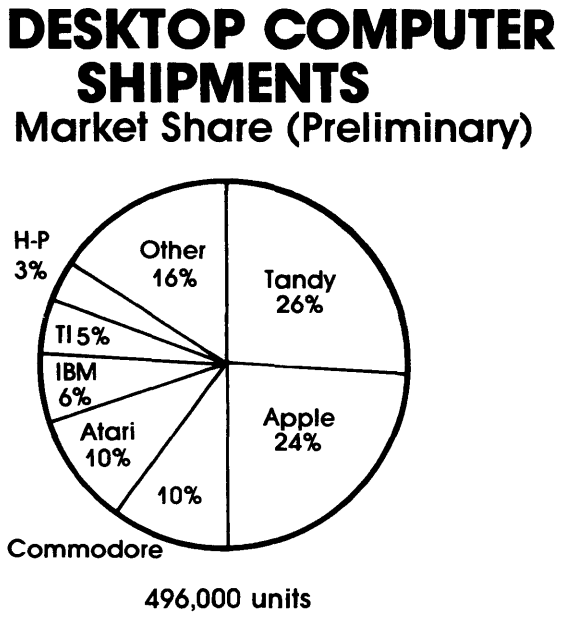

FIGURE 3. U.S. 1981 DESKTOP MARKET SHARE.*

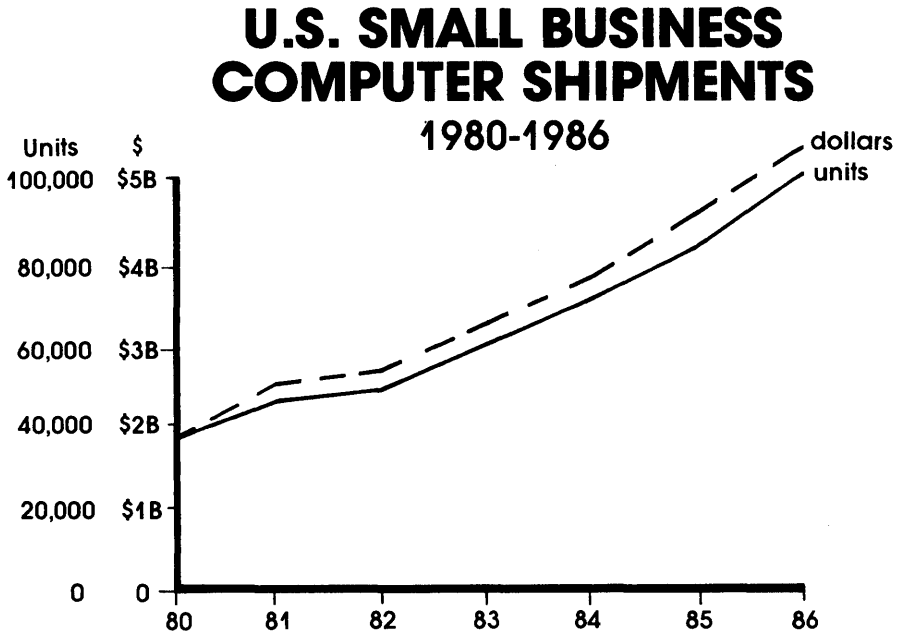

FIGURE 4. U.S. SBC SHIPMENT AND REVENUE PROJECTIONS THRU 1986.*

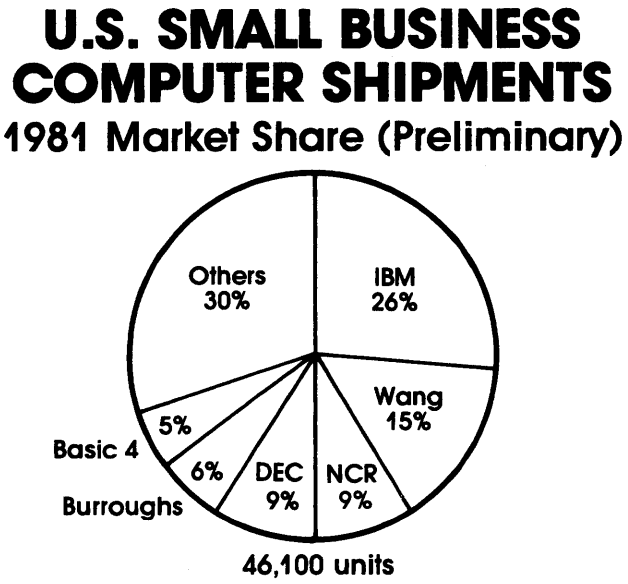

FIGURE 5. 1981 U.S. SBC MARKET SHARE.*

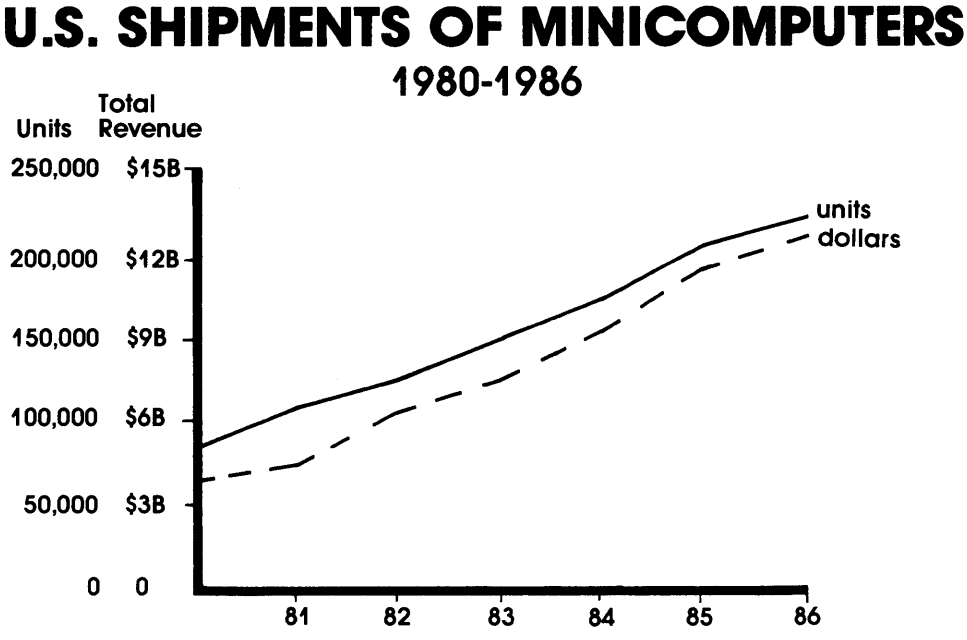

FIGURE 6. U.S. MINICOMPUTER SHIPMENT AND REVENUE PROJECTIONS THRU 1986.*

U.S. MINICOMPUTER SHIPMENTS

1981 Market Share (Preliminary)

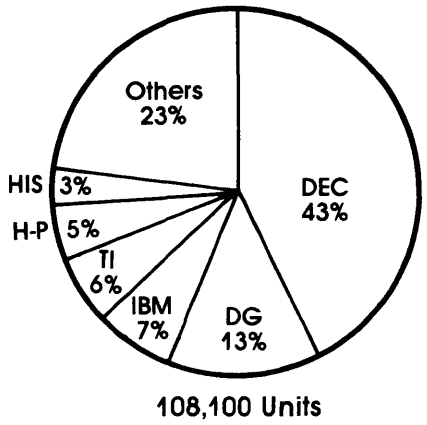

FIGURE 7. U.S. MINICOMPUTER 1981 MARKET SHARE.*

BILLION DOLLAR CLUB

Information Processing Related Revenues

	1976	1981	Compound Growth	1981 Growth
IBM	13,400	24,073	12.4	12.7
DEC	736	3,198	34.2	35.1
CDC	1,358	3,101	18.0	11.1
NCR	1,674	3,072	12.9	4.1
Sperry Univac	1,467	2,900e	14.6e	7.1e
Burroughs	1,612	2,718	11.0	12.6
HIS	914	1,774	14.2	8.6
HP	461	1,771	30.9	17.3
TOTAL	21,622	42,607	14.5	12.9

FIGURE 8. 1981 TOP 10 COMPUTER INDUSTRY REVENUE LEADERS.*

INFORMATION PROCESSING REVENUES -- LEADING MANUFACTURERS
(Millions of Dollars)

