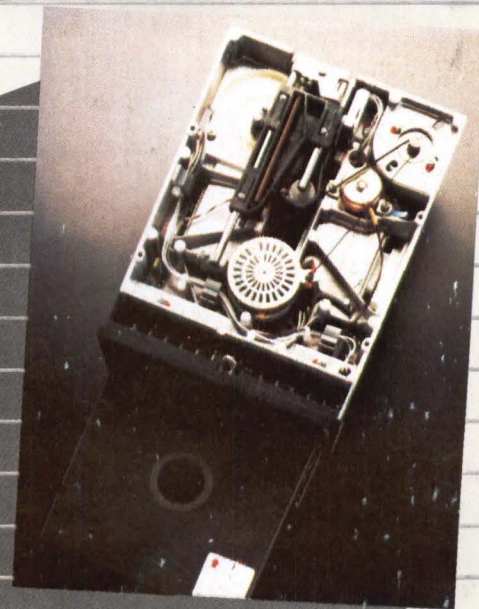
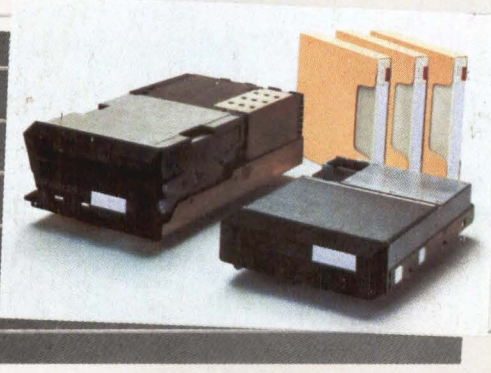
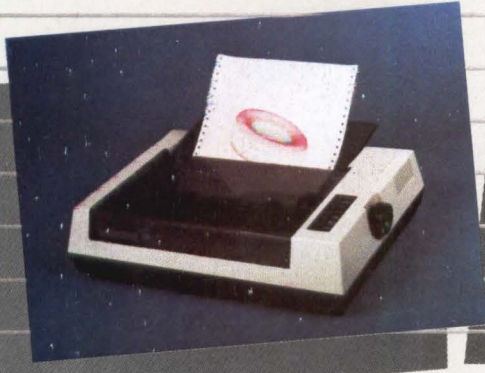


# Mini-Micro Systems

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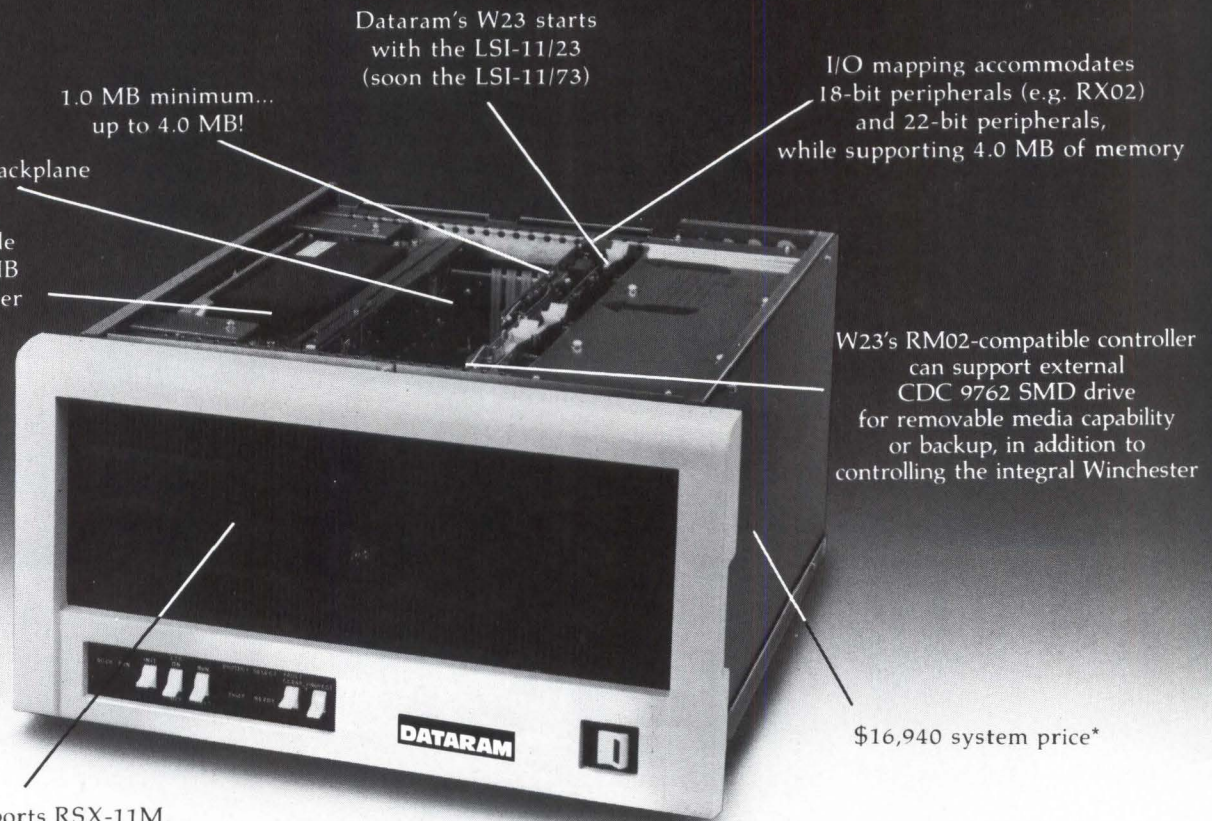
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## Peripherals Digest



The source book for system integrators

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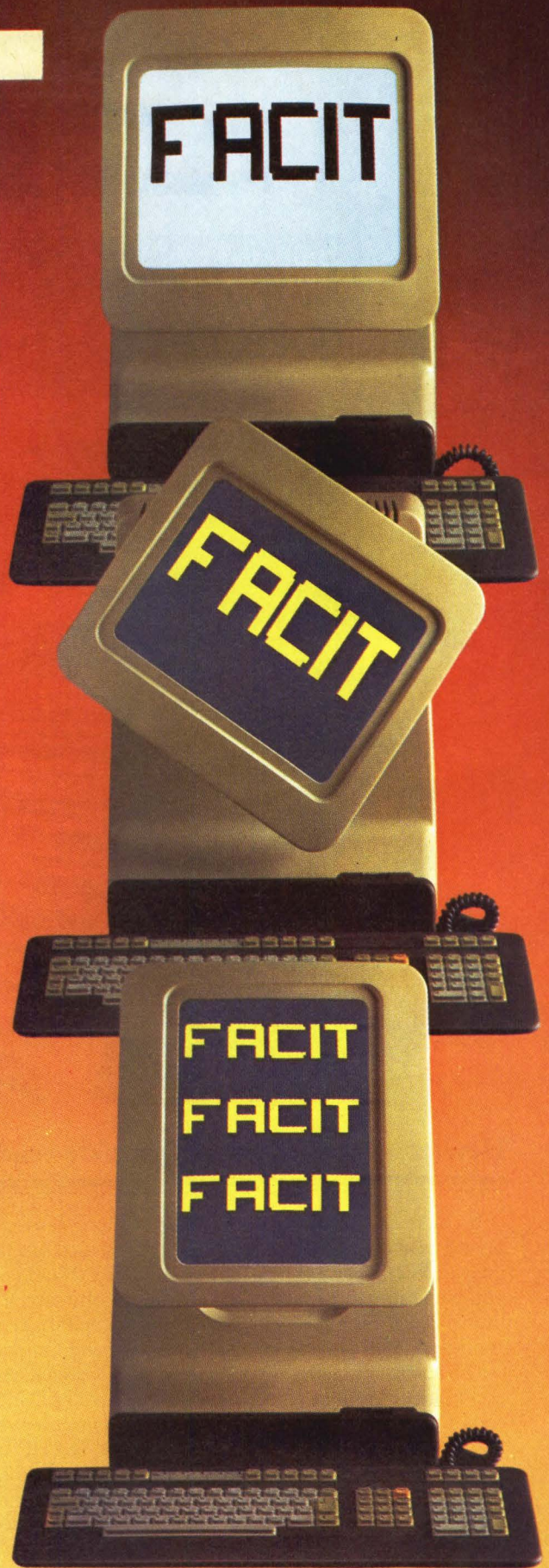
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A Cahners Publication

Vol. XVI No. 13 Fall 1983

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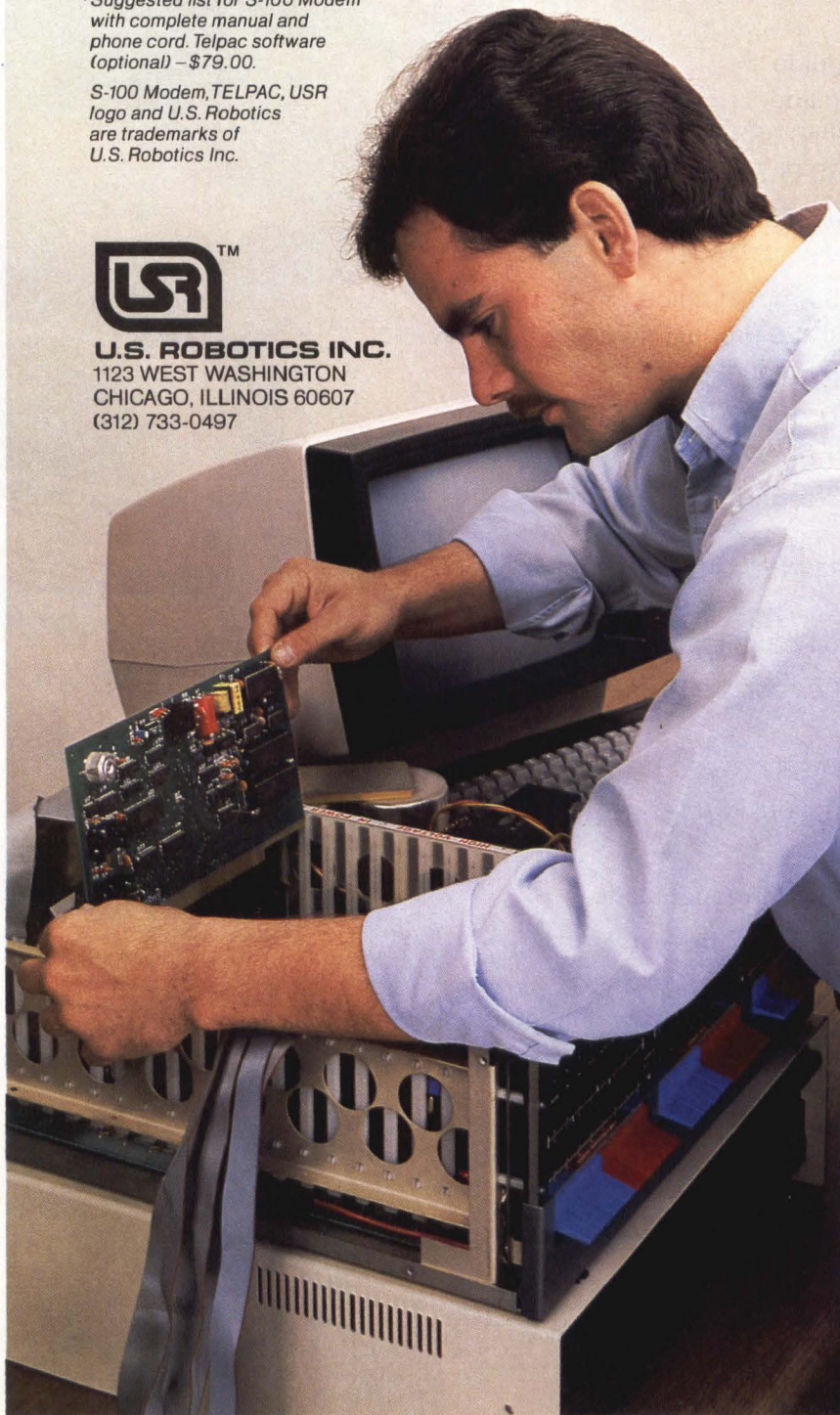
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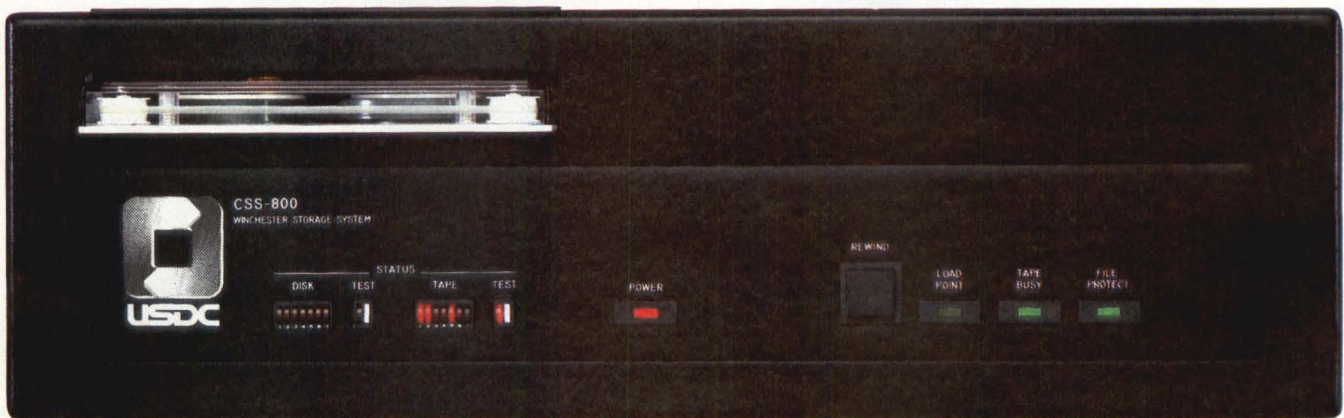
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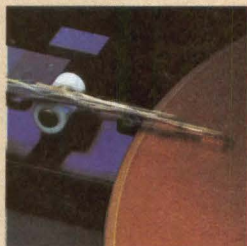
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The Whitney suspension, first introduced to OEM markets by Amcodyne in 1982, is the most stable read/write platform in

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*Inset photos depict the Whitney Suspension (at left, top), retracted head launch (at left, bottom), active hub seal (at right, top), and the recirculating air filter (at right, bottom).*

around the spindle. With the cartridge installed, only the cartridge interior is part of the clean air system. The HDA chamber is purged to a Class 50 environment within 45 seconds of power-up. Air quality within the positively-pressurized plenum chamber is maintained by a recirculating air filter that provides 20 times the scrubbing capacity of other fixed or removable drives.

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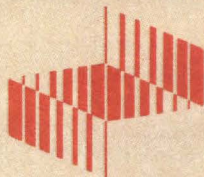


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# How to use the Peripherals Digest

The Peripherals Digest is designed for ease of use by novice and veteran system integrators alike. It is divided into seven tabbed main sections: six for products, the seventh for the directory of manufacturers. Each of the six product sections has two subsections:

- a market overview compiled by *Mini-Micro Systems* editors,
- one or more product pricing and specification tables arranged alphabetically by company, compiled by computer and based on mailed surveys.

The directory of manufacturers is the last section of the Digest and is a consolidated alphabetical listing of all the vendors listed in the six product chapters. Each directory entry provides a vendor's mailing address and telephone number, as well as a circle number for the reader service card.

To use the Peripherals Digest most effectively, use the tabs to find the right section quickly. To find addresses or phone numbers, use the directory of manufacturers. To check prices or specifications,

- turn to appropriate section,
- find the appropriate product table,
- find the vendor alphabetically.

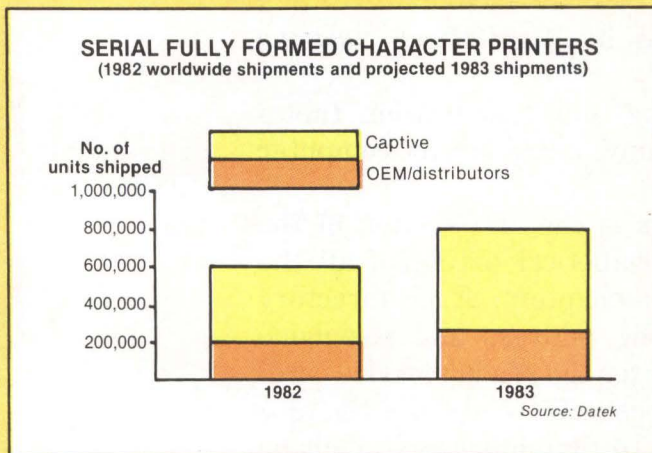
To select a peripheral:

- turn to the appropriate section,
- check the market overview,
- refer to the product tables to rule out inappropriate products,
- refer to the directory of manufacturers to find where to contact prospective suppliers.

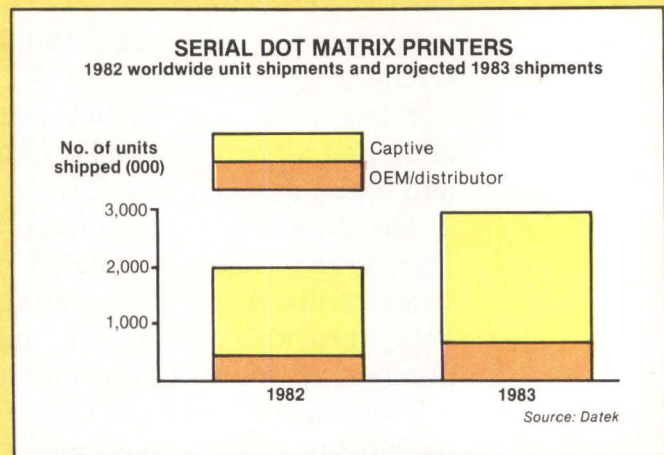
To comment on the Digest or suggest future chapters or entries, contact the Editor, *Mini-Micro Systems Peripherals Digest*, 221 Columbus Avenue, Boston, Mass. 02116.

# Many opportunities characterize printer market

Edward S. Foster, Associate Editor



Sales of keyboard-send-receive and receive-only daisy-wheel printers in 1982 totaled more than \$1.7 billion, with more than 600,000 units shipped worldwide.



In 1982, the worldwide serial dot-matrix printer market exceeded \$2.7 billion, representing more than 2 million units. The figures include all types of serial dot-matrix models.

The printer market contains an expanding set of specialized niches for old and new technologies. The market for serial fully-formed character printers is a case in point. While soothsayers debate which of the many contending technologies—thermal transfer, ink jet, etc.—will make daisy-wheel printers extinct, established suppliers and new entrants continue to find a healthy market for their products. Worldwide sales for 1982, including keyboard-send-receive (KSR) and receive-only (RO) models, totaled more than \$1.7 billion. More than 600,000 units were shipped worldwide.

Traditional daisy-wheel market leaders Diablo Systems Inc. and Qume Corp. have had to make room for a third major supplier with a 30- to 60-cps printer—NEC Information Systems Inc. NEC's Spinwriter series is based on a thimble print element. Diablo and Qume have responded by exploring new applications niches for their daisy-wheel technology. Diablo, emphasizing

its continuing investment in "fifth-generation" daisy-wheel technology, is pushing its 630 ECS (extended character set) daisy-wheel. The 630 ECS about doubles the number of characters per wheel to 192 and can construct 400 characters or basic graphics. Qume has developed a modular interface to make its Sprint 11 Plus plug-compatible with a variety of major personal and home computer systems.

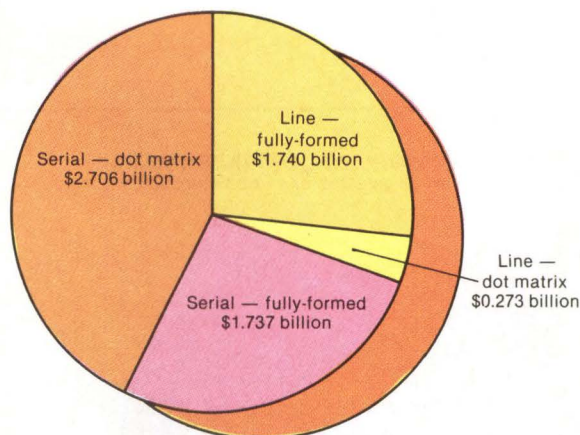
A major new segment of the daisy-wheel market has developed recently with the introduction of low-end units priced at less than \$1,000 retail and printing at speeds of 12 to 18 cps. Critics refer to them as "upgraded typewriters." A rash of new product introductions includes models by Smith Corona, Brother, Olympia and Silver Reed.

The search for new applications has covered more ground in the serial dot-matrix arena. Word processing, data processing, color graphics, bar codes and

optical-character recognition (OCR) are just some of the applications at which dot-matrix manufacturers have targeted their offerings, sometimes with just one printer. The worldwide market for serial dot-matrix printers of all types for 1982 was more than \$2.7 billion, representing more than 2 million units.

