Competition in the 16-Bit Marketplace
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TABLE OF CONTENTS

FEATURE STORY

COMMERCIAL MARKETING
- COMPETITION IN THE 16-BIT COMMERCIAL MARKETPLACE

Executive Summary..................................................... 1
Major Competition in the Small Business Computer Marketplace........ 2

The competitors listed below will be presented in the following format:
- Overview
- Software Features
- Hardware Offerings
- Product Deficiencies

Data General
- CS Series........................................................... 3

Datapoint
- 1550/1800.......................................................... 5
- 5500/6600.......................................................... 5
- 8600/8800.......................................................... 5

Hewlett-Packard
- HP 250.................................................................. 8
- HP 3000................................................................. 10

IBM
- System/23............................................................... 12
- System/34............................................................... 14
- Series/1................................................................. 16

Texas Instruments
- 990 Series.............................................................. 18

Wang
- 2200 Series............................................................. 20
- VS Series............................................................... 22

Guidelines Used in Configuring Systems
- Capacity Band Definitions......................................... 24

Initial Cost Comparisons of Competitors' Systems
- 2 CRT/User System Comparisons..................................... 24
- 4 CRT/User System Comparisons..................................... 28
- 8 CRT/User System Comparisons..................................... 31
- 16 CRT/User System Comparisons.................................... 34

Figures and Charts
1. Processor Market Definitions........................................ 38
2. U.S. Desktop Shipment Projections through 1986.................... 38
5. U.S. SBC 1981 Market Share........................................ 40

FOR INTERNAL USE ONLY

COMPETITIVE UPDATE/Vol. 1 No. 8 i

June 14, 1982
6. U.S. Minicomputer Shipment/Revenue Projections through 1986........ 40
7. U.S. Minicomputer 1981 Market Share........................................ 41
8. 1981 Top 10 Computer Industry Revenue Leaders.......................... 41
10. Datamation Top 100 Computer Companies..................................... 43

Tables
1. Top 10 DP Revenue................................................................. 45
2. $100 Million Revenue Gainers.................................................. 45
3. Top 20 Revenue Growth Rate.................................................... 46
4. Bottom 20 Revenue Growth Rate................................................. 46
5. Top 10 DP Operating Profits..................................................... 47
6. Top 10 DP Capital Expenditure.................................................. 47
7. Top 10 R&D Expenses............................................................. 47
8. Top 10 DP Employment........................................................... 48
9. DP Revenue by Product Segment................................................ 48
10. Top 10 Word Processing.......................................................... 48

COMPETITOR SECTIONS

IBM
• IBM SYSTEM/38 MODEL 7 ANNOUNCEMENTS.................................. 49

PRIME - EUROPE
• PRIME COMPETITIVE REVIEW - APRIL 1982............................... 53
COMMERICAL MARKETING

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.

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COMPETITIVE UPDATE/Vol. 1 No. 8 1 June 14, 1982
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 1pm
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

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COMPETITIVE UPDATE/Vol. 1 No. 8  3  June 14, 1982
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.

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COMPETITIVE UPDATE/Vol. 1 No. 8  4  June 14, 1982
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

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COMPETITIVE UPDATE/Vol. 1 No. 8 5 June 14, 1982
Languages: COBOL, BASIC-PLUS, RPG-PLUS, DATABUS, SNAP/3 (MACRO Assembler)

5500/6600
DOS (Disk Operating System), 4KB
8600/8800
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

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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 Applications: 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

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COMPETITIVE UPDATE/Vol. 1 No. 8 8 June 14, 1982
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

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

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 SystemApplications (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

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COMPETITIVE UPDATE/Vol. 1 No. 8 14 June 14, 1982
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 1pm, 140/95 1pm, 240/175 1pm, 160/300 1pm, 240/175 1pm, 280/195 1pm, 400/290 1pm, 490/355 1pm, 560/420 1pm, 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/I, 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)
- 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, manufac-
turing

• 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

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COMPETITIVE UPDATE/Vol. 1 No. 8 16 June 14, 1982
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)

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

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COMPETITIVE UPDATE/Vol. 1 No. 8       18       June 14, 1982
- 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.