	1976	1977	1978	1979	1980	1981
IBM	13,400	14,765	17,074	18,338	21,367	24,073
DEC (6/30)	736	1,059	1,437	1,804	2,368	3,198
CDC	1,358	1,513	1,868	2,273	2,791	3,101
NCR	1,674	1,944	2,240	2,634	2,951	3,072
Univac (3/31)	1,467	1,726	2,050	2,319	2,707	2,900e
Burroughs	1,612	1,794	2,083	2,376	2,413	2,718
HIS	914	1,037	1,294	1,453	1,634	1,774
HP (10/31)	461	588	769	1,060	1,510	1,771
TOTAL	21,622	24,426	28,815	32,257	37,741	42,607

FIGURE 9. 1976-1981 REVENUE SUMMARY OF TOP 10 COMPUTER MANUFACTURERS.*

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These statistics have been taken from the June 1981 edition of Datamation. 1981 figures should be available in the June 1982 edition.

THE DATAMATION 100

THE TOP 100 U.S. COMPANIES IN THE DP INDUSTRY

1980 RANK	COMPANY	1979 RANK	1980 DP REV. (MIL.)	% DP GROWTH RATE	1980 DP EMPL.	1980 TOTAL REV. (MIL.)	FISCAL YEAR ENDING
1	IBM	1	$21367	17%	278200	$26213	Dec.
2	NCR	2	2840	12	65500	3322	Dec.
3	Control Data	4	2790	23	49000	3808	Dec.
4	Digital Equipment Corp.	6	2743	35	60000	2743	Feb.
5	Sperry Corporation	5	2552	12	47435	5331	Mar.
6	Burroughs	3	2478	1	57300	2902	Dec.
7	Honeywell	7	1634	12	29000	4925	Dec.
8	Hewlett-Packard	8	1577	37	28000	3160	Oct.
9	Xerox	10	770	35	0	8197	Dec.
10	Memorex	9	686	4	10700	769	Dec.
11	Wang Laboratories	14	682	66	14000	682	June
12	Data General	11	673	25	14370	673	Sept.
13	Storage Technology	12	603	26	11536	603	Dec.
14	Texas Instruments	16	562	41	0	4075	Dec.
15	Computer Sciences	13	560	35	14668	560	Mar.
16	Automatic Data Processing	15	505	24	13500	505	June
17	General Electric	17	475	21	7500	24959	Dec.
18	Electronic Data Systems	19	408	31	6544	414	June
19	Amdahl Corporation	18	394	23	4200	394	Dec.
20	TRW	22	377	33	0	4983	Dec.
21	Datapoint	24	364	34	6000	364	June
22	Triumph-Adler	20	325	10	5200	325	Dec.
23	Management Assistance Inc.	23	310	13	5300	310	Sept.
24	Tektronix	30	286	38	0	1023	May
25	McDonnell-Douglas	27	280	14	0	6066	Dec.
26	Mohawk Data Sciences	25	278	12	4956	278	April
27	Prime Computer	39	268	75	4011	268	Dec.
28	Harris Corp.	29	260	24	3230	1453	June
29	Teletype Corp.	44	250	72	0	416	Dec.
30	ITT Corporation	26	250	2	5300	23819	Dec.
31	Dataproducts	34	248	44	4900	248	Mar.
32	National Semiconductor	28	245	7	2000	1159	May
33	Perkin-Elmer	35	226	31	3600	1044	June
34	Raytheon Company	33	225	29	4600	5002	Dec.
35	Tandy Corporation	42	220	47	1900	1515	June
36	Northern Telecom	21	217	-26	4100	1723	Dec.
37	Racal Electronics Ltd	40	212	40	3487	212	Mar.
38	Tymshare	32	211	20	3615	236	Dec.
39	3M Company	37	205	28	0	6080	Dec.
40	Four-Phase Systems	31	197	10	3748	197	Dec.
41	Computervision	52	191	86	3000	224	Dec.
42	C. Itoh Electronics	38	189	23	587	189	Dec.
43	System Development Corp	36	187	15	3897	187	June
44	Motorola	46	175	30	2300	3099	Dec.
45	General Instruments	43	172	15	0	823	Feb.
46	Ampex Corporation	41	170	12	4055	493	May
47	Apple Computer	74	165	175	1100	165	Sept.
48	Bunker Ramo	45	147	8	7050	468	Dec.
49	Sanders Associates	82	145	209	2500	318	July
50	Bradford National	48	143	19	4300	143	Dec.