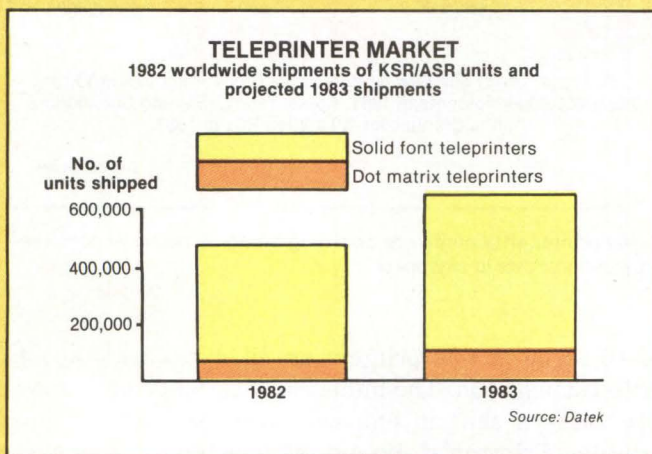
The major separation within the serial dot-matrix printer market is between the low-end, single-mode, relatively low-speed (120-cps and slower) printers, dominated by high-volume Japanese manufacturers, and the high-end multifunctional printers targeted at a variety of markets requiring different combinations of

**1982 WORLDWIDE IMPACT PRINTER MARKET**  
End-user shipment value — by major technology



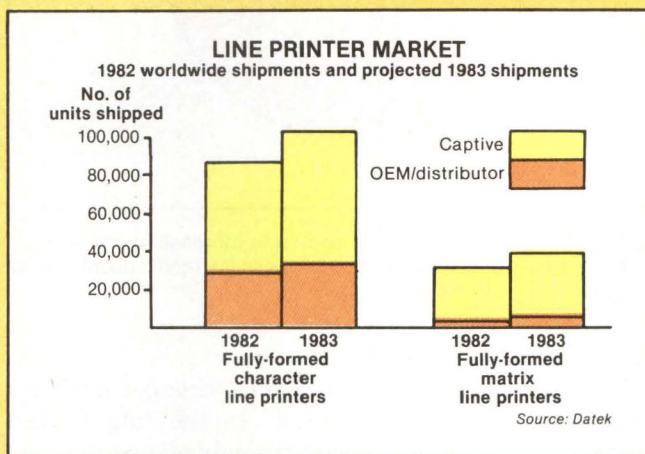
Source: Datek

**Impact serial dot-matrix printers continue at a strong pace.** Market researcher Dataquest Inc. reports that sales of less-than-120-cps printers in the first half of 1983 exceeded sales for all of 1982.



Source: Datek

**Teleprinter sales may decline** as a result of distributed data processing and small personal computer proliferation. In the near term, however, shipments will be strong, especially in the dot-matrix KSR market, in which Digital Equipment Corp. and others have successfully pursued Teletype Corp.



Source: Datek

**Despite predictions to the contrary, line printers continue to grow.** The most active market segments are for 1,200- to 2,000-lpm products. Manufacturers are replacing top-of-the-line chain-train printers with advanced band technology.

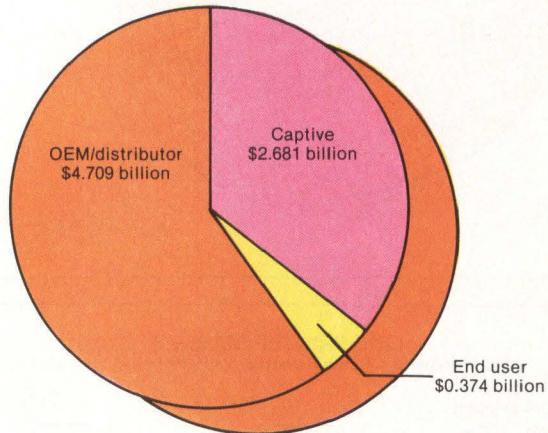
speed, print quality or graphics. Epson America Inc. remains the low-end market leader but may have lost some ground to competitors such as Okidata Corp., C. Itoh Electronics Inc. and Star Micronics Inc. in the transition from its standard-setting MX-80 to new models. Sales volumes in this market continue to grow at a rate that can keep all participants satisfied; market research company Dataquest Inc., reports that sales of less-than-120-cps printers during the first half of 1983 exceeded sales for all of 1982. Datek's annual survey lists 1982 worldwide impact serial dot-matrix printer shipments at \$2.7 billion. (Datek is a research concern in Newtonville, Mass.)

In the complex, fast-changing world of multifunctional matrix serial printers, any manufacturer that pauses long enough to declare itself a leader is likely to fall behind. Recent product introductions considered significant by industry observers include

the 500-cps DP-6500 from Anadex Corp., the Centronics Data Computer Corp. 358 four-color model, new additions to the General Electric Co. 3000 series, the 8600 from C. Itoh Electronics, NEC's Pinwriter series and the 24-wire PL350 from Toshiba Corp. The acquisition of Integral Data Systems Inc. by Dataproducts Corp. also may have important market ramifications.

Teleprinters are a subset of the serial printer market where future growth is in doubt. Distributed-processing environments and the expected omnipresence of personal desktop and portable computers may result in declining sales for KSR matrix and fully-formed character printers after 1985. The near future is somewhat brighter, especially in the dot-matrix KSR area in which companies such as Digital Equipment Corp., GE and Texas Instruments Inc. have enjoyed some market success in pursuing Teletype Corp. This year's worldwide teleprinter shipments grew by almost

**1982 WORLDWIDE PRINTER MARKET**  
End-user shipment value — by distribution channel



Source: Datek

**OEM marketing channels are expected to increase in importance** as the industry becomes more price sensitive and specialized in manufacturing processes.

150,000 units to nearly 700,000.

The line printer market provides stronger evidence that old technologies die hard. In the fully-formed character line printer segment, only drum printers have met the fate often prophesied for the entire line printer business. Manufacturers continue to introduce band, belt and chain-train line printers. The most active market segments appear to be at the high-speed end from 1,200 to 2,000 lines per minute (lpm). There, manufacturers are replacing top-of-the-line chain-train printers with advanced band technology.

There's activity in the 400- to 600-lpm segment as well, as manufacturers upgrade their low-speed entries from 150 to 300 lpm, reacting to price pressure from serial matrix printers. Dataproducts Corp. remains the king of the non-captive line printer market. Competition comes from Data Printer (acquired this year by Printronix Inc.), Centronics (with its line printer segment, courtesy of Control Data Corp.), Teletype, Fujitsu America Inc., NEC and Nissei Sangyo (with line printers from Hitachi America Ltd.).

The matrix line printer segment, historically the almost-exclusive bailiwick of Printronix, is a market targeted for invasion by CIE Terminals (a subsidiary of C. Itoh, which markets matrix line printers manufactured by Citizen Watch), Mannesmann Tally, Trilog Inc., Hitachi and GE. Although price has not been an issue in the past, increased competition and higher

**PROJECTED WORLDWIDE INSTALLED BASE AND SHIPMENTS OF PERSONAL COMPUTERS AND THEIR ASSOCIATED SERIAL PRINTERS**

	No. of personal computers installed	No. of personal computers shipped	Serial printers shipped
1977	40,000	30,000	24,000
1978	190,000	150,000	121,000
1979	440,000	250,000	205,000
1980	865,000	450,000	374,000
1981(1)	1,620,000	800,000	630,000
1982 E	2,770,000	1,250,000	750,000
1983 E	4,570,000	2,000,000	1,200,000
1984 E	6,750,000	3,000,000	1,800,000
1985 E	9,570,000	4,000,000	2,400,000

(1) Apple, Tandy and Commodore accounted for about 500,000 of these 800,000 shipments in 1981. Apple, Tandy, IBM and Commodore should ship over 1.0 million PCs in 1983.

Source: Datek

**Serial printer shipments are booming along** as personal computer growth continues to skyrocket.

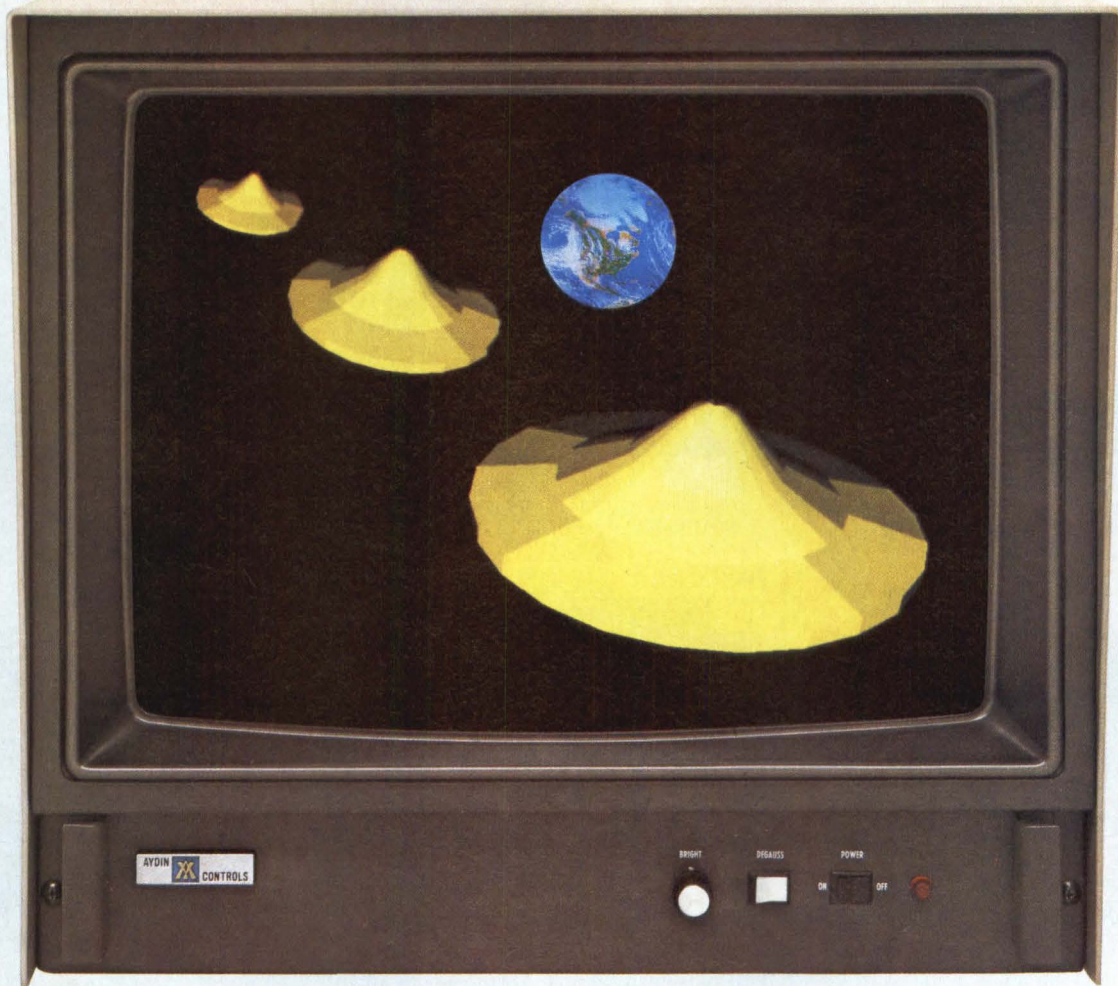
speed serial matrix printers are likely to bring about price cutting soon. The influence of serial printers may also cause a shift in emphasis from 300- to 600-lpm printers. Printronix's patent-infringement suit against Citizen Watch and CIE Terminals could have far-reaching implications now that Printronix is using it as the basis for an unfair trade practices complaint with the International Trade Administration.

Observers at systems houses and value-added printer suppliers are virtually unanimous on some market issues. These include:

- Compatibility with IBM PC word-processing and graphics software packages is a must even for some high-speed printers intended for networking applications.
- The popularity of spreadsheet packages is improving the market for wide-column printers.
- OEM marketing channels are expected to increase in importance as the industry becomes more price sensitive and more specialized in manufacturing capabilities.

Many of those familiar with the retail end of the business are particularly bullish on the possibility of low-speed daisy-wheel printers following in the footsteps of the low-end serial dot-matrix market. "We see very strong activity with the low-end daisy-wheels—stronger than we initially expected," comments Ed Juge, director of merchandising for Radio Shack, which

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SYSTEMS, single or multiple WORKSTATION pre-engineered for the most common color display applications?

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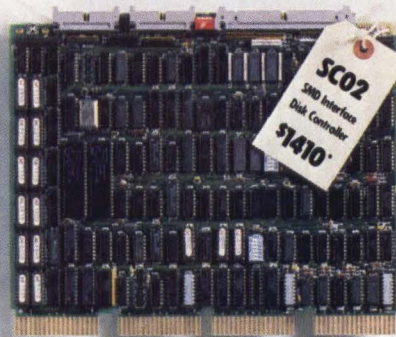


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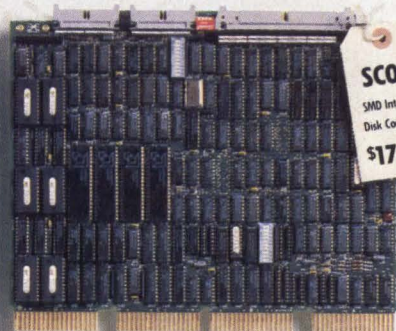
CIRCLE NO. 10 ON INQUIRY CARD

# The QBus controllers with features comptrollers love.



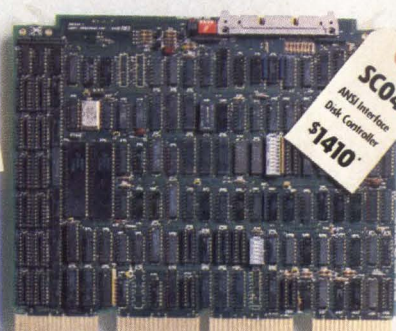
**SC02**  
SMD Interface  
Disk Controller  
\$1410\*

Handles small 12-80MB disks, emulates RP02/03, RK06/07 and RL01/02.



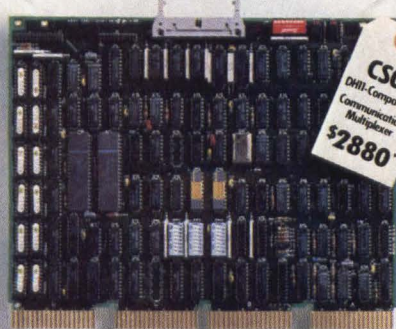
**SC03**  
SMD Interface  
Disk Controller  
\$1790\*

Operates with new high-performance 80MB and larger disks on LSI-11/23.



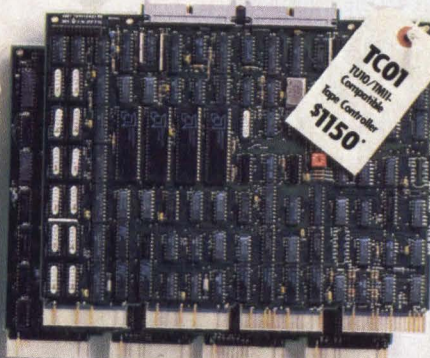
**SC04**  
ANSI Interface  
Disk Controller  
\$1410\*

Handles up to eight ANSI 8" Winchesters, emulates RK06/07 and RL01/02.



**CS01**  
DMA-Compatible  
Communications  
Multiplexer  
\$2880\*

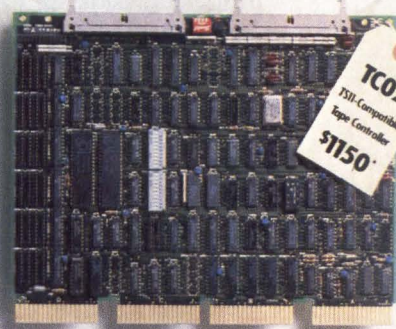
Handles 8-64 channels, 16-bit word transfers (DMA), 22-bit addressing. (16-channel price)



**TC01**  
TTY/RS232C  
Compatible  
Tape Controller  
\$1150\*

Dual density at up to 75 ips, handles up to four 1/2" transports.

Handles new cartridge Winchester disk drives, emulates RLV11/12.



**TC02**  
TTY-Compatible  
Tape Controller  
\$1150\*

Coupler works with all NRZI, PE, GCR formatters at speeds from 12.5 to 125 ips.

\*Quantity 100

Flinty-eyed finance types are push-overs for Emulex controllers.

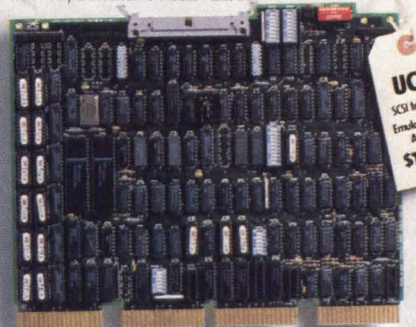
And why not? Emulex controllers have great figures.

DEC QBus users simply don't pay extra for higher Emulex quality, performance and reliability. In fact, Emulex controllers are priced to be highly competitive with the lower quality brands. And that's just the beginning.

There's no up-front investment because Emulex controllers are totally software transparent to LSI-11 through -11/23 PLUS CPUs. No special software drivers, handles or tweaks required.

Smart comptrollers don't tie up cash in needless inventory. With Emulex's remarkably fast delivery, inventories can be kept economically small.

Quantity discounts are another opportunity for



**UC01**  
SCSI Interface  
Emulating Host  
Adapter  
\$1216\*

are pleased to know that nationwide applications assistance, training, and technical support is only a quick phone call away.

Great figures?

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comptrollers with sharp pencils. With Emulex you can mix and match across a very broad product line of QBus, Unibus & VAX controllers so it doesn't take long to bring prices down even further.

Knowledge that Emulex products work (at up to 72,000 hours MTBF) is important, too. But when support is necessary, comptrollers

SEE US AT COMDEX BOOTH #2030.



**The genuine alternative.**

CIRCLE NO. 11 ON INQUIRY CARD

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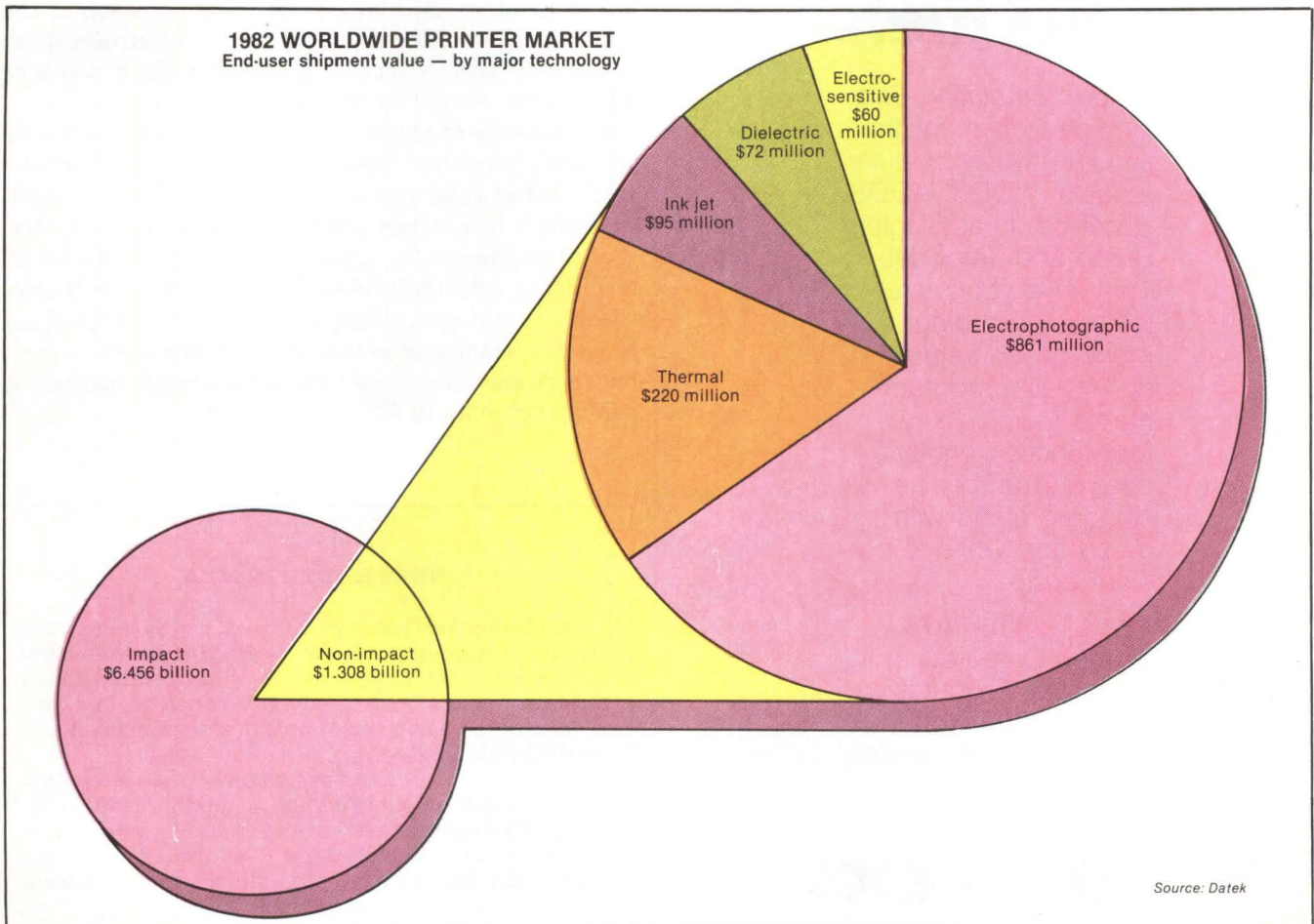
markets a \$799 18-cps daisy-wheel printer. "We are projecting rather flat growth for the higher speed daisy-wheel printers, partly from the influence of the lower speed fully-formed character printers and partly from the improved print quality of dot-matrix printers."