---

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COMPETITIVE UPDATE/Vol. 1 No. 8 19 June 14, 1982
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

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COMPETITIVE UPDATE/Vol. 1 No. 8 20 June 14, 1982
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 Datasyncs 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-II)
- 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

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COMPETITIVE UPDATE/Vol. 1 No. 8 22 June 14, 1982
Magtapes: 800 bpi/1600 bpi
Printers: 40 cps (daisy wheel), 120 cps, 200 cps, 250 1pm, 430 1pm, 600 1pm

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

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

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

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COMPETITIVE UPDATE/Vol. 1 No. 8 24 June 14, 1982
<table>
<thead>
<tr>
<th>System</th>
<th>Components</th>
<th>Price</th>
<th>Monthly Maint.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data General's Offering:</strong></td>
<td>CS/10 - Model C3</td>
<td>$23,280</td>
<td>$192</td>
</tr>
<tr>
<td><strong>System Components:</strong></td>
<td>Micro Nova Processor 80KB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CRT Console</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Line MUX</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2MB Floppy Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.4MB Winchester</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interactive COBOL</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional Components:</strong></td>
<td>6053 Dasher CRT, 16KB Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dasher tpi Printer</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Price:</strong></td>
<td></td>
<td>$23,280</td>
<td></td>
</tr>
<tr>
<td><strong>Monthly Maint.:</strong></td>
<td></td>
<td>$192</td>
<td></td>
</tr>
<tr>
<td><strong>Datapoint's Offering:</strong></td>
<td>1550-1554</td>
<td>$25,635</td>
<td>$219</td>
</tr>
<tr>
<td><strong>System Components:</strong></td>
<td>1550 CPU with 64KB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1MB Floppy Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10MB Disk (mandatory)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4 Line Serial MUX included)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional Components:</strong></td>
<td>30 cps Printer, 8200 CRT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DATABUS Language</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Price:</strong></td>
<td></td>
<td>$25,635</td>
<td></td>
</tr>
<tr>
<td><strong>Monthly Maint.:</strong></td>
<td></td>
<td>$219</td>
<td></td>
</tr>
</tbody>
</table>

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

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COMPETITIVE UPDATE/Vol. 1 No. 8 26 June 14, 1982
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:

Digital's Offering:

Data General's Offering:

Datapoint's Offering:

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COMPETITIVE UPDATE/Vol. 1 No. 8 28 June 14, 1982
**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

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COMPETITIVE UPDATE/Vol. 1 No. 8  31  June 14, 1982
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: $81,660
Monthly Maint: $733

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 1pm 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 1pm 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

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COMPETITIVE UPDATE/Vol. 1 No. 8 34 June 14, 1982
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 1pm 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 1pm 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
PROCESSOR MARKETS

General Purpose Computers
- IBM 360, 370, 4300, 30XX, 3081
- IBM System/3, 38
- Burroughs, CDC, HIS, NCR, S-U
- IBM Plug Compatibles

Minicomputers
- DEC PDP-8, 11, VAX
- H-P 1000, 3000
- DG Nova, Eclipse

Small Business Computers
- IBM System/32, 34
- DEC Datasytem 300, 500
- Burroughs B80, 90, 800, 900
- Wang 2200

Microcomputers
- IBM Personal Computer
- Tandy (Radio Shack)
- Apple

Desktop Computers
- IBM System/32, 34
- DEC Datasytem 300, 500
- Burroughs B80, 90, 800, 900
- Wang 2200

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

U.S. DESKTOP COMPUTER SHIPMENTS
1981-1986
(By Segment)

Number of Systems (000's)

Business/Professional
Home/Hobby
Scientific
Educational

80 81 82 83 84 85 86


FOR INTERNAL USE ONLY

COMPETITIVE UPDATE/Vol. 1 No. 8 38 June 14, 1982
U.S. DESKTOP COMPUTER SHIPMENTS
1981 Market Share (Preliminary)


U.S. SMALL BUSINESS COMPUTER SHIPMENTS
1980-1986

U.S. SMALL BUSINESS COMPUTER SHIPMENTS
1981 Market Share (Preliminary)

46,100 units

IBM 26%
Wang 15%
DEC 9%
NCR 9%
Burroughs 6%
Basic 4 5%
Others 30%

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

U.S. SHIPMENTS OF MINICOMPUTERS
1980-1986

Units
Total Revenue

250,000 $15B
200,000 $12B
150,000 $9B
100,000 $6B
50,000 $3B
0 0
81 82 83 84 85 86

U.S. MINICOMPUTER SHIPMENTS
1981 Market Share (Preliminary)

![Pie chart showing market share of minicomputer shipments for 1981.]