1980 RANK	COMPANY	1979 RANK	1980 DP REV. (MIL.)	% DP GROWTH RATE	1980 DP EMPL.	1980 TOTAL REV. (MIL.)	FISCAL YEAR ENDING
51	Nixdorf Computer	54	138	38	2036	138	Dec.
52	Centronics	47	129	2	2600	129	June
53	Tandem Computers	66	129	94	1630	129	Sept.
54	Lanier Business Products	62	128	64	0	275	May
55	Planning Research	53	127	25	3200	307	Sept.
56	General Automation	49	127	7	0	127	July
57	Informatics	50	126	12	2500	126	Dec.
58	Boeing	57	125	30	0	9426	Dec.
59	Telex Corporation	55	118	19	2276	172	Mar.
60	Reynolds and Reynolds	51	118	8	1450	208	Sept.
61	Wyly Corporation	60	118	35	1600	118	Dec.
62	United Telecommunications	58	115	20	1728	1912	Dec.
63	Recognition Equipment	56	113	15	2700	113	Oct.
64	Shared Medical Systems	61	106	28	1246	107	Dec.
65	AM International	67	99	49	1386	936	July
66	Commodore International	71	99	54	0	150	June
67	Dun and Bradstreet	59	97	6	1500	1176	Dec.
68	Comshare	65	88	32	856	88	June
69	The Sun Company	68	87	31	1348	12945	Dec.
70	Gould	64	87	22	1650	87	June
71	Exxon	72	86	39	0	108449	Dec.
72	Computer Automation	70	81	26	1200	81	June
73	Modular Computer Systems	63	81	13	1481	81	Dec.
74	Martin-Marietta	76	78	43	2245	2538	Dec.
75	Gerber Scientific	75	78	42	1300	89	April
76	CPT Corporation	84	76	69	826	76	June
77	Paradyne Corporation	89	76	83	1617	76	Dec.
78	BASF Systems	77	75	39	0	90	Dec.
79	Lear Seigler	69	75	15	500	1489	June
80	Conrac	73	70	13	0	147	Dec.
81	Interactive Data	78	69	30	1100	69	Dec.
82	Applicon	85	68	51	1000	68	April
83	Commerce Clearing House	80	67	37	0	254	Dec.
84	Quotron Systems	81	64	35	785	64	Dec.
85	Dysan Corporation	96	63	86	1800	63	Oct.
86	Cray Research	88	61	42	761	61	Dec.
87	Triad Systems	94	60	61	818	60	Sept.
88	General Datacom	87	57	30	1050	57	Sept.
89	Anacomp Inc	95	57	60	950	87	June
90	Intergraph	99	56	91	764	56	Dec.
91	Rolm	93	53	43	0	251	June
92	MSI Data	83	53	17	852	53	Mar.
93	Nashua	91	53	34	467	671	Dec.
94	National Data	90	53	29	2175	67	May
95	American Express	79	53	6	1600	53	Dec.
96	MSA Inc.	92	52	37	799	52	Dec.
97	Auto-Trol Technology	97	51	51	660	51	Dec.
98	Philips Information Systems	100	50	100	500	50	Dec.
99	Printronix	98	49	49	838	49	Mar.
100	Verbatim	86	48	8	1200	48	June

FIGURE 10. DATAMATION TOP 100 COMPUTER COMPANIES.**

TABLE I

TOP 10 DP REVENUES
(in $ millions)

	1980	1979	% Growth Rate
1 IBM	21,367	18,338	16.5
2 NCR	2,840	2,528	12.3
3 Control Data	2,791	2,273	22.8
4 DEC	2,743	2,032	35.0
5 Sperry	2,552	2,270	12.4
6 Burroughs	2,478	2,442	1.5
7 Honeywell	1,634	1,453	12.5
8 Hewlett-Packard	1,577	1,147	37.5
9 Xerox	770	570	35.1
10 Memorex	686	658	4.3
Total Top 10	39,438	33,710	17.0
Total	55,626	46,220	20.4
Top 10 as a Percent of Total	70.9%	72.9%	