Any doubts about the viability of multifunctional dot-matrix printers should be eased by Radio Shack's initial success with a triple-mode model employing a 24-wire print head. The company believes this type of printer can steal some business from the high-speed daisy wheels because of its print quality. For the same price as a high-speed daisy wheel, customers get very readable print and the flexibility of three printing modes, the company maintains.

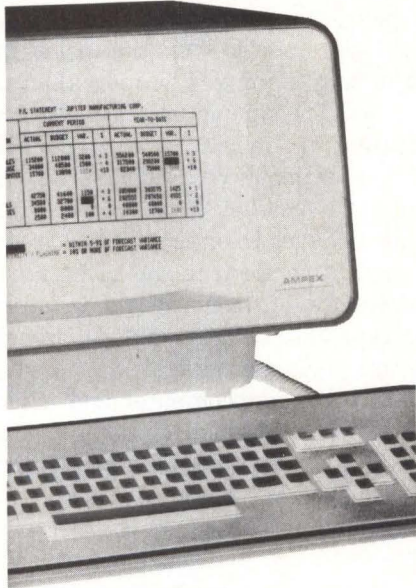
At the next higher level of system performance, the enthusiasm for multifunctional dot-matrix printers is also keen, notes Bill Kershaw, product manager for Apple Computer Inc.'s Accessory Products Group.

"Our perspective is that dot-matrix printing will prevail in one form or another," observes Kershaw, adding that he does not preclude the matrix technology in some cases being non-impact. "There will still be a market for daisy wheels for some specific applications such as legal documents, but the print quality of dot-matrix printing is going to be more than satisfactory in most areas. The sample output we've seen of the next generation of impact dot-matrix printers is exceptional. The technology is reaching the point where you can't be sure whether its a matrix character or not." Kershaw believes color capabilities are inevitably going to be a driving force in the printer market. In looking at vendors of monochrome printers, Apple wants color capabilities that could be brought into a family of future printer products.

The push of both microcomputer and minicomputer systems into higher performance ranges has much to do with the continuing activity in the line printer market, notes Tom Loucas, president of Digital Associates Corp., a value-added supplier of line printers to end-user sites. "In the low-end marketplace, growth will be driven by the growing user base of 16-bit micro-based small business systems as well as new offerings in band and matrix technologies," he asserts. "At the high end, growth will result from the increasing



Xerox's success with the 2700 laser printer indicates a strong challenge by laser and other non-impact printing technologies in the future.



## Twenty Terminals In One.

Ampex *Emulation Plus* terminals do more than emulate twenty popular models of DEC, ADDS, Hazeltine, Lear Siegler, Soroc and Televideo. They give you more features, including menu-driven setup, non-volatile program-mable function keys, four-function printer port, and amber as standard along with green and white at no extra cost.

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CIRCLE NO. 12 ON INQUIRY CARD

## PERIPHERALS DIGEST

number of 32-bit superminis in combination with low-end mainframe users. The need for increased throughput in these user bases is growing at a rapid rate."

Loucas believes that a gap exists in the market with the phase-out of Dataproducts' drum printer for heavy-duty 600- and 1,000-lpm printers. Data Printer's 1260 and 1210 chain-train printers are the only products he sees filling that need. He would like to see Dataproducts offer a lower speed version of its BP series to fill the gap. He also feels the proliferation of superminis and the trend toward distributed data processing is increasing the demand for high-speed remote line printers with noise levels lower than 60 dBA and high-speed communications support.

Loucas echoes the sentiments of many in the line printer business who accept the inevitability of non-impact printing taking a large share of the market. All sectors of the printer market are feeling the potential of non-impact technology. Thermal, thermal-transfer and ink-jet printers are vying for application niches in the serial market. Electrophotographic, electrosensitive and ion-deposition technologies make their presence felt in areas served by line printers.

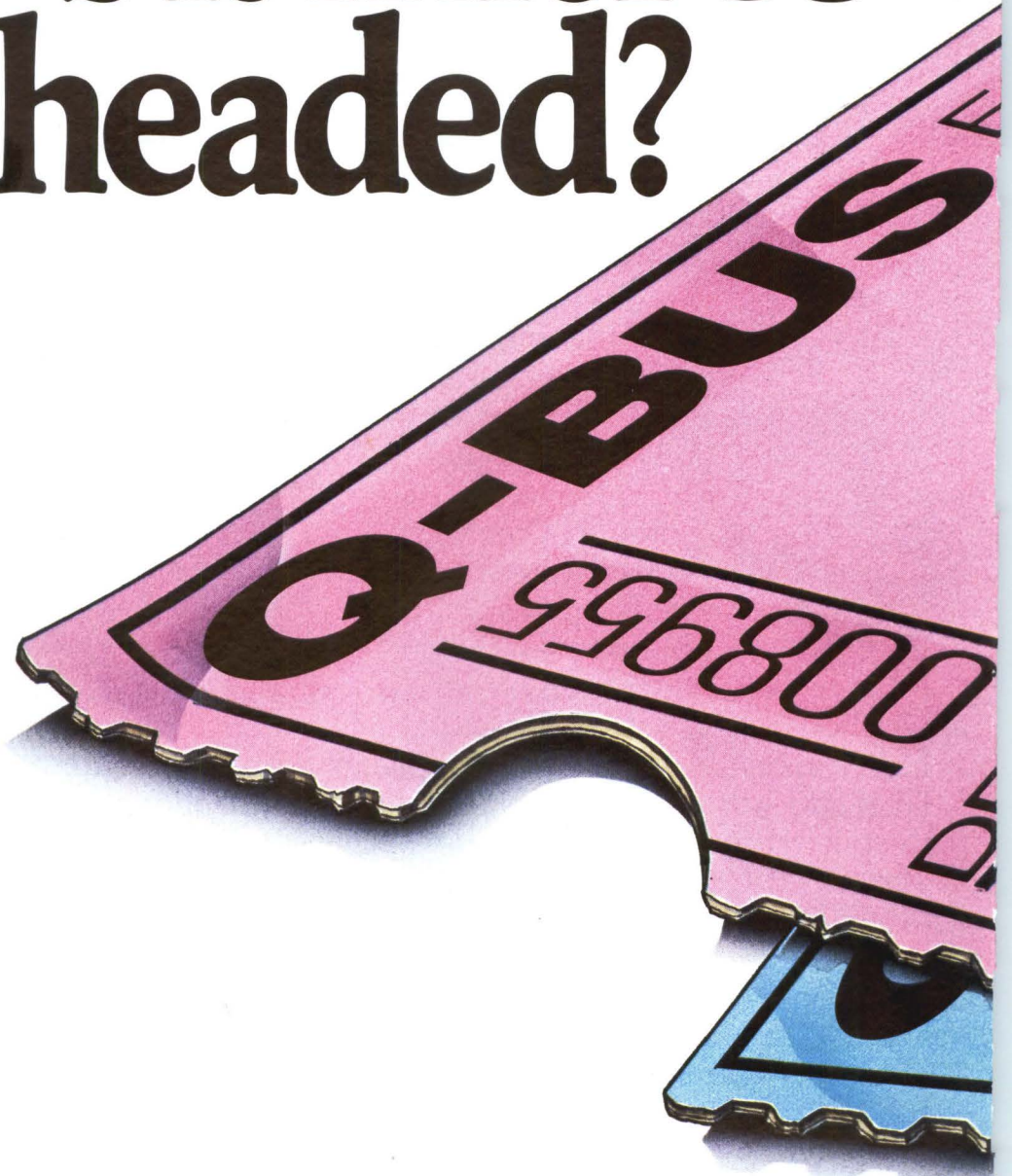
The success of products such as Xerox Corp.'s 2700 12-page-per-minute (ppm) laser printer and Versatec Inc.'s ECP42 color plotter has helped diminish skepticism about non-impact printing's marketability. So has the commitment to initial non-impact products by traditional industry leaders Dataproducts and Diablo. Clearly, non-impact offerings of the near future will not cause the demise of established printer technologies, but there are many niches left in the printer market for non-impact units to fill. □

### NEXT MONTH IN MMS

The December issue of Mini-Micro Systems, the annual technology review, is MMS's encyclopedic resource for its unique readership of value-added OEMs and users, and resellers. It consists of feature articles about various technologies, with market and product data in graphs, charts and tables.

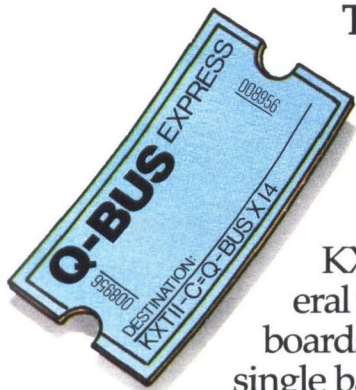
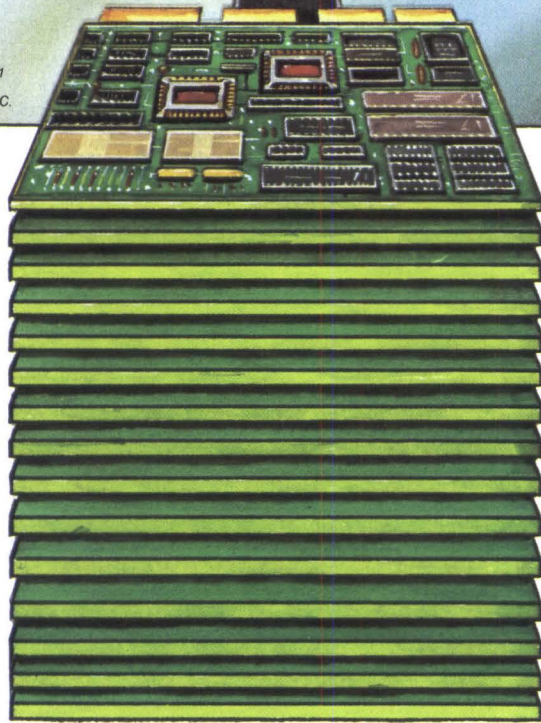
Each topic covers the evolution of the technology and its present significance to MMS readers, including the current state-of-the-technology and state-of-the-market. The issue will address the trends within the technology, plus short- and long-term product and market projections.

**Where are  
16-bit micros  
headed?**



# roducing four new

Up to 14 KXT11-C peripheral processors can communicate with a host CPU via a single Q-BUS backplane connection. T11 microprocessor based, the quad-height board also operates as a standalone SBC.



## The KXT11-C: Now multiple peripheral processors on the Q-Bus.

Up to 14  
KXT11-C periph-  
eral processor  
boards can reside in a  
single backplane to sig-  
nificantly increase your  
application throughput on Q-Bus.

Each can be task dedicated so applications can be segmented for efficiency.

Each off-loads the host CPU of real-time data buffering, preprocessing and high-speed communications responsibilities.

The KXT11-C features 32Kb static RAM with user sockets for an additional 16Kb RAM or 32Kb ROM. You get three serial ports for synchronous/asynchronous design flexibility. Plus 20 lines of parallel I/O, three programmable interval timers, onboard boot and diagnostics.

The KXT11-C also features a two-channel DMA controller for high-speed data transfers between onboard devices and Q-Bus memory.

For concurrent real-time processing in a high-level language, the KXT11-C runs MicroPower/Pascal onboard. As a peripheral processor, it is supported under RT-11, RSX-11M, RSX-11M-PLUS and MicroPower/Pascal executing on the Q-Bus master CPU.

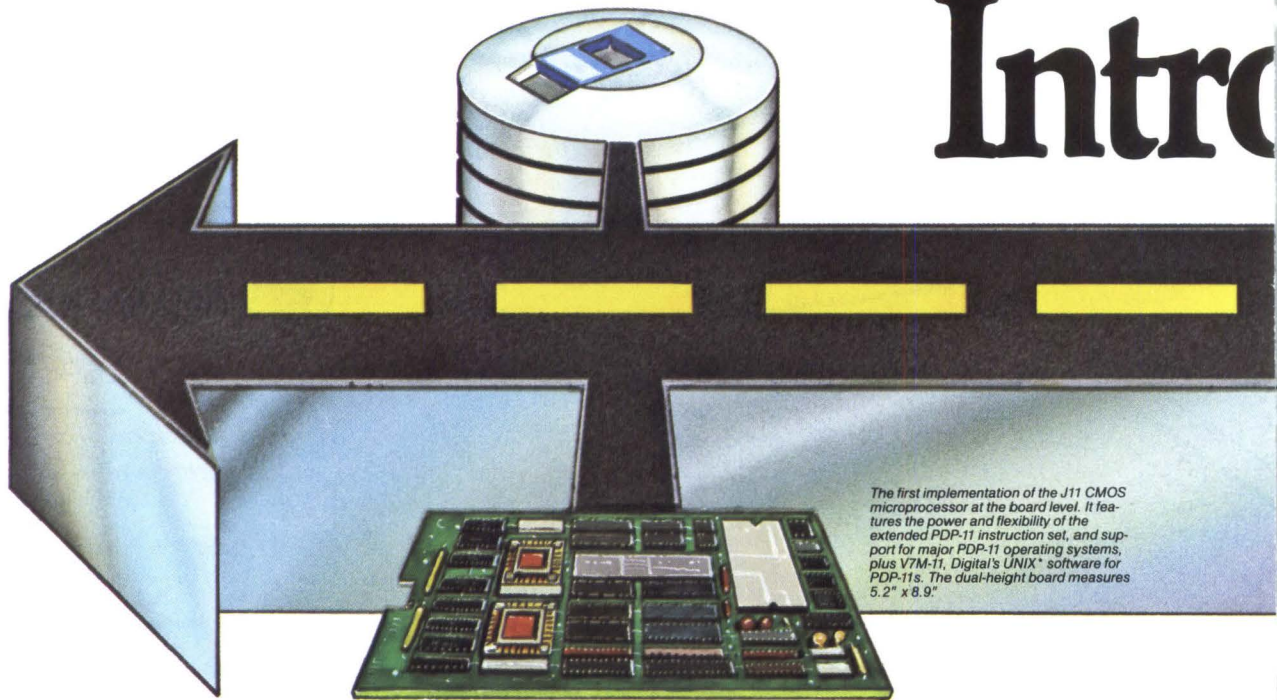
The intelligent new KXT11-C: An easy way to give your application an instant performance boost by consolidating I/O processing.

EXPRESS  
008955  
DESTINATION:  
LSI-III/73 = PDP11/44 ON A BOARD

008955  
DESTINATION:  
KXT11-C=Q-BUS X14

008955  
DESTINATION:  
REAL TIME CDC

# Intro



The first implementation of the J11 CMOS microprocessor at the board level. It features the power and flexibility of the extended PDP-11 instruction set, and support for major PDP-11 operating systems, plus V7M-11, Digital's UNIX\* software for PDP-11s. The dual-height board measures 5.2" x 8.9".

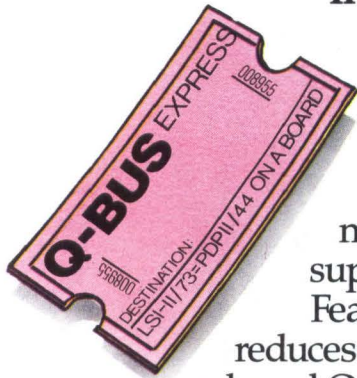
**Introducing the LSI-11/73: PDP-11/44 CPU class performance on a single board.** The LSI-11/73 has been designed to give you four times the processing power of the LSI-11/23.

Its J11 microprocessor features integral floating point, memory addressing up to 4 million bytes, sophisticated memory management, separate I & D space with kernel, supervisor and user modes.

Featuring 8Kb of high-speed cache memory, the LSI-11/73 reduces execution times in many applications up to 60%. An onboard Q-Bus interface allows you to customize your configuration by selecting from hundreds of Q-Bus options available from Digital and third parties.

The LSI-11/73 supports Digital's popular PDP-11 operating systems—RT-11, RSX-11M, RSX-11M-PLUS, RSTS/E and MicroPower/Pascal software—plus V7M-11, Digital's UNIX\* software for PDP-11s. This protects your investment in applications software as you migrate from existing Q-Bus processors.

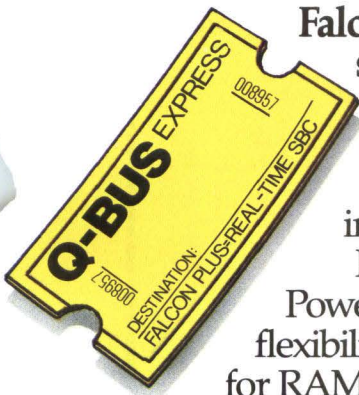
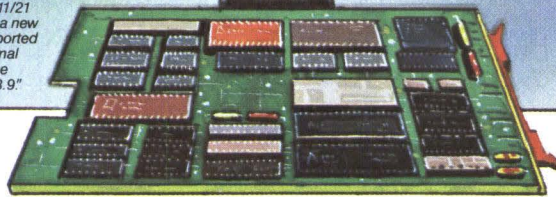
The LSI-11/73: Digital's new high performance processor on the Q-Bus.



# stops on the Q-Bu

This new version of the Falcon SBC-11/21 features increased functionality and a new module design. Falcon-PLUS is supported by RT-11 v.5, and comes with additional onboard RAM and ROM support. The dual-height board measures 5.2" x 8.9".

Now multiple programmers can use a single MicroPower/Pascal at their RSX-11M, RSX-11M-PLUS, or VMS system.



**Falcon-Plus: The industry's smallest 16-bit SBC is now supported by RT-11.** Featuring Digital's T11 microprocessor and PDP-11 instruction set, the new Falcon-PLUS is a compact, powerful tool for an even greater variety of ROM- and RAM-based dedicated computing applications. And it's cost-effective with either.

Falcon-PLUS offers the real-time strengths of MicroPower/Pascal for ROM-based solutions, coupled with the flexibility of the RT-11 real-time, single-user operating system for RAM-intensive applications.

The board features 16Kb of static RAM, expandable to either 48Kb RAM or 32Kb ROM via four onboard user-configurable sockets.

Easy to configure, it provides two asynchronous serial lines, 24 lines of parallel I/O, real-time clock, and Q-Bus interface. And the price for new Falcon-PLUS remains the same as the original Falcon SBC-11/21.

Falcon-PLUS: You get all the rich, base-level functionality of the original Falcon...Plus.

# Ticket Information

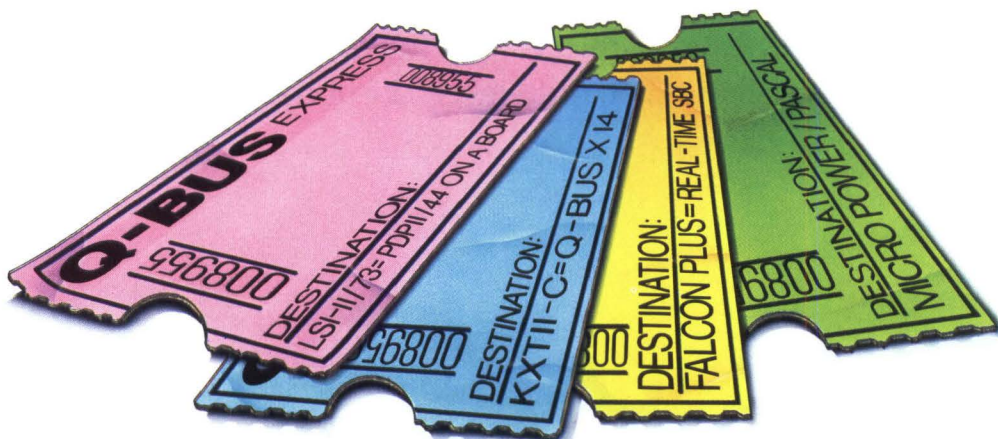
Digital is on the Q-Bus with you with service, support and documentation up and down the line.