108,100 Units

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

BILLION DOLLAR CLUB
Information Processing Related Revenues

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>13,400</td>
<td>24,073</td>
<td>12.4</td>
<td>12.7</td>
</tr>
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FIGURE 8. 1981 TOP 10 COMPUTER INDUSTRY REVENUE LEADERS.*
### INFORMATION PROCESSING REVENUES -- LEADING MANUFACTURERS

(Millions of Dollars)

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

* Reprinted courtesy of International Data Corporation (IDC)

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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

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<td>30</td>
<td>1050</td>
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<td>57</td>
<td>60</td>
<td>950</td>
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<td>90</td>
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<td>56</td>
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<td>764</td>
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<td>Rolm</td>
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<td>53</td>
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<td>29</td>
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<td>6</td>
<td>1600</td>
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<td>660</td>
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<td>500</td>
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<td>Dec.</td>
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<td>838</td>
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<td>8</td>
<td>1200</td>
<td>48</td>
<td>June</td>
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FIGURE 10. DATAMATION TOP 100 COMPUTER COMPANIES.**
### TABLE I

**TOP 10 DP REVENUES**  
(in $ millions)  

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>1980</th>
<th>1979</th>
<th>% Growth</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>18,338</td>
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</tr>
<tr>
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<td>NCR</td>
<td>2,840</td>
<td>2,528</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Control Data</td>
<td>2,791</td>
<td>2,273</td>
<td>22.8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DEC</td>
<td>2,743</td>
<td>2,032</td>
<td>35.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Sperry</td>
<td>2,552</td>
<td>2,270</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Burroughs</td>
<td>2,478</td>
<td>2,442</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Honeywell</td>
<td>1,634</td>
<td>1,453</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Hewlett-Packard</td>
<td>1,577</td>
<td>1,147</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Xerox</td>
<td>770</td>
<td>570</td>
<td>35.1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Memorex</td>
<td>686</td>
<td>658</td>
<td>4.3</td>
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</table>

Total Top 10: 39,438
Total: 55,626
Top 10 as a Percent of Total: 70.9%

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

### TABLE II

**$100 MILLION REVENUE GAINERS**  
(in $ millions)  

<table>
<thead>
<tr>
<th>1980 Dp Revenue Gain</th>
<th>1980 % Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IBM</td>
<td>3,029</td>
</tr>
<tr>
<td>2 DEC</td>
<td>712</td>
</tr>
<tr>
<td>3 Control Data</td>
<td>518</td>
</tr>
<tr>
<td>4 Hewlett-Packard</td>
<td>430</td>
</tr>
<tr>
<td>5 NCR</td>
<td>312</td>
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<tr>
<td>6 Sperry</td>
<td>282</td>
</tr>
<tr>
<td>7 Wang Labs</td>
<td>271</td>
</tr>
<tr>
<td>8 Xerox</td>
<td>200</td>
</tr>
<tr>
<td>9 Honeywell</td>
<td>182</td>
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<tr>
<td>10 Texas Instruments</td>
<td>164</td>
</tr>
<tr>
<td>11 Computer Sciences</td>
<td>145</td>
</tr>
<tr>
<td>12 Data General</td>
<td>133</td>
</tr>
<tr>
<td>13 Storage Technology</td>
<td>124</td>
</tr>
<tr>
<td>14 Prime Computer</td>
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</tr>
<tr>
<td>15 Apple</td>
<td>105</td>
</tr>
<tr>
<td>16 Teletype</td>
<td>105</td>
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</table>

Subtotal: 6,764
Total Dp 100: 9,344

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

**TOP 20 REVENUE GROWTH RATE**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Total U.S. Growth Rate (in $ millions)</th>
<th>U.S. Foreign</th>
<th>Dp%</th>
<th>Dp%</th>
<th>1980 Growth Rate</th>
<th>1980 Earnings</th>
</tr>
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<tbody>
<tr>
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<td>Apple</td>
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**NM** - Not Meaningful

### TABLE IV

**BOTTOM 20 REVENUE GROWTH RATE**

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<th>Rank</th>
<th>Company</th>
<th>Total U.S. Growth Rate (in $ millions)</th>
<th>U.S. Foreign</th>
<th>Dp%</th>
<th>Dp%</th>
<th>1980 Growth Rate</th>
<th>1980 Earnings</th>
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<td>12.2</td>
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<td>6.3</td>
<td>20.4</td>
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</table>

**NM** - Not Meaningful

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

**FOR INTERNAL USE ONLY**

COMPETITIVE UPDATE/Vol. 1 No. 8  46 June 14, 1982
### TABLE V

**TOP 10 DP OPERATING PROFITS**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>1980 (in $ millions)</th>
<th>1979 (in $ millions)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IBM</td>
<td>5,231</td>
<td>4,649</td>
<td>12.5</td>
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<td>DEC</td>
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<td>327</td>
<td>32.6</td>
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<td>52.7</td>
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<tr>
<td>5</td>
<td>Sperry</td>
<td>255</td>
<td>206</td>
<td>23.7</td>
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<td>6</td>
<td>Control Data</td>
<td>238</td>
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<td>35.1</td>
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<td>64.7</td>
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<td>10</td>
<td>Data General</td>
<td>105</td>
<td>92</td>
<td>14.6</td>
</tr>
</tbody>
</table>