TABLE 1. TOP 10 DP REVENUES (1980)**

TABLE II

$100 MILLION REVENUE GAINERS
(in $ millions)

	1980 Dp Revenue Gain	1980 % Growth Rate
1 IBM	3,029	16.5
2 DEC	712	35.0
3 Control Data	518	22.8
4 Hewlett-Packard	430	37.5
5 NCR	312	12.3
6 Sperry	282	12.4
7 Wang Labs	271	66.1
8 Xerox	200	35.1
9 Honeywell	182	12.5
10 Texas Instruments	164	41.2
11 Computer Sciences	145	34.8
12 Data General	133	24.7
13 Storage Technology	124	25.9
14 Prime Computer	115	75.0
15 Apple	105	175.1
16 Teletype	105	72.4
Subtotal	6,764	20.7
Total Dp 100	9,344	20.4

TABLE 2. $100 MILLION REVENUE GAINERS (1980)**

TABLE III

TOP 20 REVENUE GROWTH RATE

(in $ millions)

		Total Dp % Growth Rate	U.S. Dp % Growth Rate	Foreign Dp % Growth Rate	1980 Dp Rev.	1980 Earnings
1	Sanders Assoc.	208.5	91.5	NM	145.0	49
2	Apple	175.1	163.4	224.7	165.2	47
3	Philips Information Sys.	100.0	100.0	NM	50.0	98
4	Tandem	93.9	58.7	179.4	128.8	53
5	Intergraph	91.3	80.1	153.7	56.5	90
6	Dysan	86.1	79.9	127.7	62.9	85
7	Computervision	85.5	72.7	108.3	191.1	41
8	Paradyne	83.2	74.0	108.9	75.9	77
9	Prime	75.0	59.9	95.8	267.6	27
10	Teletype	72.4	62.1	NM	250.0	29
11	CPT	68.9	44.7	157.7	76.4	76
12	Wang Labs	66.1	68.8	61.5	681.8	11
13	Lanier	64.1	60.6	129.7	128.0	54
14	Triad Systems	61.0	61.0	NM	60.2	87
15	Anacomp	60.1	60.1	60.0	57.0	89
16	Commodore International	54.1	−13.2	105.2	98.7	66
17	Applicon	51.4	35.2	136.6	68.5	82
18	Auto-trol Technology	51.3	58.5	27.1	50.8	97
19	AM International	49.0	49.0	49.0	98.8	65
20	Printronix	48.8	37.7	93.0	48.9	99

NM - Not Meaningful

TABLE 3. TOP 20 REVENUE GROWTH RATE (1980)**

TABLE IV

BOTTOM 20 REVENUE GROWTH RATE

(in $ millions)

		Total Dp Growth Rate	U.S. Dp % Growth Rate	Foreign Dp % Growth Rate	1980 Dp Rev.	1980 Earnings
1	Northern Telecom	−26.0	−15.1	−31.6	217.1	36
2	Burroughs	1.5	−.3	3.8	2,478.0	6
3	Centronics	2.0	−7.7	17.5	128.9	52
4	ITT	2.0	.0	5.3	250.0	30
5	Memorex	4.3	9.1	−.6	686.0	10
6	Dun & Bradstreet	5.9	5.9	NM	96.7	67
7	American Express	6.0	6.0	NM	53.0	95
8	National Semiconductor	6.5	8.0	4.8	245.0	32
9	General Automation	7.0	6.2	8.6	126.7	56
10	Reynolds & Reynolds	7.6	7.6	7.1	117.8	60
11	Verbatim	7.6	7.4	8.0	48.4	100
12	Bunker Ramo	8.0	11.6	−9.2	146.7	48
13	Triumph Adler	10.2	−6.9	40.2	325.0	22
14	Four-Phase Systems	10.3	12.3	2.3	197.2	40
15	Informatics	12.0	8.9	32.0	125.9	57
16	Ampex	12.2	12.2	12.2	169.7	46
17	Mohawk	12.3	12.3	12.4	277.7	26
18	NCR	12.3	10.1	14.2	2,840.0	2
19	Honeywell	12.5	10.5	17.2	1,634.1	7
20	MAI	12.7	6.3	20.4	310.4	23