The LSI-11/73, KXT11-C and Falcon-PLUS all carry a ONE YEAR return-to-factory warranty—plus optional extended warranty programs.

For complete product specifications, return the coupon below.  
Or call 1-800-848-4400, ext. 139 - in HI, AK and Canada, call (617) 568-5707.

<input type="checkbox"/> Please send detailed product specifications:	Name _____
<input type="checkbox"/> LSI-11/73	Title _____
<input type="checkbox"/> KXT11-C	Company _____
<input type="checkbox"/> Falcon-PLUS	Address _____
<input type="checkbox"/> MicroPower/ Pascal-RSX	City _____ State _____ Zip _____
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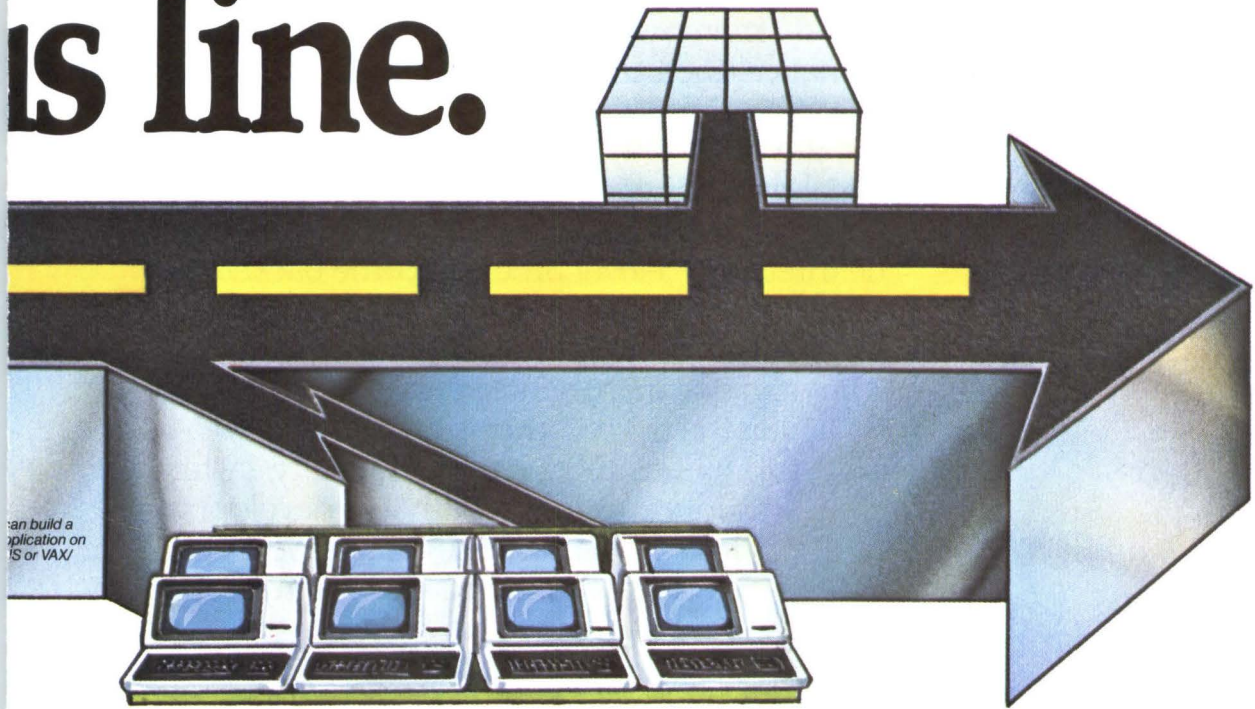
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MM 11



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# is line.



## **MicroPower/Pascal-RSX and MicroPower/Pascal-VMS: Powerful software for real-time control.**

MicroPower/Pascal is an advanced software toolkit that's a combination operating system and highly-structured programming language. It lets you optimize your Q-Bus configuration to implement real-time control, and features a globally optimizing compiler that generates code as efficient as many assembly languages.

With MicroPower/Pascal, programmers can build a run-time, ROMable application with an extended version of Pascal that supports concurrent real-time programming, process synchronization, and device register accessing.

Working independently on a single PDP-11 or VAX/VMS system, each programmer develops a portion of the target solution. These software modules are then compiled separately and linked to a customized kernel using special MicroPower utilities running under the host operating system. Debugging, in original Pascal terms, is also accomplished from the host system.

Micro Power/Pascal: Now the Q-Bus will get your products to market even faster.

**Digital extends its commitment to the Q-Bus.** To the world's leading 16-bit micro family, Digital adds four new members.

For greater processor performance, the LSI-11/73 board-level CPU. For high-speed I/O processing, the KXT11-C peripheral processor. For dedicated real-time applications, the Falcon-PLUS single board computer. And for faster real-time software development on both 16- and 32-bit host systems, MicroPower/Pascal-RSX and -VMS.

The three board-level products come backed by Digital's new ONE YEAR return-to-factory warranty—the first of its kind for CPU boards from any major components vendor.

For the microcomputer OEM and end-user, this means more design flexibility, faster product upgrades with less development time, and brand new migration paths for applications based on the popular PDP-11 instruction set.

Q-Bus is going places. Carrying the world's largest selection of 16-bit application software.

Powered by the world's best-selling 16-bit board-level products.

Find out how far you can go. Get on Q-Bus today.



## TELEPRINTERS

Company, model	Printing method (matrix size)	Printing speed (cps)	Form width (inches)	Chars./line	Character sets code	Modem coupler (m/c)	Portable (Y/N)	Graphics (Y/N)	Unit price (\$)	Features/Options
<b>COMPUTER DEVICES INC.</b>										
Series 2000	thermal (1x11)	160	8.75	80/132	96, 128 ASCII	C	Y	Y	1,395	300/1200 baud, additional memory, Int'l or APL key caps
<b>COMPUTER TRANSCEIVER SYSTEMS INC.</b>										
4000	thermal (5x7)	30	14.875	136	ASCII/APL	C	Y	N	3,495	data logger, self-test, LED printhead position indicator
4000 Sherlock	thermal (5x7)	30	14.875	136	ASCII	C	Y	N	4,995	automatic encryption, decryption
4120	thermal (5x11-18x11)	140	14.875		ASCII/APL	C	Y	Y	3,295	1200 baud, compressed print, double-width print, self-test
4120 BSR	thermal (5x11-18x11)	140	14.875	selectable	ASCII/APL	C	Y	Y	3,695	1200 baud, compressed print, double-width print, self-test
430	impact (5x7)	80	8.75	80/140	ASCII		Y	Y	995	compressed print, 20 mA current loop, answerback, RS232C
440	impact (5x7)	80	8.75	80/140	ASCII	C	Y	Y	1,195	ASR, answerback, 20 mA current loop, compressed print
443	impact (5x7)	80	8.75	80/140	ASCII	C	Y	Y	1,795	16K-byte memory, editing functions, battery backup, Telex I & II
<b>DATASOUTH COMPUTER CORP.</b>										
DS180	impact (5x7)	180	14.875	132/217	ASCII/APL		N	Y	1,595	non-volatile format retention
DS220	impact (7x9)	220	14.875	132/217	ASCII/APL		N	Y	1,595	dual-mode operation
<b>DIGITAL EQUIPMENT CORP.</b>										
CORRESPONDENT (LA12A/B)	impact (9x9, 18x9)	150	9	80/132	128 ASCII	C	Y	Y	2,195	300/1200 bps modem
<b>EXTEL CORP.</b>										
A series	impact (5x7)	30	8.5	80	128 ASCII, baudot	M	N	N	1,310	variety of built-in modems
B series	impact (5x7)	30	8.5	80	128 ASCII, baudot	M	N	N	2,546	
E series	impact (5x7)	30	8.5	80	64 baudot	M	N	N	2,495	includes paper tape punch/reader
<b>GENERAL ELECTRIC CO.</b>										
200 Document Handler	impact (7x9)	200		136	ASCII	M	N	N	5,752	
200KSR Forms Access	impact (7x9)	200		136	ASCII	M	N	N	3,020	self-test, diagnostics; optional red/black print, APL, text editing
GE 200KSR	impact (7x9)	136				M	N	N	2,470	self-test, diagnostics, optional APL, current loop, VFU, red/blue print
GE 2030KSR	impact (9x7)	60	15.35	132	94 ASCII, others	M	N	Y	1,250	top/bottom of form, VT, HT, diagnostics, margin set
GE 2120KSR	impact (9x7)	150	15.35	132	94 ASCII, Int'l	M	N	Y	2,195	620-char. buffer, friction feed, test and diagnostics
<b>HEWLETT-PACKARD CO.</b>										
2635B	impact (9x12)	180	15.25	136			N		4,370	
<b>LEXICON CORP.</b>										
LEX-21	thermal (5x7)	30	4.25	40		C	Y	N	595	originate or answer, 2K-byte memory, battery backup, 5 lbs.
<b>MANNESMANN TALLY</b>										
MT1612 KSR	impact (7x9)	200	15.25	218	96 USASCII		N	N	2,295	20-char. answerback, 2K-byte buffer, 49 programmable functions
<b>MILTOPE CORP.</b>										
PK200	impact (9x7)	120	11	80	ASCII	M	N	Y	12,000	meets military specifications
<b>PLESSEY PERIPHERAL SYSTEMS</b>										
PM-LC11	impact (9x9)	200		132/176	95 ASCII		N	Y		2.6K-byte FIFO buffer storage, self-test
<b>QWINT SYSTEMS INC.</b>										
KSR 740 Series	impact (7x5)	65	8.5	140	96 ASCII, baudot	M		Y	995	1200 baud, EIA interface or DC loop, on-line configuration
MSR 740 series	impact (7x5)	65	8.5	140	96 ASCII, baudot	M		Y	1,095	1200 baud, 4K-byte memory, on-line configuration
<b>ROGERS PRODUCTS CO.</b>										
Typrinter 221	solid font (daisywheel)	30		198				N	2,850	elec. typewriter, 4K-byte output buffer, 12K-byte buffer/spooler

## TELEPRINTERS

Line printers

Company, model	Printing method (matrix size)	Printing speed (cps)	Form width (inches)	Chars./line	Character sets/code	Modem coupler (M/C)	Portable (Y/N)	Graphics (Y/N)	Unit price (\$)	Features, Options
<b>SIEMENS COMMUNICATIONS SYSTEMS INC.</b>										
PT-80TWX/DDD	impact (9x12)	60	14.875	80/134	128 ASCII	M	N	N	3,500	Bell 103 compatible 300 bps Async halfduplex full duplex modem, compatible with Teletype 33/35
<b>TELETYPE CORP.</b>										
42	impact (7x9)	30	12	80	baudot		N	N	1,987	Telex operation, unbuffered/buffered versions (4K or 16K), punch reader module, multi-point operation
43	impact (7x9)	30	12	80/132	ASCII	M	N	N	1,647	buffered (16K) or unbuffered; pin, friction or tractor feed
<b>TELPAR INC.</b>										
PL12E	impact (5x8)	30	2.25	12	ASCII		Y	N	297	
PL20E	thermal (5x8)	50	2.45	20	ASCII		Y	N	297	
PS48E	thermal (5x7)	30	5.5	48	ASCII		Y	N	579	
<b>TEXAS INSTRUMENTS INC.</b>										
707 Portable	thermal (7x9)	45	8.5	80/132		C	Y	N	695	full size QWERTY kybd., 4.5 lbs., optional battery pack
743	thermal (5x7)	30		80/136				N	995	
763	thermal (5x7)	30		80				N	2,695	20K-byte non-volatile bubble memory
767	thermal (5x7)	30		80				N	3,995	40K-byte non-volatile memory, data entry validation
783	thermal (5x7)	120		80				N	1,595	110-9600 bps communications
820	impact (9x7)	150		132				N	2,165	1280-char. receive buffer
840	impact (9x7)	75		132				N	1,095	paper out indicator
Portable 745	thermal (5x7)	30		80/136		C	Y	N	1,295	
Portable 765	thermal (5x7)	30		80		C	Y	N	2,995	20K-byte memory
Portable 787	thermal (5x7)	120		80		M	Y	N	2,395	self-diagnostics
<b>3M</b>										
1460/1945	impact (5x7)	35	4.25	40	128 ASCII	C	Y	Y	1,095	Bell 103 compatible modem, coupler optional; supports bi-directional printing; detachable keyboard
1980/1945	impact (5x7)	35	8.5	80/136	128 ASCII	C	Y	Y	1,145	Bell 103 compatible autodial modem, coupler optional, supports bidirectional printing, detachable keyboard
<b>TRANS-LUX CORP.</b>										
Connection	impact (5x7-4x5)		8.5	69-80	ASCII	M	Y	N	3,695	autodial, 16K-byte memory, CRT, disk storage, message library
Teleprinter	impact (5x7)	50	8.5	69	baudot	M	Y	N	2,395	4K-byte or 16K-byte memory, kybd. dialing
Trans-Lux 300	impact (5x7-4x5)		8.5	72/80	ASCII	M	Y	N	2,865	autodial, 16K-byte memory
<b>WENGER DATENTECHNIK</b>										
Print Swiss Matrix KSR	impact (9x10)	20,160		80/136				Y	1,080 (Q250)	3K byte buffer, optional DEC LA 34/8 compatibility

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If you're looking for a dependable lineup of printers, look at Printronix. We've got it all in the family.

From Word Processing at 80 LPM, Graphics at 150 LPM, to high-volume Data Printing at 2000 LPM, Printronix printers do it all, without skipping a beat. In fact,

they're the only printers built to take the pressure of continuous duty processing in the most rigorous environments.

And, in addition to industrial durability, our unique hammerbank technologies give you superior print quality and outstanding graphics capability.



## P-Series

The P-Series consists of our proven printer/plotters, the P300 and P600. At 300 LPM, the P300 can combine bar codes, OCR and alphanumerics all in one dependable package to bring you the best in medium-speed line printer capabilities.

And, with twice the throughput of our P300, the extra-rugged P600 is truly an industrial printer, designed for all your heavy-duty processing tasks.

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Our DataPrinter series gives you the most reliable band printer performance available, using a precision hammer actuator system evolved from chain printer technology.

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Our MVP is the business printer that really means business. It's the world's first and only microcomputer line printer which puts the dependability of our P-Series into a smaller package.

The MVP is truly the Most Versatile Printer, with selectable speeds ranging from 80 LPM to 200 LPM, and full graphics capability. It's the perfect printer for all your multi-user, multi-application needs.

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# “DOTS INC

Besides 45 cps letters, you can print documents, rough drafts and data at up to 250 cps. Plus charts, graphs and graphics—in virtually limitless colors.

Print resolution accurate to .0014 inch. Dot addressable graphics to 240V x 720H.

An understatement. Print flexibility includes up to 6 resident fonts, italics and proportional spacing. Plus bar codes, OCR, scientific and international fonts. Or, you can download your own unique fonts.

You can't see the dots in this letter quality printout. That's what makes the revolutionary AMT 45 cps dot matrix computer printer so incredible. In fact, it's the first computer printer that's better-than-letter.

Handles universal single and continuous forms up to 15" wide automatically. Multi-part forms, preprinted forms—you can even generate your own forms.

Actual size, unretouched printout. Even under 4.4X magnification, you still can't see the dots.



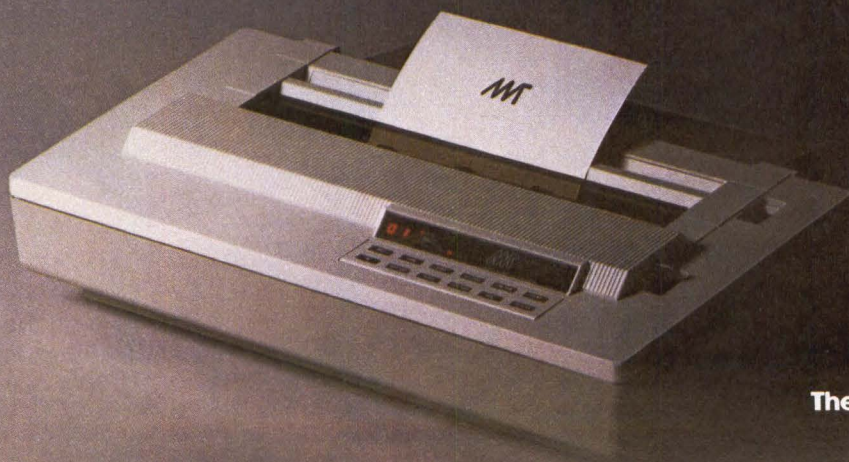
You've never seen anything like it. Our new AMT printer is the first dot matrix that prints with *perfect* letter quality. Now that's incredible. But that's not all. The AMT dot matrix is so flexible, functional and letter-perfect, it replaces the office daisywheel, plotter and conventional dot matrix data printer. In fact, the AMT is so powerful and versatile it can match the system demands of the most sophisticated computer. Yet it's astonishingly easy to use.

We could go on and on. About systems modularity. Simplified maintenance. Third-party service. Intelligent ribbon systems. Software flexibility. Special applications. And much more. But all it takes is one look at the AMT in action. Write to Michael Allison, V.P. Sales, Advanced Matrix Technology Inc., 1157 Tourmaline Drive, Newbury Park, CA 91320. Or call (805) 499-8741. The AMT better-than-letter™ printer. Dots incredible.

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# REDIBLE.”



**MT**  
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The first better-than-letter™ printer.

A minimum of moving parts and an exceptionally rugged design make the CI-600 from CIE Terminals the *first* 600 LPM matrix line printer you can depend on.

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The CI-600 is ideal for retail, business, engineering and scientific graphics applications, all of which are easily accessed and used. And there's more.

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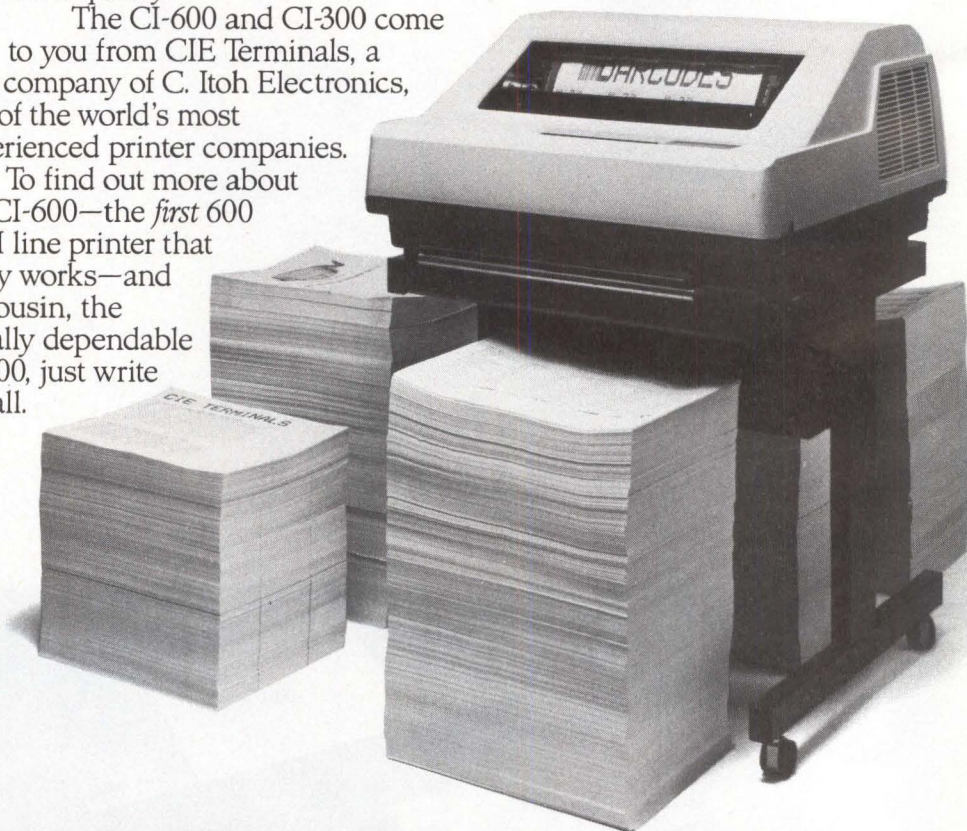
Processing. An unusually small print head diameter for needle-sharp character clarity. Hundreds of unique character fonts. And three built-in interfaces, two parallel and one serial.

There are also two paper-loading points—front and bottom. Plus flexible line spacing and line feed speed.

If you'd like the same quality, but don't need as much speed, we also offer the CI-300—with 300 LPM data processing and 85 LPM of letter quality.