**Total Top 10**

- Total: 7,379
- Top 10 as a percent of Total: 86.8%
- Number of Companies Reporting: 70
- Total Dp Rev. Represented: 49,905
- Percent of Dp Rev. Represented: 89.7%

### TABLE VI

**TOP 10 - DP CAPITAL EXPENDITURES**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>1980 (in $ millions)</th>
<th>1979 (in $ millions)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IBM</td>
<td>1,985</td>
<td>1,548</td>
<td>28.2</td>
</tr>
<tr>
<td>2</td>
<td>DEC</td>
<td>321</td>
<td>125</td>
<td>156.4</td>
</tr>
<tr>
<td>3</td>
<td>Control Data</td>
<td>296</td>
<td>208</td>
<td>42.8</td>
</tr>
<tr>
<td>4</td>
<td>NCR</td>
<td>156</td>
<td>115</td>
<td>36.2</td>
</tr>
<tr>
<td>5</td>
<td>Hewlett-Packard</td>
<td>148</td>
<td>115</td>
<td>28.7</td>
</tr>
<tr>
<td>6</td>
<td>Burroughs</td>
<td>147</td>
<td>100</td>
<td>47.0</td>
</tr>
<tr>
<td>7</td>
<td>Sperry</td>
<td>117</td>
<td>75</td>
<td>56.7</td>
</tr>
<tr>
<td>8</td>
<td>Wang Labs</td>
<td>96</td>
<td>65</td>
<td>49.9</td>
</tr>
<tr>
<td>9</td>
<td>Storage Technology</td>
<td>76</td>
<td>56</td>
<td>36.0</td>
</tr>
<tr>
<td>10</td>
<td>Automatic Data Processing</td>
<td>70</td>
<td>65</td>
<td>7.7</td>
</tr>
</tbody>
</table>

**Total Top 10**

- Total: 4,077
- Top 10 as a percent of Total: 83.7%
- Number of Companies Reporting: 60
- Total Dp Rev. Represented: 48,110
- Percent of Dp Rev. Represented: 86.5%

### TABLE VII

**TOP 10 R & D EXPENSES**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>1980 (in $ millions)</th>
<th>1979 (in $ millions)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IBM</td>
<td>1,277</td>
<td>1,125</td>
<td>13.5</td>
</tr>
<tr>
<td>2</td>
<td>DEC</td>
<td>217</td>
<td>155</td>
<td>39.9</td>
</tr>
<tr>
<td>3</td>
<td>Sperry</td>
<td>216</td>
<td>189</td>
<td>14.1</td>
</tr>
<tr>
<td>4</td>
<td>NCR</td>
<td>201</td>
<td>171</td>
<td>17.5</td>
</tr>
<tr>
<td>5</td>
<td>Control Data</td>
<td>183</td>
<td>149</td>
<td>22.4</td>
</tr>
<tr>
<td>6</td>
<td>Burroughs</td>
<td>175</td>
<td>152</td>
<td>15.1</td>
</tr>
<tr>
<td>7</td>
<td>Honeywell</td>
<td>150</td>
<td>117</td>
<td>28.2</td>
</tr>
<tr>
<td>8</td>
<td>Hewlett-Packard</td>
<td>139</td>
<td>103</td>
<td>35.0</td>
</tr>
<tr>
<td>9</td>
<td>Data General</td>
<td>66</td>
<td>54</td>
<td>26.2</td>
</tr>
<tr>
<td>10</td>
<td>Amdahl</td>
<td>63</td>
<td>42</td>
<td>49.3</td>
</tr>
</tbody>
</table>

**Total Top 10**

- Total: 3,713
- Top 10 as a percent of Total: 72.4%
- Number of Companies Reporting: 64
- Total Dp Rev. Represented: 48,552
- Percent of Dp Rev. Represented: 87.3%
### TABLE VIII