NM - Not Meaningful

TABLE 4. BOTTOM 20 REVENUE GAINERS (1980)**

TABLE V

TOP 10 DP OPERATING PROFITS

(in $ millions)

	1980	1979	% Change
1 IBM	5,231	4,649	12.5
2 DEC	434	327	32.6
3 NCR	390	348	12.0
4 Hewlett-Packard	261	184	52.7
5 Sperry	255	206	23.7
6 Control Data	238	176	35.1
7 Honeywell	186	152	21.9
8 Burroughs	145	456	-68.2
9 Wang Labs	113	70	64.7
10 Data General	105	92	14.6
Total Top 10	7,379	6,660	10.8
Total	5,500	7,715	10.2
Top 10 as a percent of total	86.8%	86.3%	
Number of Companies Reporting	70		
Total Dp Rev. Represented	49,905	41,678	
Percent of Dp Rev. Represented	89.7	90.6	

TABLE 5.

TOP 10 DP OPERATING PROFITS (1980)**

TABLE VI

TOP 10 - DP CAPITAL EXPENDITURES

(in $ millions)

	1980	1979	% Change
1 IBM	1,985	1,548	28.2
2 DEC	321	125	156.4
3 Control Data	296	208	42.8
4 NCR	156	115	36.2
5 Hewlett-Packard	148	115	28.7
6 Burroughs	147	100	47.0
7 Sperry	117	75	56.7
8 Wang Labs	96	65	48.9
9 Storage Technology	76	56	36.0
10 Automatic Data Processing	70	65	7.7
Total Top 10	3,412	2,470	38.1
Total	4,077	2,975	37.1
Top 10 as a Percent of Total	83.7%	83.0%	
Number of Companies Reporting	60		
Total Dp Rev. Represented	48,110	40,124	
Percent Dp Rev. Represented	86.5	87.2	

TABLE 6.

TOP 10 DP CAPITAL EXPENDITURES (1980)**

TABLE VII

TOP 10 R & D EXPENSES

(in $ millions)

	1980	1979	% Change
1 IBM	1,277	1,125	13.5
2 DEC	217	155	39.9
3 Sperry	216	189	14.1
4 NCR	201	171	17.5
5 Control Data	183	149	22.4
6 Burroughs	175	152	15.1
7 Honeywell	150	117	28.2
8 Hewlett-Packard	139	103	35.0
9 Data General	68	54	26.2
10 Amdahl	63	42	49.3
Total Top 10	2,688	2,257	19.1
Total	3,713	3,057	21.5
Top 10 as a Percent of Total	72.4%	73.8%	
Number of Companies Reporting	64		
Total Dp Rev. Represented	48,552	40,537	
Percent Dp Rev. Represented	87.3	88.1	

TABLE 7.

TOP 10 R & D EXPENSES (1980)**

TABLE VIII

TOP 10 DP EMPLOYMENT

(in thousands)

	1980	1979	% Change
1 IBM	278	270	2.9
2 NCR	66	65	1.6
3 DEC	60	50	21.0
4 Burroughs	57	57	1.4
5 Control Data	49	48	1.4
6 Sperry	47	46	2.8
7 Honeywell	29	29	1.8
8 Hewlett-Packard	28	25	12.0
9 Computer Sciences	15	13	10.6
10 Data General	14	14	4.8
Total Top 10	643	616	4.5
Total	863	806	7.1
Top 10 as a Percent of Total	74.5%	76.4%	
Number of Companies Reporting	83		
Total Dp Rev. Represented	51,894	43,221	
Percent Dp Rev. Represented	93.3	94.0	

TABLE 8.