The CI-600 and CI-300 come to you from CIE Terminals, a new company of C. Itoh Electronics, one of the world's most experienced printer companies.

To find out more about the CI-600—the *first* 600 LPM line printer that really works—and its cousin, the equally dependable CI-300, just write or call.



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## LINE PRINTERS

Company, Model	Printing method	Printing speed (lpm)	Chars./line	Character sets/ fonts	Simul. copies	Unit price (\$)	Features, options
<b>BDS CORP.</b>							
B-1000	band	1000	132	gothic, OCR A, OCR B, Int'l.	6		self-test, static eliminator, direct access 12-channel VFU
B-1500	band	1500	132		6		power paper stacker, acoustic cabinet, static eliminator
B-300	band	300	132	gothic, OCR A, OCR B, Int'l.	6		self-test, static eliminator, direct access 12-channel VFU
B-600	band	600	132	gothic, OCR A, OCR B, Int'l.	6		self-test, static eliminator, direct access 12-channel VFU
<b>BURROUGHS CORP.</b>							
B 9246-12/13	band	1250	132			42,500	
B 9246-20	train	2000	132			69,300	
B 9246-6	band	650	132			14,700	
B 9249-375	band	375	132			8,915	
<b>CENTRONICS DATA COMPUTER CORP.</b>							
6081	band	300/750	132/136	48, 64, 96, 128 ASCII	6	7,120	touch-sensitive control panel
6085	band	300/750	132/136	48, 64, 96, 128 ASCII	6	8,525	touch-sensitive control panel, acoustic cabinet
9372-I	train	1200	132	48 character set			enclosed forms feed, power stacker, Dataproducts controller
9372-II	train	1600	132	48 character set			power forms stacker, enclosed forms feed, Dataproducts controller
9372-III	train	2000	132	48 character set			power forms stacker, enclosed forms feed, Dataproducts controller
9373-III	train	2000	132	48 character set			power forms stacker, IBM 1403/3211 controller
I-E series	band	1130	132	48, 64, 96, 128 ASCII	6		quiet cabinet, towel ribbon
II-E series	band	1440	132	48, 64, 96, 128 ASCII	6		quiet cabinet, towel ribbon, power stacker
III-E series	band	2400	132	48, 64, 96, 128 ASCII	6		quiet cabinet, towel ribbon
Linewriter 400	band	400	132/136	48, 64, 96, 128 ASCII	6		multiple interfaces, 4-digit alphanumeric display
<b>C. ITOH ELECTRONICS INC.</b>							
CI-300	impact matrix	300	220	96 ASCII, Int'l.	6	4,495	DP, LQ, graphics modes, downloadable char. sets
CI-600	impact matrix	600	220	96 ASCII, Int'l., block/engineering	6	5,995	DP, LQ, graphics modes, 3 I/Os, resolution to 400 dpi
<b>DATA GENERAL CORP.</b>							
4327	band	300	132	USASCII	6	8,900	
4364	band	600	132	USASCII	6	12,900	
4373	band	1200	136	USASCII	6	28,500	
<b>DATA PRINTER CORP.</b>							
1200	chain	1200	132	48, 64, 96 ASCII	6		self test, alarm panel
1210	chain	1000	132	48, 64, 96 ASCII	6		self test, alarm panel
1260	chain	600	132	48, 64, 96 ASCII	6		self test, alarm panel
3101	band	1000	132	48, 64, 96 ASCII	6		band height adjustment, paper out sensor
3121	band	1200	132	48, 64, 96 ASCII	6		paper motion detector, quiet cabinet
3601	band	600	132	48, 64, 96 ASCII	6		paper motion detector, band height adjustment, quiet cabinet
3751	band	750	132	48, 64, 96 ASCII	6		paper motion detector, paper out sensor, quiet cabinet
BT 1500	band	1500	132	48, 64, 96 ASCII	6		self test, autoline feed, alarm panel
<b>DATAPPOINT CORP.</b>							
9257	band	300	132	64, 96 ASCII	4	10,800	variable form length, self test, dual tractor
9258	band	600	132	64, 96 ASCII	4	14,500	variable form length, self test, dual tractor
9266	drum	900	132	96 ASCII	6	29,750	acoustic cabinet
<b>DATAPRODUCTS CORP.</b>							
B-1000	band	1000	132/136	more than 50 fonts ; English, foreign, math, science	6	12,800	diagnostic display; self-test, acoustic cabinet, Dataproducts interface
B-300	band	300	132/136	more than 50 fonts ; English, foreign, math, science	6	6,800	diagnostic status display, self test, Dataproducts interface

## LINE PRINTERS

Line printers	Company Model	Printing method	Printing speed (lpm)	Chars. line	Character sets fonts	Simul. copies	Unit price (\$)	Features options
	B-600	band	600	132/136	more than 50 fonts ; English, foreign, math, science	6	8,600	diagnostic status display, self test, Dataproducts interface
	BP-1500	band	1500	132/136	more than 50 fonts ; English, foreign, math	6	23,000	diagnostic display, self-test, direct-access VFU, Dataproducts interface
	BP-2000	band	2000	132/136	more than 50 fonts ; English, foreign, math, science	6	32,000	diagnostic display, self-test, direct access VFU, Dataproducts interface
<b>DECISION DATA COMPUTER CORP.</b>								
	6610	drum	1000	132	64 ASCII	5	22,000	power paper puller, soundproof cabinet
	6665	drum	650	132	64 ASCII	5	17,000	power paper puller, forms motion sensor
	6680	drum	800	132	64 ASCII	5	19,000	fine vert./horiz. adjustment, sound-proof cabinet
	6703-25	impact matrix	300	132	16 available	4	6,188	coarse/fine vert./horiz. adjustment, lighted print area
	6807	band	700	132	13 available	6	12,100	vert./horiz. adjustment, forms motion sensor, front/rear operation panel
	6811	band	1100	132	13 available	6	17,000	power paper pull, rear operation panel; remote visible alarm; LED display
	6814	band	1400	132	13 available	6	23,000	power paper pull; rear operation panel; remote visible alarm; LED display
<b>DIGITAL ASSOCIATES CORP.</b>								
	1200	chain	1200	132	gothic, courier, OCR A, OCR B	6		static eliminator, paper puller, 2 sets motor tractors
	1210	chain	1000	132	gothic, courier, OCR A, OCR B	6		static eliminator, paper puller, 2 sets motor tractors
	1260	chain	600	132	gothic, courier, OCR A, OCR B	6		static eliminator, paper puller, 2 sets motor tractors
	9380-12E	band	1200	132	gothic, courier, OCR A, OCR B	6		selectable forms length, LED status display, Dataproducts I/O
	9380-18E	band	1800	132	gothic, courier, OCR A, OCR B	6		selectable forms length, LED status display, Dataproducts I/O
	9386E	band	600	132	gothic, courier, OCR A, OCR B	6		selectable forms length, LED status display, Dataproducts I/O
	B-1000	band	1000	132	gothic, courier, OCR A, OCR B	6		selectable form length, LED status display, Dataproducts I/O
	B-300	band	300	132	gothic, courier, OCR A, OCR B	6		Dataproducts I/O, LED status display, static eliminator
	B-600	band	600	132	gothic, courier, OCR A, OCR B	6		Dataproducts I/O, LED status display, pedestal/paper shelf
	BP-1500	band	1200	80/132	gothic, courier, others	6		Dataproducts I/O, LED status display, selectable forms length
	BP-2000	band	1650	80/132	gothic, courier, others	6		Dataproducts I/O, LED status display, selectable forms length
	Remote LP System	band	1800	132	gothic, courier, OCR A, OCR B	6		Dataproducts/Centronics I/O
	T-510	band	340	132	gothic, courier, OCR A, OCR B	6		letter/draft quality printing, Dataproducts I/O
	6203	band	1250	132		6		towel ribbon, power paper stacker, line counter
	L-400	band	400	132	gothic, courier, OCR A, OCR B	6		LED status display, selectable forms length
<b>DIGITAL EQUIPMENT CORP.</b>								
	LP 27	band	1200		64, 96 ASCII	6	27,990	LED diagnostic display
<b>FUJITSU AMERICA INC.</b>								
	J1200	band	1200	132/136	48, 64, 96, 128 ASCII	6		
	J300	band	300	132/136	48, 64, 96, 128 ASCII	6		
	J600	band	600	132/136	48, 64, 96, 128 ASCII	6		
	J900	band	900	132/136	48, 64, 96 ASCII	6		
<b>GENERAL ELECTRIC CO.</b>								
	GE 310/340	belt	425	132	ASCII	6	4,170	2 chain tape loop, bottom rear paper feed
	GE 510	belt	425	132	ASCII, Int'l, gothic	6	6,080	optional carbon film ribbon
<b>HARRIS CORP.</b>								
	4270	chain	900	132/136	96 ASCII	6	40,900	acoustic cabinet
	4330	band	600	132/136	64 ASCII	6	14,950	acoustic cabinet
	4335	band	450	132/136	96 ASCII	6	14,950	acoustic cabinet



## LINE PRINTERS

Line printers	Company Model	Printing method	Printing speed (lpm)	Chars./line	Character sets/fonts	Simul. copies	Unit price (\$)	Features/options
<b>HEWLETT-PACKARD CO.</b>								
	2608A/S	impact matrix	400	132	large, block, line drawing characters	6	11,170	
	2563A	impact matrix	300	132	bar code, italics, line drawing and block	6		
<b>HONEYWELL INFORMATION SYSTEMS INC.</b>								
	PRU7270	impact matrix	200	132	96 ASCII	3	3,450	compressed/elongated print, multiple pitches, RS232C/RS422 interface
	PRU9620	belt	1200	132/136	9 fonts, OCR A, OCR B	6	31,000	
<b>HOUSTON INSTRUMENT</b>								
	8220	electrostatic	1000	132	96 ASCII	1	3,995	prints on wide fan-fold or roll paper
<b>MANNESMANN TALLY</b>								
	T-3000 Series	impact matrix	300	132	96 USASCII	6		quiet cabinet, self-test
	MT 3300	impact matrix	300	132	96 USASCII	6	4,995	business graphics
	MT 660	impact matrix	600	132		6	7,995	full graphics
<b>MILTOPE CORP.</b>								
	HSP 3609-212A	impact matrix	600	80/132	64, 96, 128 ASCII	4	20,000	MIL approved, graphics capability
	LP 3036	impact matrix	300	36	64, 96 ASCII, others	2	7,500	MIL approved, graphics capability
	TP 2000	thermal matrix	160	40/66	64, 96 ASCII, others	1	7,500	MIL approved; graphics, chart recorder optional
	TP 3000	thermal matrix	750	80/132	64, 96, 128 ASCII, others	1	15,300	MIL approved, graphics capability
<b>MODULAR COMPUTER SYSTEMS</b>								
	4240	belt	300	132	96 character set	6	8,100	acoustic enclosure
	4241	belt	600	132	96 character set	6	10,250	acoustic enclosure
	4242	belt	900	132	96 character set	6	15,875	acoustic enclosure
<b>NEC INFORMATION SYSTEMS</b>								
	L300	band	300	136	NEC gothic, OCR B	5	5,250	electronic VFU, enhanced print mode
	L600	band	600	136	NEC gothic, OCR B	5	6,920	electronic VFU, enhanced print mode
<b>PLESSEY PERIPHERAL SYSTEMS</b>								
	LP 11	impact matrix	300	132	96 ASCII	6	6,405	
<b>PRINTER SYSTEMS CORP.</b>								
	PSC-B1000	band	1000	132	48, 64, 96 ASCII	6		compatible with IBM, Burroughs, Univac, Honeywell
	PSC-B300	band	300	132	48, 64, 96 ASCII	6		compatible with IBM, Burroughs, Univac, Honeywell
	PSC-B600	band	600	132	48, 64, 96 ASCII	6		compatible with IBM, Burroughs, Univac, Honeywell
<b>PRINTRONIX INC.</b>								
	P-300 XQ	impact matrix	400	132	96 ASCII, others	6	6,450	Centronics plug compatible, forms length selector, paper out detector
	P-600 XQ	impact matrix	800	132	96 ASCII, others	6	8,550	Centronics plug compatible, forms length selector, paper out detector
<b>RACAL-MILGO INFORMATION SYSTEMS INC.</b>								
	4295	impact matrix	300	132	96 ASCII	6	6,332	
<b>SOUTHERN SYSTEMS INC.</b>								
	M-100	impact matrix	145	40/132	bar codes	6		
	QT 300	band	360	132/198		6		quiet cabinet, self-test
	QT 600	band	720	132/198		6		quiet cabinet, self-test
	QT 1000	band	1200	132		6		quiet cabinet, self-test
	QT 1200	band	1440	132		6		quiet cabinet, self-test
<b>STORAGE TECHNOLOGY (DOCUMENTATION)</b>								
	Impact 3000	band	3000	132		6		automatic elevator stacker, direct access VFU, line counter
	UNIV. 1000	band	1600	132		6	13,775	automatic elevator stacker, direct access VFU, line counter

# QUADJET™ BY QUADRAM™

Quadram's new Quadjet ink jet printer is the ideal choice for your color graphics hard copy. It can take all your ideas and put them down on paper. So things like business, scientific and engineering applications are all of a sudden clearer and more meaningful.

## Colors to tempt the palette.

With Quadjet you can color your charts, graphs and diagrams black, red, green, yellow, cyan, blue or magenta. Use all seven of them together, or in any combination. The color scheme is up to you.

Of course, Quadjet prints text as well as graphics, including standard and enlarged characters. With a maximum graphics resolution of 640 dots/line, your projects are printed crisply and clearly every time.

**OUTSTANDING  
COLOR GRAPHICS  
AT AN INCREDIBLY  
AFFORDABLE PRICE.**

## Quadjet fits in.

Quadjet is small and portable so you can put it just where you want it. Don't worry about the noise. State-of-the-art ink jet technology makes printing whisper quiet.



Quadjet uses disposable ink cartridges that are a snap to change. Just pop the old one out and the new one in. You'll find that each one prints about 4 million characters. As for paper, any 8½" sheet will do, whether it's form fed, sheet fed or some other kind.

## A word about compatibility.

A standard centronics parallel interface makes Quadjet compatible with your IBM PC, XT or Apple computer. And if you have

Quadram's Quadlink that allows you to use Apple software with your IBM PC, Quadjet can work that way too.

An easy-to-use software package lets you and Quadjet get down to business right away.

## The quality you've come to expect.

Quadram put the same kind of quality into Quadjet that you find in all Quadram products.

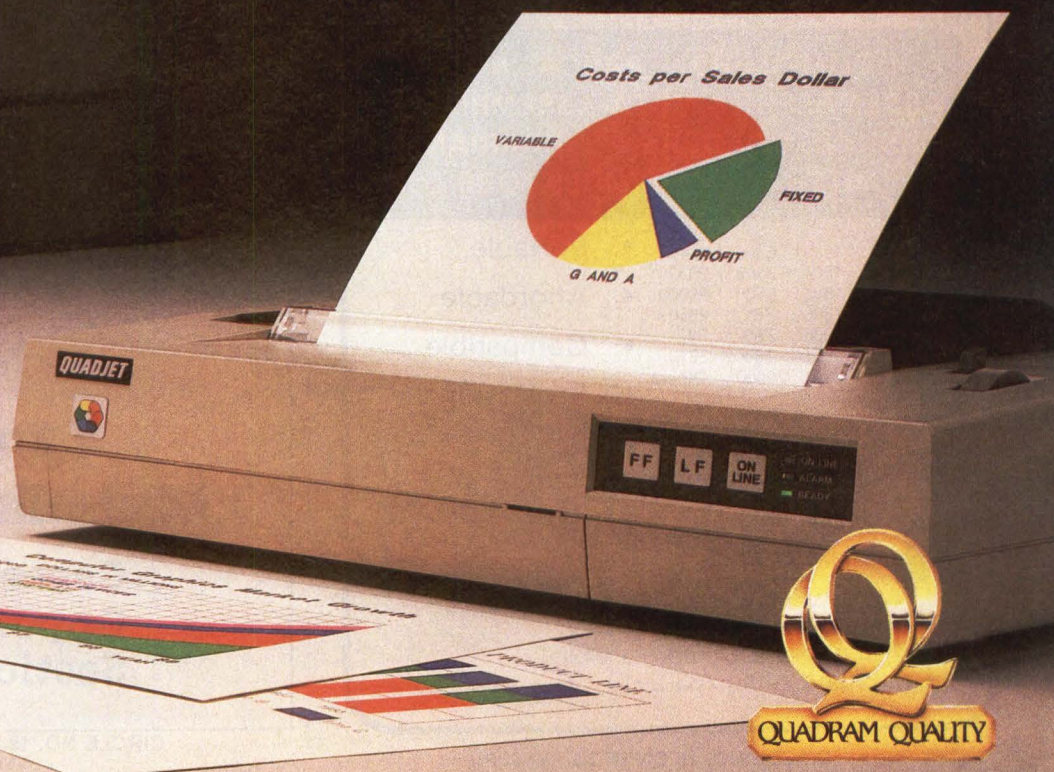
Considering all of Quadjet's features, we'll let you draw your own conclusions. We think you'll find Quadjet gives you unsurpassed Quadram quality at an incredibly affordable price.



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## LINE PRINTERS

Line printers	Company Model	Printing method	Printing speed (lpm)	Chars./line	Character sets/ fonts	Simul. copies	Unit price (\$)	Features, options
<b>SYNERGY PRINTING SYSTEMS</b>								
	Multi-Mode Printer	impact matrix	300, 600		OCR, bar codes, graphics		4,500	Centronics, Dataproduct or RS232C interface, near letter quality mode at 85 or 170 lpm
<b>TELETYPE CORP.</b>								
	40	belt	300	80/132	upper/lower case ASCII	6	3,262	input buffer
	4540	belt	300	80/132	ASCII	6	5,595	input buffer, quiet floor cabinet, EBCDIC or ASCII codes
	T-300	belt	300	132	upper/lower case ASCII	6	4,400	self-diagnostics, serial/parallel interfaces
<b>TRILOG INC.</b>								
	C-144	impact matrix	190	132	96 ASCII	6	11,500	color output
	C-60	impact matrix	300	132/220	96 ASCII	6	11,500	color output on plain paper 60x72
	T-100	impact matrix	250	132/220	96 ASCII	6	8,200	
	T-1100A	impact matrix	250	132/220	96 ASCII	6	9,050	Versatec interface
	TIP-150	impact matrix	150	132/220	96 ASCII	6	3,900	field-upgradable to 300 lpm
	TIP-300	impact matrix	300	132/220	96 ASCII	6	4,900	
	C-100	impact matrix	250	132/220	96 ASCII	6	11,500	100x100 dpi graphic resolution
<b>WANG LABORATORIES INC.</b>								
	5573	band	250	132	64, 96 ASCII	6	9,000	
	5574	band	600	132	64, 96 ASCII	6	12,500	
	5575	band	1100	136	64, 96 ASCII	6	28,500	

## CROSS SOFTWARE FOR MICROPROCESSORS

**COMPILERS — PASCAL & C  
ASSEMBLERS & META-ASSEMBLERS  
LINKING LOADERS — LIBRARIANS  
INTERACTIVE SIMULATORS**

8048	8096	1802	6305	9940	• Portable
8051	6800	1804	6309	9989	• Affordable
8080	6801	1805	6500	99000	• Compatible
8085	6802	1806	Z8	2650	• Professional
8086	6805	2900	Z80	F8	• Source Licenses
8087	6809	2901	Z8002	3870	
8088	68000	6301	9900	Others	

These programs written in Pascal and Fortran, will run on most mini and mainframe computers.