**TOP 10 DP EMPLOYMENT**  
(in thousands)  

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>1980</th>
<th>1979</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IBM</td>
<td>278</td>
<td>270</td>
<td>2.9</td>
</tr>
<tr>
<td>2</td>
<td>NCR</td>
<td>66</td>
<td>65</td>
<td>1.6</td>
</tr>
<tr>
<td>3</td>
<td>DEC</td>
<td>60</td>
<td>50</td>
<td>21.0</td>
</tr>
<tr>
<td>4</td>
<td>Burroughs</td>
<td>57</td>
<td>57</td>
<td>1.4</td>
</tr>
<tr>
<td>5</td>
<td>Control Data</td>
<td>49</td>
<td>48</td>
<td>1.4</td>
</tr>
<tr>
<td>6</td>
<td>Sperry</td>
<td>47</td>
<td>46</td>
<td>2.8</td>
</tr>
<tr>
<td>7</td>
<td>Honeywell</td>
<td>29</td>
<td>29</td>
<td>1.8</td>
</tr>
<tr>
<td>8</td>
<td>Hewlett-Packard</td>
<td>28</td>
<td>25</td>
<td>12.0</td>
</tr>
<tr>
<td>9</td>
<td>Computer Sciences</td>
<td>15</td>
<td>13</td>
<td>10.6</td>
</tr>
<tr>
<td>10</td>
<td>Data General</td>
<td>14</td>
<td>14</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Total Top 10</td>
<td>643</td>
<td>616</td>
<td>4.5</td>
</tr>
</tbody>
</table>

**Total**  

- Top 10 as a Percent of Total: 74.5%  
- Total: 863  
- Number of Companies Reporting: 83  
- Total Dp Rev. Represented: 51,894  
- Percent Dp Rev. Represented: 93.3%

### TABLE IX

**DP REVENUES BY PRODUCT SEGMENT**  
(in $ millions)  

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

### TABLE X

**TOP 10 WORD PROCESSING**  
(in $ millions)  

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>1980</th>
<th>%</th>
<th>1980 Wp as a % of Dp 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wang Labs</td>
<td>252.3</td>
<td>11.0</td>
<td>681.8</td>
</tr>
<tr>
<td>2</td>
<td>Lanier</td>
<td>110.1</td>
<td>48.6</td>
<td>128.0</td>
</tr>
<tr>
<td>3</td>
<td>DEC</td>
<td>82.3</td>
<td>102.6</td>
<td>2,743.3</td>
</tr>
<tr>
<td>4</td>
<td>Xerox</td>
<td>69.3</td>
<td>35.1</td>
<td>770.0</td>
</tr>
<tr>
<td>5</td>
<td>Raytheon</td>
<td>67.5</td>
<td>37.8</td>
<td>225.0</td>
</tr>
<tr>
<td>6</td>
<td>Exxon</td>
<td>66.2</td>
<td>31.9</td>
<td>86.0</td>
</tr>
<tr>
<td>7</td>
<td>CPI</td>
<td>65.7</td>
<td>63.9</td>
<td>76.4</td>
</tr>
<tr>
<td>8</td>
<td>Burroughs</td>
<td>49.6</td>
<td>1.5</td>
<td>2,478.0</td>
</tr>
<tr>
<td>9</td>
<td>Philips Info Systems</td>
<td>46.0</td>
<td>100.0</td>
<td>50.0</td>
</tr>
<tr>
<td>10</td>
<td>NBI</td>
<td>40.1</td>
<td>95.5</td>
<td>43.2</td>
</tr>
</tbody>
</table>

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COMPETITIVE UPDATE/Vol. 1 No. 8  
June 14, 1982
IBM SYSTEM/38 MODEL 7 ANNOUNCEMENTS

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:

<table>
<thead>
<tr>
<th>Model</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/38-7</td>
<td>3.50</td>
</tr>
<tr>
<td>S/38-5</td>
<td>1.75</td>
</tr>
<tr>
<td>S/38-4</td>
<td>1.35</td>
</tr>
<tr>
<td>S/38-3</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>VAX-11/780</th>
<th>S/38-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAX-11/750</td>
<td>S/38-5</td>
</tr>
<tr>
<td>VAX-11/730</td>
<td>S/38-4</td>
</tr>
<tr>
<td></td>
<td>S/38-3</td>
</tr>
</tbody>
</table>

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-II VS. IBM S/38 PRICING

The following chart summarizes current VAX-II pricing compared to S/38. Comparable systems were configured using our capacity class definitions (available upon request). The VAX-II systems include VMS, CDDF/DTR, PMS and COBOL (all Category "A"). DBMS was not included in the VAX-II 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-II counterparts, due to the high disk overhead of S/38 database facilities.

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

*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.

FOR INTERNAL USE ONLY

COMPETITIVE UPDATE/Vol. 1 No. 8 50 June 14, 1982
**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-ll family. VAX-ll offers capabilities (DATATRIEVE, languages, graphics, communications functionality) not available on S/38.
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


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