TOP 10 DP EMPLOYMENT (1980)**

TABLE IX

DP REVENUES BY PRODUCT SEGMENT

(in $ millions)

	1980 $	1980 %	1979 $	1979 %	% Growth Rate
Systems					
Mainframes	15,148	27.2	13,312	29.0	13.8
Minicomputers	8,840	15.9	6,916	15.0	27.8
Microcomputers	769	1.4	416	0.9	84.9
Word Processing	881	1.6	538	1.2	63.8
Total Systems	25,638	46.1	21,182	46.1	21.0
Oem Peripherals	3,968	7.1	3,128	6.8	26.9
End User Peripherals	6,910	12.4	5,943	12.9	16.3
Data Communications	1,141	2.1	927	2.0	23.1
Software Products	1,738	3.1	1,347	2.9	29.0
Maintenance	8,888	16.0	7,372	16.0	20.6
Service	6,432	11.6	5,329	11.6	20.7
All Other	911	1.6	772	1.7	18.0
Total	55,626	100.0	46,000	100.0	20.9

TABLE 9.

DP REVENUES BY PRODUCT SEGMENT (1980)**

TABLE X

TOP 10 WORD PROCESSING

(in $ millions)

	1980 Wp	% Change	1980 Total Dp	Wp as a % of Dp	Dp 100 Ranking
1 Wang Labs	252.3	112.0	681.8	37.0	11
2 Lanier	110.1	48.6	128.0	86.0	54
3 DEC	82.3	102.6	2,743.3	3.0	4
4 Xerox	69.3	35.1	770.0	9.0	9
5 Raytheon	67.5	37.8	225.0	30.0	34
6 Exxon	66.2	31.9	86.0	77.0	71
7 CPT	65.7	68.9	76.4	86.0	76
8 Burroughs	49.6	1.5	2,478.0	2.0	6
9 Philips Info Systems	46.0	100.0	50.0	92.0	98
10 NBI	40.1	95.5	43.2	93.0	109

TABLE 10.

TOP 10 WORD PROCESSING (1980)**

IBM SYSTEM/38 MODEL 7 ANNOUNCEMENTS

Roger Bisbo
X6777 MK1-2/N38
RCS: MK12

IBM has announced S/38-7, purchase price cuts on S/38-5, withdrawal from marketing of selected S/38 configurations, a local high-speed S/1-to-S/38 interconnect, and IBM 3776/3777 attachment to S/38. VAX-11 vs. IBM S/38 pricing is also included in this article.

S/38-7 ANNOUNCED

IBM has announced S/38-7, a field-upgradeable expansion to the S/38 family. Main memory capacity is 2, 3 or 4MB (twice the maximum amount and four times the minimum previously available). IBM claims double the internal performance of the prior, top-of-the-line S/38-5. This would place the relative performance of the S/38 family members at:

S/38-7	3.50
S/38-5	1.75
S/38-4	1.35
S/38-3	1.00

Although no controlled benchmarks have been run, the following chart summarizes our current understanding of VAX-S/38 performance positioning:

VAX-11/780	<----->	
		S/38-7
VAX-11/750	<----->	
		S/38-5
VAX-11/730	<----->	S/38-4
		S/38-3

We presently feel S/38-7 positions between VAX-11/750 and VAX-11/780 in performance. However, we can expect IBM to aggressively market it against VAX-11/780. Present S/38-5 sites can upgrade to S/38-7 commencing in June, with new installations scheduled to start in January 1983.

S/38-5 PURCHASE PRICE REDUCTION

Purchase prices on S/38-5 have been cut by 10% to 19.5%, depending on configuration. A similar price reduction was announced on S/38-3 when S/38-4 was announced last year. Monthly rental, lease and maintenance charges remain unchanged.

SELECTED S/38 CONFIGURATIONS DISCONTINUED

Effective June 24, IBM will no longer market the following:

- Any S/38 with 512K bytes of main memory (previously the minimum memory allowed).
- S/38-5s with 768K, 1280K and 1792K bytes of main memory. S/38-5s will now be available with only 1, 1.5 or 2M bytes of memory.
- S/38-3s with only 64M bytes of disk storage. Minimum disk storage allowed on S/38-3s will now be 128M bytes.

LOCAL HIGH-SPEED S/1-TO-S/38 INTERCONNECT

IBM will now support a 56K baud local connection between S/1 and S/38. Previously, such a connection was limited to 9.6K baud. IBM has already announced this support for S/38-to-S/38 and S/38-to-S/34 local communications.

IBM 3776/3777 ATTACHMENT TO S/38

S/38 will now support attachment of IBM 3776 (Models 1 and 2) and 3777 Model 1 batch terminals over point-to-point, switched or non-switched, BSC communication lines.