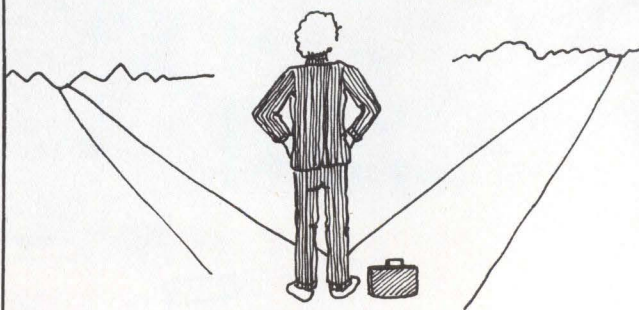
for more information, contact:



**MICROTEC  
RESEARCH INC**

505 W. Olive Ave., Suite 325  
P.O. Box 60337  
Sunnyvale, California 94088  
Phone: (408) 733-2919 TLX: 4990808

## Wondering Where To Turn Next?



## Turn To Mini-Micro Systems Career Opportunities Section

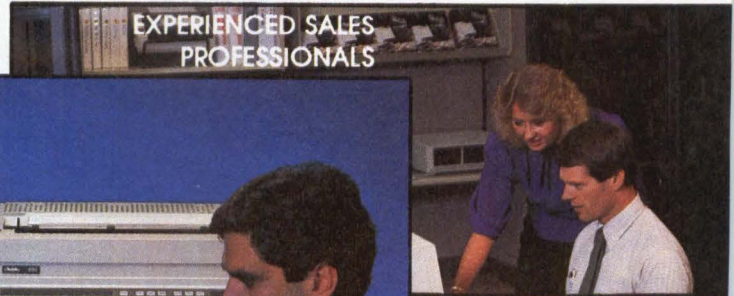
CIRCLE NO. 19 ON INQUIRY CARD

MINI-MICRO SYSTEMS/Fall 1983

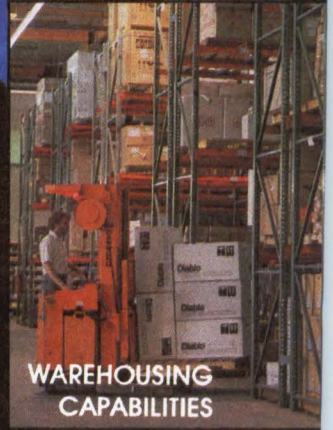
# Another Reason We're The InteGREATest System Source: Diablo's Printer Selection



TRAINING FACILITIES



EXPERIENCED SALES  
PROFESSIONALS



WAREHOUSING  
CAPABILITIES



IMMEDIATE DELIVERY

We have everything it takes for your decision support system, including a complete selection of Diablo printers to show your system off. For up to 400 cps speed, there's the Diablo matrix line. For extra quiet operation, there's a new CQ Series of matrix printers, with four times lower sound levels than the competition. Quiet is also what you get with Diablo's new ink jet Series C and thermal transfer Series 200, operating at a low 55dBA. But that's not all—Series C also offers color, and resolution sharper than that of personal computer CRTs!

For a selection of more than 200 printstyles, you'll want Diablo's 620 or 630 daisywheel printers. Choose standard size printwheels or Extended Character Set wheels that form hundreds of characters each. With Diablo's All Purpose Interface, we can match up these printers to all the top micros and personal computers.

But we can do a lot more than match the right Diablo printer to your needs. We can help you put

together an entire system, because we carry all the top names in software and hardware. We make sure they all work together with extensive pre-testing procedures, and complete installation service. Then we follow up with training assistance. And we offer you single source maintenance and service for all the equipment in your system.

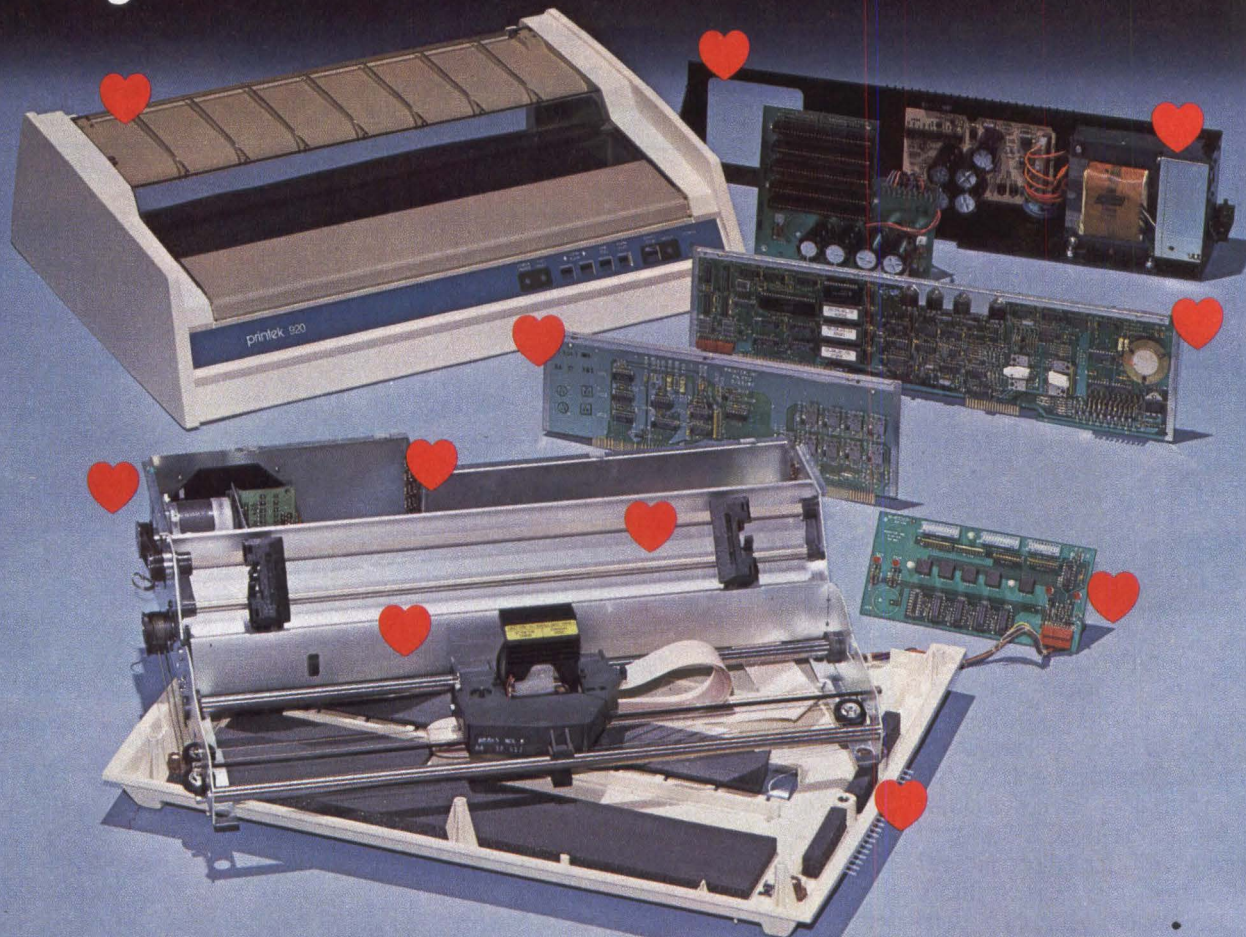
Call our location nearest you for complete information. We'll also be glad to discuss the financing options we offer you.

## WE MAKE DECISION SUPPORT EASIER



LOS ANGELES	(213) 615-3950	NEW JERSEY	(201) 882-0150
ORANGE COUNTY	(714) 546-0523	PHILADELPHIA	(609) 424-6963
SAN FRANCISCO	(408) 986-8055	NEW YORK	1-800-631-3492
BOSTON	(617) 657-8013	TORONTO	(416) 677-2888

# Why OEMs Love PRINTEK

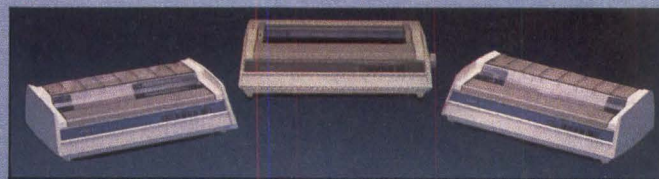


OEMs love PRINTEK in many ways, for many things. For the product with its sophisticated simplicity that is easily adapted and customized. For the company that is responsive to special requirements and support. Consider these PRINTEK points—and be prepared to fall in love.

- ♥ **Elegant cabinetry** with molded-in color to avoid chipping and discoloration problems (color changes available)—break away clear polycarbonate top with interlock—easily customized front label. Flame retardant NORYL® material.
- ♥ **Universal power supply**—heat-sinked for protection, with VDE transformer spacings, ready to operate world-wide. Large I/O cutout for multiple custom connectors. FCC, UL, CSA, VDE compliance.
- ♥ **Intelligent microprocessor design**—architecture permits customized interface control, up to 20 print functions are software-controllable.
- ♥ **Processor bus option slots** (910/920) allows ready development of custom I/O, memory, fonts, etc. Model 930 option permits custom memory and I/O.
- ♥ **ROM capacity:** 910: 32K program, 48K fonts  
920: 32K program, 48K fonts  
930: 56K program, 80K fonts
- ♥ **Extra dipswitch positions** on front control panel for custom needs (variable line lengths, communication protocols, etc.)
- ♥ **Rugged chassis** with extruded cross member for stability and simplicity (910/920), heavy duty motors, ball bearings, fan cooling, shock isolators.

NORYL is a registered trademark of GE.

- ♥ **Long-life printhead.** Features heat sink, ruby bearings, oiled wipers and high grade shaft finishes for long life, encapsulated coils for efficient thermal dissipation, 1 year warranty, easy replacement. 9 and 18 wire designs.
- ♥ **Quick-change adjustable tractors** with snap-out shafts (930 also has friction feed).
- ♥ **Unique encoder** assures accurate position detection and speed control. Logic seeking/Bidirectional design.
- ♥ **Multiple paper feed paths** with easy-change bottom paper guide. Accepts up to 16" fanfold (930 also accepts single sheets).
- ♥ **All documentation provided**—Product (available disks for quick edits), Service, Spares suggestions.



**Three multi-function models to love.** Model 910: 200/45 cps speeds. Model 920: 340/80 cps. Model 930: 200/80 cps. Call toll-free for information.

Printek, Inc., Benton Harbor, MI 49022  
616/925-3200 TWX 810-270-3112

**1-800-368-4636**

**printek** 

best thing next to your computer

CIRCLE NO. 21 ON INQUIRY CARD



## SOLID FONT SERIAL PRINTERS

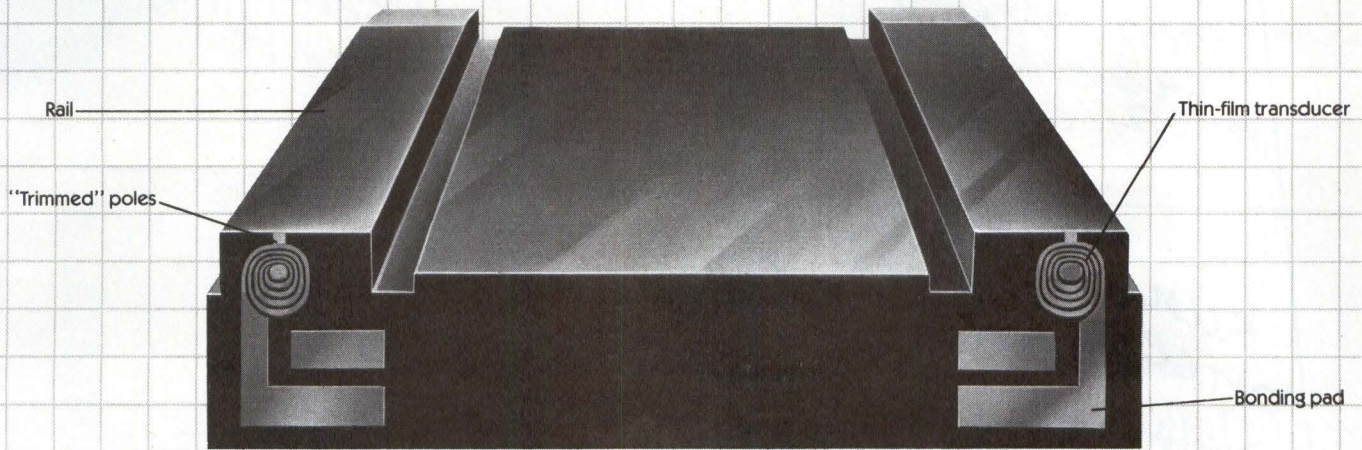
Company, Model	Printing method	Printing speed (cps)	Chars./ line	Graphics (yes/no)	Multicolor (yes/no)	Character sets/code	Unit price (\$)
<b>ANDERSON JACOBSON INC.</b>							
833	daisywheel	45	132, 158	Yes	No	ASCII, APL	3,650
<b>APPLE COMPUTER INC.</b>							
Daisy Wheel Printer	daisywheel	40	198	Yes	No	Prestige elite, bold, French, German	2,195
<b>BDS CORP.</b>							
LQ-35	daisywheel	35	132	Yes	Yes		
LQ-55	daisywheel	55	132	Yes	Yes		
<b>BROTHER INTERNATIONAL</b>							
HR-15	daisywheel	13	120, 180	Yes	Yes	ASCII, Int'l, romance languages	599 (Q1)
HR-25	daisywheel	23	130, 195	Yes	Yes		995 (Q1)
<b>BURROUGHS CORP.</b>							
AP1301	daisywheel	35	132, 198	No	No	pica	4,568
<b>C. ITOH ELECTRONICS INC.</b>							
A10-20	daisywheel	18	136	Yes	No		995
F10-40	daisywheel	40	136	Yes	No		1,995
F10-55	daisywheel	55	136	Yes	Yes		2,295
<b>COMREX INTERNATIONAL INC.</b>							
CR-I	daisywheel	17	132	No	No	English, OCR, ASCII, script, pica, elite, Brougham	995
CR-II	daisywheel	12	110	No	No	English, OCR, ASCII, script, pica, elite, Brougham	599
<b>DAISY SYSTEMS HOLLAND BV</b>							
M20	daisywheel	20	157, 188	Yes			1,295
M45	daisywheel	45	132, 158	Yes			1,995
<b>DAISY WRITER, DIV. OF COMPUTERS INTERNATIONAL INC.</b>							
2000	daisywheel	20	132	Yes	No	Quadro, pica, OCR B, Prestige, script, Brougham, Grande	1,495 (Q1)
<b>DATA TERMINALS &amp; COMMUNICATIONS</b>							
380Z	daisywheel	32	132, 198	Yes	No	17 fonts	1,495
Stylewriter	daisywheel	12, 25	110, 132, 165	Yes	Yes	20 fonts, 15 languages	899 (Q1)
<b>DATAPOINT CORP.</b>							
9611	daisywheel	30	132	No	No	Courier 72	3,495
<b>DATAPRODUCTS CORP.</b>							
35	daisywheel	35	132, 196	Yes	No		1,995
55	daisywheel	55	132, 196	Yes	No		2,495
<b>DIABLO SYSTEMS INC.</b>							
620	daisywheel	25	132, 198	No		ASCII	1,095
630	daisywheel	40	132, 198	Yes		ASCII	2,340 - 3,495
<b>DIGITAL EQUIPMENT CORP.</b>							
LQP02	daisywheel	32	158	No	No		2,800
<b>FACIT/DATAROYAL</b>							
4560	daisywheel	22		No	No		1,395
4565	daisywheel	40	136	No	No		1,895
<b>FUJITSU AMERICA</b>							
SP320	daisywheel	48	136	Yes	Yes		1,500
SP830	daisywheel	80	136	Yes	Yes		2,950
<b>HEWLETT-PACKARD CO.</b>							
2601/02A		40	80	No	No		1,950 - 3,520
<b>LEADING EDGE PRODUCTS</b>							
Printmaster F-10		55		Yes	Yes		

## SOLID FONT SERIAL PRINTERS

Solid font serial printers

Company, Model	Printing method	Printing speed (cps)	Chars./ line	Graphics (yes/no)	Multicolor (yes/no)	Character sets/code	Unit price (\$)
Starwriter F-10		40		Yes	No		
<b>MORROW</b>							
MP100	daisywheel	12, 14	101, 151				595
MP200	daisywheel	16, 17	132, 197				945
MP300	daisywheel	27, 31	132, 197				1,195
<b>NCR CORP.</b>							
6455-2310		33	132, 198	Yes	No	Selection of 50 fonts	3,075
<b>NEC HOME ELECTRONICS USA INC.</b>							
15 LQ	daisywheel	12, 14	101, 121, 151	No	No	96 character set	695 (Q1)
<b>NEC INFORMATION SYSTEMS</b>							
2000R	print thimble	20	136	Yes	No	Selection of 50 fonts	
2050	print thimble	20	136	Yes	No	Selection of 50 fonts	1,250
3500	print thimble	30	136	Yes	Yes	pica, elite	1,995
3510	print thimble	30	132			Selection of 50 fonts	2,290
7710	print thimble	55	132	Yes	No	Selection of 50 fonts	2,580
7750	print thimble	55	136	Yes	Yes	pica, elite	
<b>OLYMPIA USA</b>							
Electronic Compact RO	daisywheel	14	115, 172	No	No		999 (Q1)
102	daisywheel	17	141, 212	No	No		1,399 (Q1)
3000	daisywheel	50	150, 225	No	No		1,899 (Q1)
<b>OPE PRINTERS, INC.</b>							
DY 211		20	114, 198	No	No	20 fonts	1,350
DY 311		30	128, 225	No	No	20 fonts	1,960
<b>PLESSEY PERIPHERAL SYSTEMS</b>							
LQ11	thimble	33	136	No	No	Courier 72, European	1,920
<b>PRIMAGES INC.</b>							
IMAGE I	daisywheel	45	162	Yes	No	Versatile 10/12, Narrator, Courier 10	1,695
<b>PRINTER SYSTEMS CORP.</b>							
DP55	daisywheel	50	132	No	No		
<b>QUME CORP.</b>							
Sprint 8	daisywheel	35, 40, 50		Yes	No	ASCII, selection of 30 fonts	1,585
Sprint II plus		40, 55	132, 197	Yes	No	ASCII, selection of 30 fonts	1,680
<b>SILVER-REED</b>							
EXP 500	daisywheel	14		Yes	No	Courier 10, 12, Gothic	599
EXP 550	daisywheel	17		Yes	No	Courier 10, 12, Gothic	895
EXP 770	daisywheel	31		Yes	No	Courier 10, 12, Gothic	1,195
<b>SMITH CORONA</b>							
TP-1	daisywheel	12	105	No	No	10 fonts available	695
TP-2	daisywheel	12	105	No	No	10 fonts available	749
<b>TELETEX COMMUNICATION CORP.</b>							
TTX-1014	daisywheel	12, 14	115, 173	No	No	Prestige, Courier, Mikron, Cubic, Orator	649
<b>TRIVEX, DIV. OF MOHAWK DATA SCIENCES</b>							
8010		55	132	No	No	EBCDIC, ASCII	5,235
<b>VIVITAR COMPUTER PRODUCTS (FORM. TRANSTAR)</b>							
120S	daisywheel	14	120	Yes	No	Courier 10, 12 Prestige elite, pica, script	650
130S	daisywheel	18	132	Yes	No	Courier 10, 12 Prestige elite, pica, script	950
140S	daisywheel	40	132	Yes	No	all Diablo 630 plastic printwheels	1,695
<b>WANG LABORATORIES, INC.</b>							
2281WR/6581W	daisywheel	30, 35	198	No	No	39 multilingual printwheels	4,500/5,000
6581WC/2281WCR	daisywheel	30, 35	270	No	No	39 multilingual printwheels	7,000/6,000
DW-20	daisywheel	20	198	No	No	39 multilingual printwheels	2,695

# THE ANATOMY OF A THIN-FILM HEAD.



The thin-film head by Magnex. Henceforth, consider all other magnetic read-write heads obsolete.

Magnex designs and manufacturing methods have taken thin-film heads from a theoretical advance in the state-of-the-art to actuality.

Using Magnex thin-film heads, your next generation of disk drives will achieve significantly higher track densities. More accurately. And at a cost you thought was years away.

## Dry sputtering. For higher areal density.

The Magnex-developed dry sputter deposition process for permalloy will give your high-performance disk drive more desirable anisotropic magnetic properties.

As your areal density requirements increase, the Magnex dry sputtering process will provide increasingly higher frequencies via laminated poles.

## Consistent composition.

Dry sputtering controls permalloy composition within tight tolerances. Even at the apex or side-wall of a step. Uniform composition provides excellent magnetic properties.

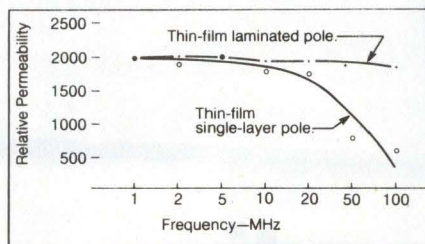
The result is minimum read-back noise. Important as future track widths become smaller and smaller.

## Trimming the poles.

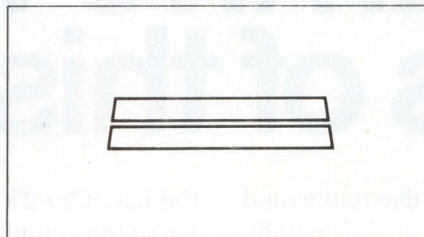
Magnex-patented "Poletrim"\* shaves upper and lower pole pieces to virtually identical widths. So side-reading is symmetrical, off-track

performance is enhanced.

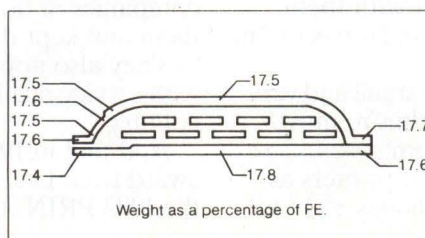
These perfectly aligned pole tips let you achieve higher track densities than with conventional thin-film heads. And they'll read/write more accurately on closely spaced tracks.



Permeability vs. Frequency  
Laminated and single-layer thin-film head pole pieces.



"Poletrim"\*  
Poles are trimmed to virtually identical widths.



Weight as a percentage of FE.

Cross section illustrates uniformity of pole composition.  
**CIRCLE NO. 22 ON INQUIRY CARD**

## We'll test your design.

Magnex is manufacturing production quantities of advanced thin-film heads. Today. And we can make heads that suit your specific application.

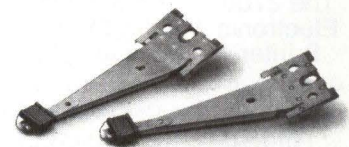
Your disk drive developments deserve a technology that will advance with you beyond today's requirements.

If you're seriously looking ahead, take advantage of our unique ability to perform magnetic and functional testing of your design. We'll work with you to optimize it.

We're anxious to talk with you about the Magnex family of PCM or newly-developed OEM thin-film heads. Or a design for individual applications.

Get in touch with us. Magnex Corporation, 6850 Santa Teresa Boulevard, San Jose, California 95119, (408) 281-1000, TELEX 176042.

\*"Poletrim" is a trademark of Magnex Corporation.



**MAGNEX**

Print & distribute 187 customer status reports.

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Yellow paper.

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United Charities letter for employees.  
Use logo & Pres. Sig.

Charts for sales meetings.  
Ask Bob for number.

# If you can live without o 90 days of this, we'll tak



**The 2700 Electronic Printer.**

You might think an offer like that would be a risky thing for us. But you'd be wrong. Because almost everyone who tries our 2700 distributed electronic printers finds they really can't bear to part with them.

They're just too efficient and too economical to give up.

You see, since they're very small and very quiet, you can put them exactly where they're most convenient for the people who need them.

And, since they function as high speed printers as well as letter-quality printers, you save money right off

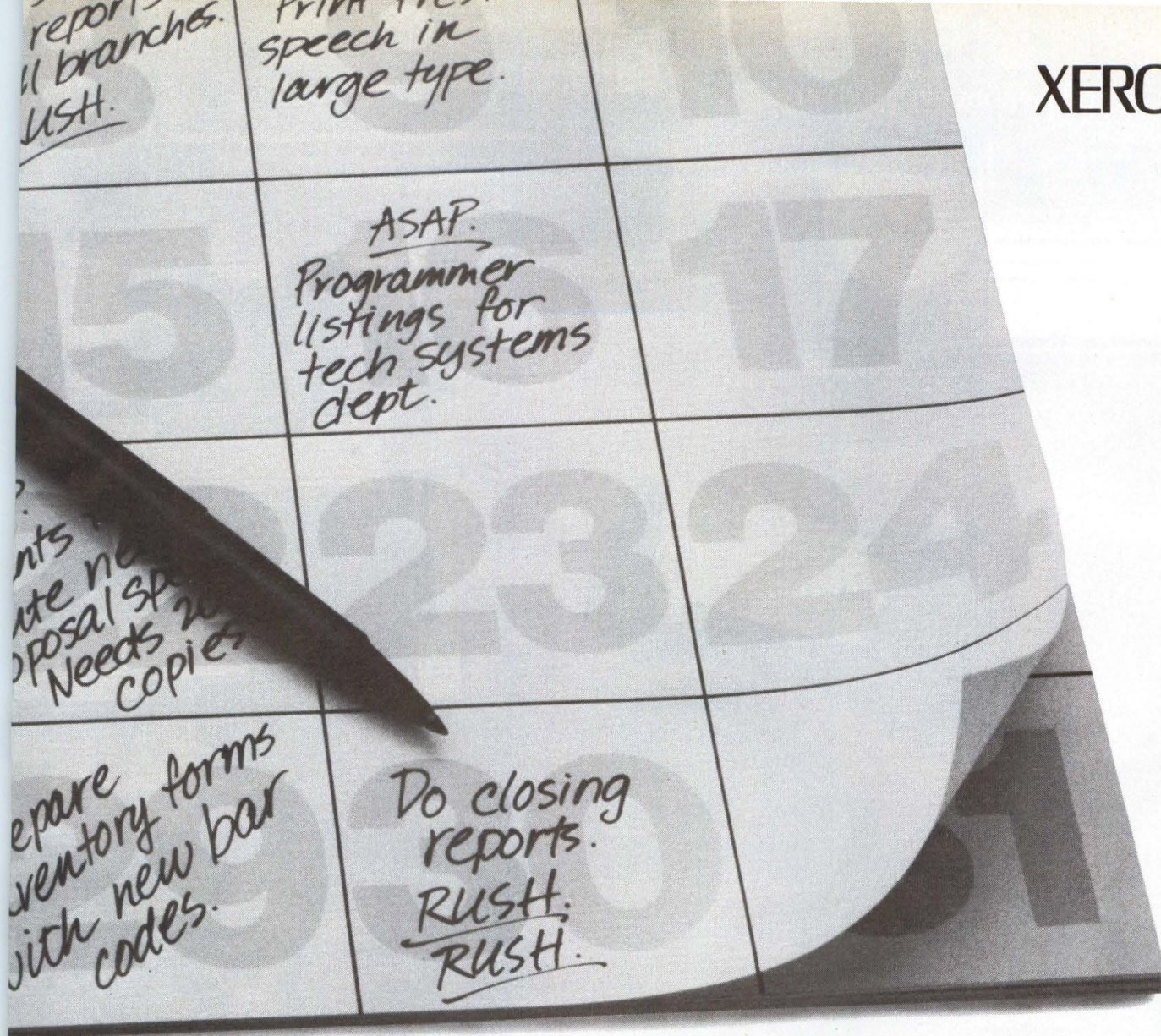
the bat. (Our 2700s can actually print out at up to 12 pages per minute and still give you an impressive print-shop look.)

But those are only a few of the reasons hundreds of companies in dozens of different industries have tried them and kept them.

They also appreciate the fact that the 2700 comes with service available in more than 100 cities across the country.

And that in 1982 it won the Printer of the Year award from Datek Information Services, publishers of the 1983 PRINTOUT annual.

XEROX



# Use your Xerox 2700 after 90 days and give it back.

So, if you still feel we're running a risk with our offer, please feel free to take advantage of us.\*

To arrange for a nearby demonstration, just call Xerox Printing Systems Division, toll-free, at 1 (800) 556-1234, Ext. 95. In California, 1 (800) 441-2345, Ext. 95. Or send in our coupon.

Then, simply have our local sales office qualify you under our order qualification procedure and you'll have your very own 2700 to use for at least 90 days.

We say at least only because we know you'll keep it a lot longer than that.

And probably order more.

You caught my interest. Tell me where I can see a demonstration and how I can qualify for your special 90-day offer on the Xerox 2700.

MMSPD 11/83

Name/Title \_\_\_\_\_

Company \_\_\_\_\_

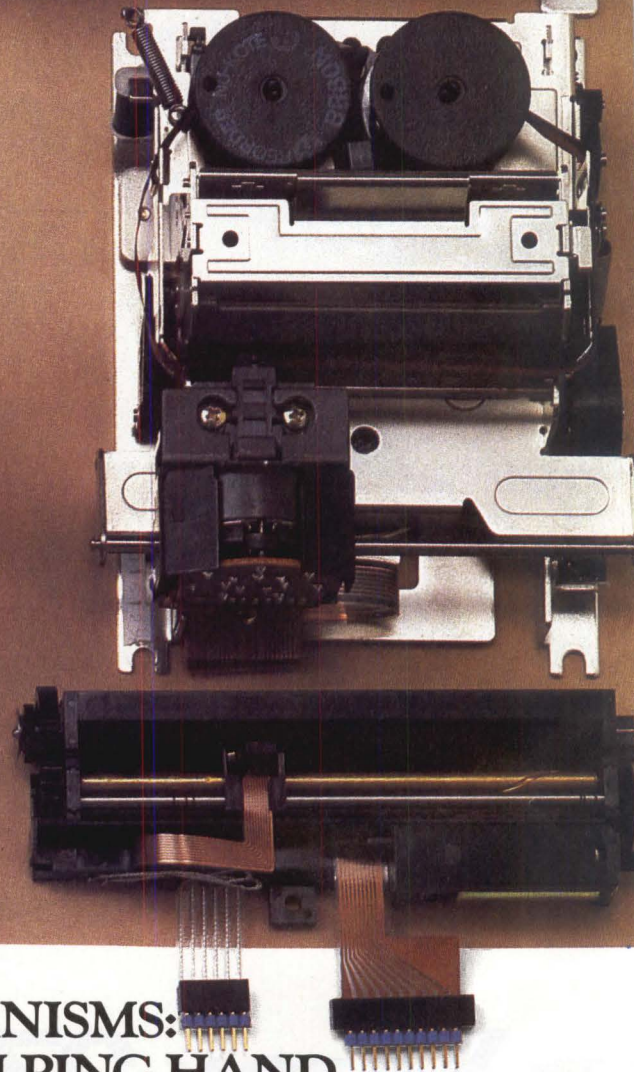
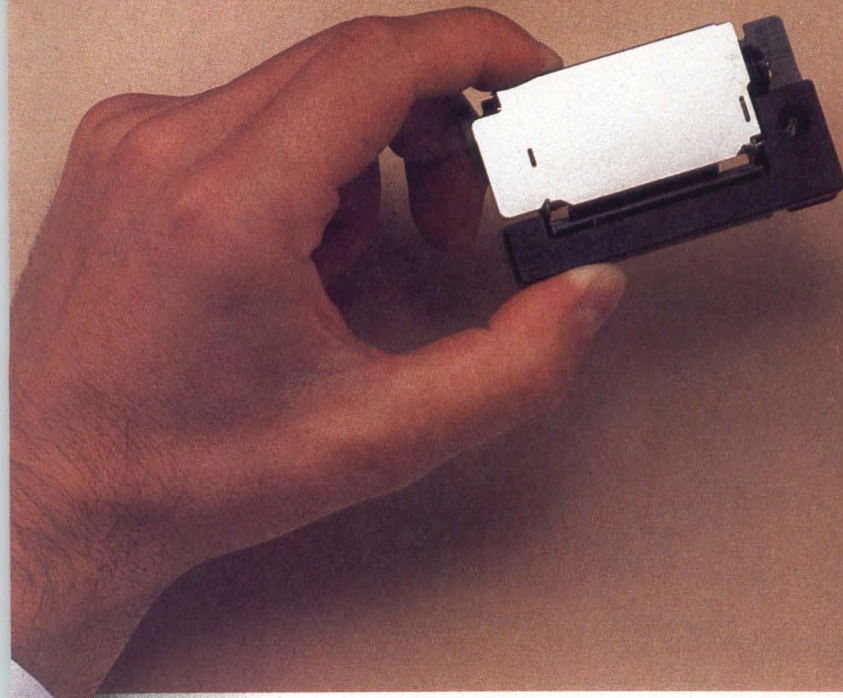
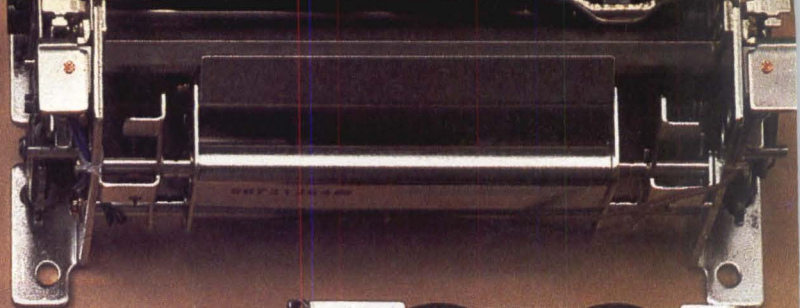
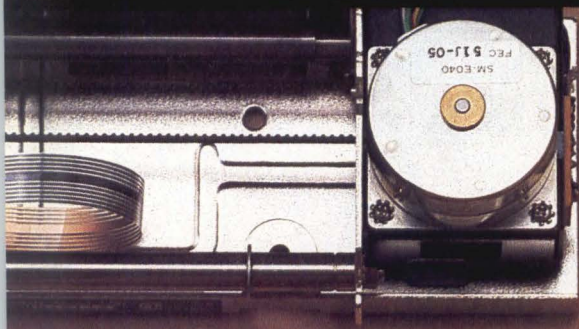
Street \_\_\_\_\_ City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_ Phone ( ) \_\_\_\_\_

Mail to: Keith Davidson, Xerox Printing Systems Division, 880 Apollo Street, El Segundo, CA 90245.

\*This offer is only available through our standard lease plans. It expires on December 31, 1983.

EPSON QUALITY PRODUCTS FOR THE OEM.



## EPSON PRINTER MECHANISMS: THEY COME WITH A HELPING HAND.

PORTABLE/HAND-HELD COMPUTER PRINTERS				
Model	Head	Columns	Speed	Weight
M1XX	Impact Shuttle	16 to 40	0.4 to 0.7 LPS	2.1 oz
M2XX	7 wire impact	21 to 31	2.4 LPS	28.0 oz
M5XX	7 wire impact	40	3.0 LPS	59.0 oz
M12XX	Thermal	40	0.5 LPS	5.2 oz
M3XXX	9 wire impact	80	80 CPS	4.4 lb

That's how we got where we are. By caring about your problems. Lending you a helping hand in selecting a printer for your application. Helping you package it as an integral part or as a stand-alone. And always delivering a cost-effective, quality solution. On schedule.

The printer mechanisms shown here can easily be designed into portable and hand-held computers. We have many more. In many variations. For many applications. Call or write us today. Let us start by giving you a helping hand.

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You've heard that Epson delivers more printer mechanisms than anyone else. That's true. More than 600,000 shipped per month.

You've heard that our out-of-box failure rate is measured in 10ths of a percent. True again.

But maybe you're concerned that the leader in ECR and POS printers is too busy to worry about your application. *Not a chance!*

# EPSON

EPSON AMERICA, INC.

OEM Products Division  
Printer Group

3415 Kashiwa Street, Torrance,  
CA 90505 (213) 534-0360  
or 533-8277 Telex 182412

CIRCLE NO. 24 ON INQUIRY CARD

## MATRIX SERIAL PRINTERS

Matrix serial printers

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets/code	Unit price (\$)
<b>ADDMASTER CORP.</b>								
171	impact (7 x 5)	50	18, 21	no	no	no	ASCII, baudot	299
<b>ALPHACOM INC.</b>								
1842	thermal (5 x 7)	80	40	yes	no	no		160
8125	thermal (5 x 7)	100	80	yes	no	no		215
<b>ANACOM GENERAL CORP.</b>								
150	impact (9 x 9)	150	80, 136	no	no	no		1,495
150Z	impact (9 x 12)	150	85, 132	yes	no	yes	ASCII, graphics, italics	1,895
160	impact (9 x 9)	150	80, 136	no	no	no		1,750
160Z	impact (9 x 12)	150	85, 132	yes	no	yes	ASCII, graphics, italics	2,150
<b>ANADEX INC.</b>								
DP-6500A	impact (18 x N)	500	80, 220	yes	no	yes		2,995
DP-9000A	impact (9 x 9)	150	80	yes	no	no		1,625
DP-9001A	impact (11 x 9)	120	80, 133	yes	no	no		1,625
DP-9500A	impact (9 x 9)	150	80, 176	yes	no	no		1,725
DP-9501A	impact (11 x 9)	120	80, 220	yes	no	no		1,725
DP-9620A, DP-9625A	impact (13 x 9)	200	80, 220	yes	no	no		1,850; 1,995
DP-9725A	impact (13 x 9)	200	80, 220	yes	yes	yes		2,350
WP-6000A	impact (18 x N)	230	80, 220	yes	no	no	Helvetica, italics, scientific	2,700
<b>ANDERSON JACOBSON INC.</b>								
864	impact (5 x 9)	180	132, 225	yes	no	yes	ASCII, APL, graphics	2,995
<b>APPLE COMPUTER INC.</b>								
Dot Matrix	impact	120	136	yes	yes	no		695
<b>AXIOM CORP.</b>								
EX-1620	electrostatic (11 x 20)	960	160	yes	no	no		795
EX-420	electrostatic (11 x 20)	550	128	yes	no	no		745
IMP-4	impact (5 x 9)	100	137	yes	no	yes		699
<b>BDS CORP.</b>								
GP-300	impact (18 x 50)	300	220	yes	yes	yes	bar code, OCR	
<b>BURROUGHS CORP.</b>								
AP1340	impact (9 x 7)	230	132, 220	no	no	no	international	3,590
AP310	impact (9 x 7)	90	82, 132	no	no	no	international	1,895
B9252	impact (9 x 7)	150	132, 220	no	no	no	international	1,995
B9253	impact (9 x 7)	120	66, 132	yes	no	no	international	895
<b>C. ITOH ELECTRONICS INC.</b>								
1550B	impact (7 x 9)	120	136	yes	no	no		995
1550S	impact (7 x 9)	120, 180	136	yes	no	no		1,295
8510B	impact (9 x 9)	120	80	yes	no	no	graphics	725
8510S	impact (9 x 9)	180, 120	80	yes	yes	no		895
8600	impact	180, 90, 6	80	yes	yes	no	graphics	1,395
<b>CANON USA INC.</b>								
A-1200	impact (9 x 7)	120	80, 40, 136	yes	no			595
X-8220A	impact (5 x 7)	60, 120	136	no	no			995
<b>CENTRONICS DATA COMPUTER CORP.</b>								
122	impact (11 x 8)	120	132	yes	no	no	ASCII	995
150	impact (9 x 7)	150	40, 132	no	no	no	ASCII	
152	impact (9 x 7)	150	66, 216	no	no	no	ASCII	
159	impact (9 x 7)	150	40, 132	no	no	no	ASCII	
351	impact (7 x 9)	200, 65		yes	no	yes	international	2,195
352	impact (7 x 8)	200		yes	no	no	international	1,795

## MATRIX SERIAL PRINTERS

Matrix serial printers

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets code	Unit price (\$)
353	impact (7 x 8)	200, 65		yes	no	yes		2,495
357	impact (7 x 8)	400		yes	no	no	96ASCII, international	2,995
358	impact (7 x 9)	400, 100		yes	yes	yes	96ASCII, international	3,395
<b>COMPRINT INC.</b>								
912-Series	electrosensitive (12 x 9)	225	80	no	no	no		595
<b>COMPUTER TRANSCEIVER SYSTEMS INC.</b>								
420 RO	impact (7 x 5)	80	140	yes	no	no		795
P 200	thermal (7 x 5)	120	136	yes	no	no		
<b>COOSOL INC.</b>								
101B-80E	impact (14 x 7)	110	88	yes	no	yes	96ASCII	325
<b>CRADEN PERIPHERALS CORP.</b>								
DP4	impact (7 x 9, 9 x 9)	150, 125		no	no	no	96ASCII	
<b>DATA IMPACT PRINTERS</b>								
84G	impact (7 x 7)	100	132	yes	no	yes		795
81	impact (7 x 7)	100		no	no	yes		449
92	impact (7 x 9)	100		yes	no	yes		695
<b>DATA MACHINES INTERNATIONAL</b>								
40	impact (5 x 7)	80	40	yes	no	yes		250
<b>DATAPOINT CORP.</b>								
9621	impact (9 x 9)	160	132	no	no	yes		2,500
9628	impact (9 x 9)	160	80, 132	no	no	no		995
<b>DATAPRODUCTS CORP.</b>								
M-100	impact (9 x 14)	140	132	yes	no	no		3,000
M-120	impact (7 x 7)	180	132	no	no	no		2,700
M-200	impact (7 x 7)	340	132	no	no	no		3,000
480	impact (24 x 9, 18 x 9)	72, 75, 96, 110		yes	no	no	96ASCII, international	
P 132	impact (24 x 9, 18 x 9)	110, 200	132	yes	yes	no	international, scientific	1,499
P 80	impact (24 x 9, 18 x 9)	110, 200	80	yes	yes	no	international, Greek, math	1,299
<b>DATASOUTH COMPUTER CORP.</b>								
180	impact (9 x 7)	180	132, 158, 217	yes	no	no		1,595
DS220	impact (9 x 7, 9 x 15, 18 x 48)	220, 100, 40	132, 158, 217	yes	no	yes	Helvetica 10, Courier 10	1,995
<b>DATEL-INTERSIL</b>								
APP-20A1	thermal (5 x 7)	21	20	no	no	no	ASCII	625
APP-48A1	thermal (5 x 7)	57	48	no	no	no	96ASCII	995
<b>DECISION DATA COMPUTER CORP.</b>								
6541-02	impact (5 x 7)	150	132	no	no	no	ASCII, EBCDIC	4,195
6541-05	impact (5 x 9)	150	132	no	no	no	DSC, EBCDIC	5,314
<b>DIGITAL ASSOCIATES CORP.</b>								
M-100	impact (9 x 14)	140	66, 132, 218	yes	no	no	128ASCII	
M-120	impact (7 x 7)	180	66, 132, 218	yes	no	no	128ASCII	
M-200	impact (7 x 7)	340	66, 132, 218	yes	no	no	128ASCII	
<b>DIGITAL EQUIPMENT CORP.</b>								
LA 100	impact (9 x 9)	240	216	yes	no	yes	Courier, Orator	2,860
LA12	impact (9 x 9)	150	132	yes	no	no		1,995
LA120	electrostatic (7 x 7)	180	216	no	no	no		2,750
LA120	impact (7 x 7)	180	216	no	no	no		2,750
LA34/38	impact (9 x 7)	30	216	yes	no	no		1,270
LA50	impact (7 x 9)	100	132	yes	no	no		850