VAX-11 VS. IBM S/38 PRICING

The following chart summarizes current VAX-11 pricing compared to S/38. Comparable systems were configured using our capacity class definitions (available upon request). The VAX-11 systems include VMS, CDDF/DTR, FMS and COBOL (all Category "A"). DBMS was not included in the VAX-11 configurations. DBMS would add $59,640 to the 5-year sum of costs. Digital Basic Hardware Service and DECsupport software charges were used. S/38 configurations contain twice the user disk space of their VAX-11 counterparts, due to the high disk overhead of S/38 database facilities.

No. of Users	----VAX-11------ Model	5 Yr. SOC	-----S/38------- Model	5 Yr. SOC	IBM Costs Higher by
64	780	$842,044	7*	$944,513	+ 12.2%
48	780	713,820	7	771,276	+ 8.0%
32	750	460,250	5	550,586	+ 19.6%
24	750	349,880	5	452,337	+ 29.3%
16	730	241,135	4	321,729	+ 33.4%
8	730	206,727	3	236,079	+ 14.2%

*We believe the S/38-7, 64-user system to be a very marginal performer.

The price cuts on S/38-5 were in the price of main memory. Previously, S/38-5 memory cost $29,120 per MB. This has been reduced 32% to $19,560 per MB, but remains higher than memory prices for the new S/38-7 ($17,500 per MB). Monthly memory maintenance charges are also less for S/38-7 ($110 per MB for S/38-7 vs. $132 per MB for S/38-5). S/38-7 memory offers higher performance (400 ns vs. 600 ns cycle for 4 bytes) and larger configurations (4MB vs. 2MB) than S/38-5.

SUMMARY

S/38-7 is a significant upward expansion of the S/38 family. An important feature is that all family members are field upgradeable. This means that price cuts on S/38-5 should be viewed as a mechanism to generate cash sales and not an attempt to dispose of obsolete inventory. IBM has discontinued "low-ball" S/38 configurations and is moving to provide memory upgrades in larger increments. The S/1 is becoming IBM's communications front end for S/38. Attachment of IBM 3776/3777 batch terminals (formerly a DPD product) makes S/38 a more attractive choice for DDP in large (i.e., FORTUNE 500) accounts.

Our marketing message must continue to emphasize the greater flexibility of our VAX-11 family. VAX-11 offers capabilities (DATATRIEVE, languages, graphics, communications functionality) not available on S/38.

PRIME COMPETITIVE REVIEW - APRIL 1982

Mike Harding
X3446 Reading, DEC Park/F2
RCS: RDGB

Product and Service Announcements

- Current

  Update to recent report. The Prime 2530 recently mentioned is targeted at the Prime 300 replacement market only.

- Anticipated

  The Rabbit is rumoured to be the same price as VAX-11/730 but almost twice the performance. It will be released soon as the 2250, the first in a 2200 series. The main features will be:

  - Same processor as 250II
  - Slower I/O
  - 1MB memory boards only
  - Up to 4MB maximum
  - 68Mb Winchesters
  - Twin streamer tapes
  - New design disk controller
  - New type diagnostics board, to be more competitive with Digital
  - New communications board - 8 asynch. lines, 1 synch. line
  - Likely to be same number of users as 250II
  - Will not require environmental control
  - Integral disk unit
  - Probably 2Kb cache

  To be released shortly:

  - RPG-II (before end of June)
  - COBOL (June-Sept. 1982)
  - PL/I (Sept.-Dec. 1982)

  All products will have a debugger interface.

  EMACS screen editor should be released now.

  Primos Rev 19 to include:

  - HELP facility
  - Access control lists
  - Disk quotas
  - User profile and registration
  - File transfer service based on yellow and blue look

  Will announce a commitment to SNA.

Business, Organisational and Financial Changes

- Sales

Worldwide	$365M	(1981)	$500M (targeted 1982)
UK	$49M	(1981)	$63M (targeted 1982)

Apparently they may struggle to reach the targets.

- I have available the complete up to date Prime UK organisational chart for anyone who would like a copy.

Lost and Won Sales

- Recent orders reported in the Press:

1 x 850	Gebrueder Subzer Winterthur, Switzerland	Joins a 750