## MATRIX SERIAL PRINTERS

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets code	Unit price (\$)
<b>DIGITEC CORP.</b>								
6430	electrostatic (7 x 5)	50	21, 32	no	no	no		399
6431	electrostatic (7 x 7)	50	21, 32	no	no	no		549
6433	electrostatic (7 x 5)	50	21, 32	no	no	no		430
6470	thermal (7 x 5)	50	21	no	no	no		445
6610	impact (7 x 5)	16	24	yes	no	no		495
6630	impact (7 x 5)	16	16 to 22	yes	no	no		565
<b>DURANGO SYSTEMS INC.</b>								
Poppywriter	impact (9 x 9, 36 x 18)	165, 40	132	yes	no	yes		2,495
<b>EATON CORP.</b>								
4000 +	impact (9 x 7)	120	40	yes	no		96ASCII	1,295
7000 +	impact (7 x 7)	50	40	yes	no		96ASCII	425
<b>ENVISION</b>								
420	impact 18 wire print head	100 to 300		yes	yes	yes	pica, Orator, script, bold, italics	4,450
430	impact 18 wire print head	100 to 300		yes	yes	yes	pica, Orator, script, bold, italics	5,450
<b>EPSON AMERICA INC.</b>								
FX-80	impact (9 x 9 to 18 x 18)	160	80, 132	yes	no	yes	96ASCII, international	699
RX-80	impact (9 x 9 to 18 x 18)	100	80, 137	yes	no		96ASCII, international, 96 italic	494
RX80-FT	impact (9 x 9, 18 x 18)	100	40, 48, 68, 80, 96, 137	yes	no		elite, pica, italics	599 (Q1)
<b>EXTEL CORP.</b>								
ComScribe	impact (12 x 28)	60	80	no	no	no	128ASCII, baudot	695
<b>FACIT/DATAROYAL</b>								
4510	impact (9 x 15)	100	40, 80	yes	no	no		695
4542	impact (9 x 9)	250	150	yes	yes	no		4,125
4544	impact (9 x 9)	250	150	yes	yes	no		
4570	impact (9 x 9)	250			no	yes		3,995
IPS 5000	impact (9 x 9)	125	80, 136	no	no	no	96ASCII	1,110
IPS 5000A	impact (9 x 9)	150	80, 136	no	no	no	96ASCII	1,160
IPS 5000C	impact (9 x 9)	165	80, 136	yes	no	no		1,595
IPS 5000V	impact (9 x 9)	165	80, 136	yes	no	yes	bar code	2,095
<b>FLORIDA DATA CORP.</b>								
OSP 120	impact	600	237	yes	no	yes		3,900
OSP 125	impact	600	237	no	no	yes		4,300
OSP 130	impact	600	237	yes	no	yes		4,100
<b>FUJITSU AMERICA INC.</b>								
DPL24	impact (24 x 180)	80	136	yes	no	no	Courier 10, Prestige elite, bold	1,995
DPLM24	impact (24 x 180)	60	80	yes	no	no	Courier 10, Prestige elite, bold	1,450
TTP16	thermal (16 x 20)	30	80		yes	no	Courier 10, Prestige elite	625
<b>GENERAL ELECTRIC CO.</b>								
200 RO	impact (7 x 9)		136	no		no		2,270
200RO Forms Access	impact (7 x 9)	200	136	no		no	ASCII	2,840
2030 RO	impact (9 x 7)	60	132	yes		no	94ASCII, international	1,175
2120 RO	impact (9 x 7)	150	132	yes		no	94ASCII, international	2,120
3014	impact (9 x 9, 9 x 18, 7 x 14)	160, 80, 40	136	yes	no	yes	96ASCII, graphic	1,350
3024	impact (9 x 9, 9 x 18, 7 x 14)	200, 100, 50	136	yes	no	yes	96ASCII, graphic	1,550

# DIRECTORY TO SELECTING DISK AND TAPE CONTROLLERS

## Q-BUS (LSI-11—11/23 PLUS AND MICRO PDP-11)

### DISK CONTROLLER, 14" Cartridge (2315 or 5440) Model DQ100

Emulates RK05. Interfaces Diablo, Pertec and RK05J compatible I/O. RT-11/RSX-11 compatible. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O compatible. Model DQ202A

Emulates RP02/RP03. Universal Formatting. RT-11, RSX-11 and RSTS compatible. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O compatible. Model DQ214

Emulates RL01/RL02. Universal Formatting. 56-bit ECC. 22-bit addressing. RT-11, RSX-11 and RSTS. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O compatible. Model DQ215

Emulates RK06/RK07. Universal Formatting. 56-bit ECC. 22-bit addressing. RT-11, RSX-11 and RSTS. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O compatible. Model DQ228

Emulates RM02/RM05/RM80. Universal Formatting. 56-bit ECC. 22-bit addressing. RT-11, RSX-11 and RSTS. Quad board.

### DISK CONTROLLER, 8" Disk Drive Controller. Model DQ404

Emulates RL01/RL02. Universal Formatting. SA4000 I/O compatible. RT-11, RSX-11 and RSTS compatible. Quad board.

### DISK CONTROLLER, 8" and 14" Disk Drive Controller. Model DQ413

Emulates RP02/RP03. Priam I/O compatible. RT-11, RSX-11 and RSTS compatible. Quad board.

### DISK CONTROLLER, 8" and 14" Disk Drive Controller. Model DQ414

Emulates RL01/RL02. Universal Formatting. Priam I/O compatible. RT-11, RSX-11 and RSTS compatible.

### DISK CONTROLLER, 5 1/4" Disk Drive Controller. Model DQ614

Emulates RL01/RL02. Universal Formatting. ST506/412 I/O compatible. 32-bit ECC. 22-bit addressing. RT-11, RSX-11 and RSTS. Dual Height.

### DISK CONTROLLER, 5 1/4" Disk Drive Controller. Model DQ615

Emulates RK06/RK07. Universal Formatting. ST506/412 I/O compatible. 32-bit ECC. 22-bit addressing. RT-11, RSX-11 and RSTS. Dual Height.

### DISK CONTROLLER, 5 1/4" Disk Drive Controller. Model DQ634

Emulates RL01. DMA Systems Micro Magnum compatible. 32-bit ECC. 22-bit addressing. RT-11, RSX-11 and RSTS. Dual Height.

### 1/2" MAGNETIC TAPE DRIVE CONTROLLER Model DQ120

Emulates TM-11. Industry Standard I/O. Pertec compatible. Quad board.

### 1/2" MAGNETIC TAPE DRIVE COUPLER Model DQ130

Emulates TM-11. Formatted Industry Standard I/O. (Pertec formatted I/O) and 1/4" streamer tape drive compatible. Quad board.

### 1/2" MAGNETIC TAPE DRIVE COUPLER Model DQ132

Emulates TSV05/TS-11/TU-80 (22-bit)...Formatted Industry Standard I/O (Pertec formatted I/O) and 1/2" streamer and CacheTape drive compatible. Quad board.

### 1/4" CARTRIDGE TAPE DRIVE CONTROLLER Model DQ330

Emulates TM-11/TS03. Interfaces Kennedy 6455. Quad board.

### FLOPPY DISK DRIVE CONTROLLER 8" Model DQ409

Emulates RX02. Interfaces Shugart SA850 Floppy I/O. Dual Height.

### FLOPPY DISK DRIVE CONTROLLER 5 1/4" Model DQ619

Emulates RX02. Interfaces Industry Standard I/O. 22-bit addressing. Dual Height.

## UNIBUS (PDP AND VAX)

### DISK CONTROLLER, 14" Cartridge (2315 or 5440). Model DU100

Emulates RK05. Interfaces Diablo, Pertec and RK05J compatible I/O. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O Compatible. Model DU202A

Emulates RP02/RP03. Universal Formatting. Interfaces SMD I/O. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O Compatible. Model DU215

Emulates RK06/RK07. Universal Formatting. 56-bit ECC. Interfaces SMD I/O. VAX. Quad board.

### DISK CONTROLLER, 8" and 14" SMD I/O Compatible. Model DU218

Emulates RM02/RM05. 56-bit ECC. Interfaces SMD I/O. Hex board.

### 1/2" MAGNETIC TAPE CONTROLLER Model DU120

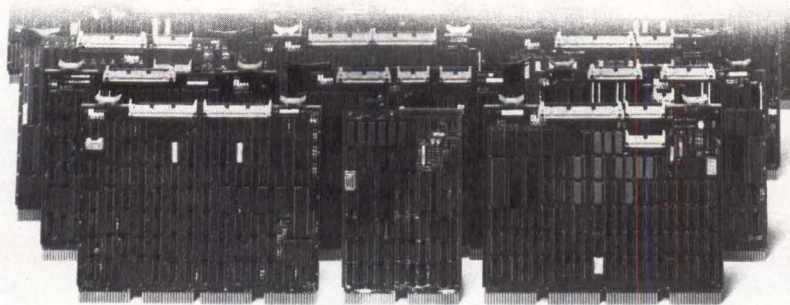
Emulates TM-11. Interfaces Industry Standard I/O (Pertec Compatibility). Quad board.

### 1/2" MAGNETIC TAPE COUPLER Model DU130

Emulates TM-11. Interfaces Formatted Industry Standard I/O (Pertec formatted I/O) and 1/2" streamer tape drive compatible. Quad board.

### 1/2" MAGNETIC TAPE COUPLER Model DU132

Emulates TS-11/TU80. Interfaces Formatted Industry Standard I/O (Pertec formatted I/O) and 1/2" streamer and CacheTape drive compatible. VAX. Quad board.



**D I L O G**

### DISTRIBUTED LOGIC CORPORATION

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## MATRIX SERIAL PRINTERS

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets code	Unit price (\$)
3180	impact (9 x 9)	180	136	yes	no	no	96ASCII, graphics	2,030
3184	impact (9 x 9, 9 x 18, 7 x 14)	180, 45	136	yes	yes	yes	96ASCII, graphics	2,230
3300	impact (9 x 9, 7 x 7)	300, 200	136	yes	no	no	96ASCII, graphics	2,250
3304	impact (9 x 9, 9 x 18, 7 x 7, 7 x 14)	300, 200, 100	136	yes	yes	no	96ASCII, graphics	2,490
3400	impact (9 x 9)	400	136	yes	no	no	96ASCII, graphics	2,450
3404	impact (9 x 9, 9 x 18, 7 x 14)	400, 100	136	yes	yes	yes	96ASCII, graphics	2,650
<b>HEWLETT-PACKARD CO.</b>								
2671A/G, 2673A	thermal (9 x 12)	120	80	yes	no	no		1,240
2932A (33A) (34A)	impact (9 x 12)	200, 100	136	yes	no	no	Cubic, Courier	2,000
<b>HI-G PRINTERS CORP.</b>								
9/40ME	impact (9 x 9)	150	40	yes	yes	yes	96ASCII	250 (Q200)
9/80ME	impact	150	80	no	no	yes	96ASCII	299 (Q264)
9/80PS	impact (9 x 9)	150	80	yes	no	no	96ASCII	1,050
9/132	impact (9 x 9)	150	132	yes	no	no	96ASCII	1,295
Durawriter	impact (9 x 9)	165	132	yes	no	no	96ASCII	1,395
<b>HONEYWELL INFORMATION SYSTEMS INC.</b>								
PRU 1005/7005	impact (7 x 7)	120	132	no	no	no	96ASCII	3,390
PRU 7070/7071	impact (9 x 7)	100	80, 132	yes	no	yes	96ASCII	1,195
PRU 7075/7076	impact (9 x 7)	100	132, 220	yes	no	yes	96ASCII	1,495
PRU 7270/7271	impact (7 x 7)	400	132	no	no	no	96ASCII	3,450
<b>INFOSCRIBE INC.</b>								
1000	impact (7 x 9, 14 x 9)	100, 200	136	yes	no	no	ASCII, international	985 (Q100)
1100	impact (7 x 9, 14 x 9)	40, 200	136	yes	no	yes	ASCII, international	1,061 (Q100)
1200	impact (7 x 9)	40, 200	132	yes	yes	yes	ASCII, international	1,396 (Q100)
1500	impact (9 x 9, 18 x 9)	200, 400	132	yes	no	no	ASCII, international	1,676 (Q100)
500	impact (9 x 9, 18 x 9)	75, 150	136	no	no	no	ASCII, international	830 (Q100)
<b>JAPAN DIGITAL LABORATORY (JDL)</b>								
P-200	impact (18 x 24)	70	80, 132	yes	no	yes	Gothic, Courier, italic	2,099
P-700	impact (18 x 24, 10 x 14)	145, 70	132	yes	no	yes	Gothic, Courier, italic	2,195
<b>LEADING EDGE PRODUCTS</b>								
Prowriter II 1550	impact (9 x 7)	120		yes	no	no	pica, elite	
<b>LEAR SIEGLER/DATA PRODUCTS DIV.</b>								
VersaPrint 500	impact (7 x 9, 14 x 9, 14 x 8)	45, 90, 180	136, 163, 224	yes	no	yes	USASCII, UKASCII, German, French, Swedish, Finnish, Danish, Norwegian	1,695
<b>MANNESMANN TALLY</b>								
Spirit	impact (9 x 8)	80	80, 142	yes	no		ASCII, italics	399
160	impact (18 x 20, 9 x 7)	40 to 160	80 to 160	yes	no			698
180	impact (18 x 20, 9 x 7)	40 to 160	132 to 264	yes	no			998
1600	impact (9 x 7)	200	132 to 218	yes	no		96USASCII	1,695
1800	impact (18 x 40, 9 x 7)	50 to 200	132 to 218	yes	no		Sans Serif, Orator	1,995

## MATRIX SERIAL PRINTERS

Matrix serial printers

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets/code	Unit price (\$)
<b>MEMOREX COMMUNICATIONS GROUP</b>								
1300	impact (7 x 7)	100	80	no	no	no		950
2087	impact (7 x 9)	180	132	no	no	no		5,995
<b>MEPCOM INTERNATIONAL INC.</b>								
EZ Print 21	impact (5 x 7)	60	21	yes	no	no	scientific	995
EZ Print 40	impact (5 x 7)	48	40	yes	no	no	scientific	1,295
<b>MICRO PERIPHERALS INC.</b>								
PrintMate 99	impact (7 x 9, 9 x 11)	100		yes	no	yes	USASCII	599
PrintMate 150	impact (7 x 9, 9 x 11)	150		yes	no	yes	USASCII	995
<b>MODULAR COMPUTER SYSTEMS (MODCOMP)</b>								
4228	impact	150	132	no	no	yes		4,140
<b>MOTOROLA INC.</b>								
702	impact (7 x 7)	120	10 to 132	no	no	yes	64ASCII	2,500
703	impact (7 x 7)	180	10 to 132	no	no	yes	96ASCII	3,125
<b>NCR CORP.</b>								
2600	thermal (5 x 8)	30	80	no	no	no	ASCII	
6410	impact (7 x 7)	90	80	no	no	no	ASCII	
6425	thermal (5 x 7)	240	80	no	no	no	ASCII	
6441	impact (7 x 7)	180	132	no	no	no	64ASCII	
<b>NEC INFORMATION SYSTEMS INC.</b>								
Pinwriter P1	impact (7 x 9 to 13 x 9)	180, 90	80	yes	no	no	pica, elite	799
Pinwriter P2	impact (7 x 9 to 25 x 18)	180, 90, 35	80	yes	no	yes	pica, elite	799
Pinwriter P3	impact (7 x 9 to 25 x 18)	180, 90, 35	136	yes	no	yes	pica, elite	1,199
<b>NEWBURY DATA RECORDING</b>								
8820	impact (9 x 7)	150	132	yes	yes	no	UKASCII, USASCII, French, German, Danish, Norwegian, Swedish, Finnish	900 (Q100)
8830	impact (9 x 7)	180	132	yes	yes	no	USASCII, UKASCII, French, German, Danish, Swedish, Finnish, Norwegian	1,200 (Q100)
8840	impact (9 x 7)	240	132	yes	yes	no	USASCII, UKASCII, French, German, Danish, Norwegian, Swedish, Finnish	1,300 (Q100)
8850	impact (9 x 11, 9 x 7)	360, 480	132	yes	no	no	96ASCII	2,200
8905	impact (12 x 20, 12 x 8)	180	132	yes	yes	no	UKASCII, USASCII, French, German, Danish, Norwegian, Swedish, Finnish	1,250 (Q100)
8910	impact	160, 240	132	yes	yes	no	USASCII, UKASCII, international	1,400 (Q100)
8925	impact (12 x 20, 12 x 8)	120, 240	132	yes	yes	no	USASCII, UKASCII, French, German, Danish, Norwegian, Swedish, Finnish	1,600 (Q100)
8930	impact (12 x 20, 12 x 8, 12 x N)	120, 240	132	yes	yes	no	USASCII, UKASCII, Spanish, Italian, German, French, Swedish	1,800 (Q100)
8931	impact (12 x N)	120, 240	132	yes	yes	no	USASCII, UKASCII, Spanish, Italian, German, French, Swedish, Danish	1,900 (Q100)
<b>NORTH ATLANTIC INDUSTRIES (QANTEX DIV.)</b>								
7030	impact (4 x 5, 9 x 7, 9 x 12, 24 x 18)	180, 150, 75, 37	136, 244	yes	no	yes	APL, Courier, scientific, trend, cubic, OCR A, italic	1,995
7020	impact (4 x 5, 9 x 7, 9 x 12)	180, 75	136, 244	yes	no	yes	APL, trend, Courier	1,625
7040	impact (4 x 5, 9 x 7, 24 x 18)	180, 150, 75, 37	136, 244	yes	no	yes	APL, Courier, trend, scientific, cubic, OCR A	2,195
<b>NOVELL DATA SYSTEMS INC.</b>								
I-800	impact	150	80, 224	no	no	yes	96USASCII, Korean	1,295



## THE PERSONAL PRINTER BUILT LIKE A SHERMAN TANK PERFORMS LIKE A STRADIVARIUS.

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# OKIDATA

Mt. Laurel, NJ 08054

A subsidiary of Oki Electric Industry Company Ltd.

## MATRIX SERIAL PRINTERS

Matrix serial printers

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets code	Unit price (\$)
<b>OKIDATA CORP.</b>								
ML 80	impact (9 x 7)	80	80, 132	yes			96ASCII	440
ML 82A	impact (9 x 9)	120		yes			96ASCII	549
ML 83A	impact (9 x 9)	120	136, 224	yes			96ASCII	899
ML 84	impact (9 x 9)	50, 200	136, 231	yes			96ASCII	1,395
ML 92	impact (9 x 9)	40, 160	80/136	yes			96ASCII	699
ML 93	impact (9 x 9)	40, 160	136, 233	yes			96ASCII	1,249
Pacemark 2350	impact (9 x 9)	350	136, 233	yes	yes		96ASCII	2,695
Pacemark 2410	impact	85, 350	136, 233	yes	yes		96ASCII	2,995
TH 240	thermal (7 x 5)	320	80	yes	no	no		850
<b>PANASONIC INDUSTRIAL CO.</b>								
KX-P1090	impact (9 x 9)	80, 96	80, 96	yes	no		pica, elite	499
KX-P1160	impact (9 x 13)	165, 196	136, 272	yes	no		pica, elite	1,750
<b>PHILIPS PERIPHERALS</b>								
GP300	impact (9 x 9, 18 x 25, 18 x 50, 36 x 50)	80 to 300	120, 144	yes	no	no	data, Gothic	3,300
GP300L	impact (9 x 9, 18 x 25, 18 x 50, 36 x 50)	80 to 300	144, 120	yes	yes		data, Gothic	3,500
<b>PLESSEY PERIPHERAL SYSTEMS</b>								
LC11	impact (9 x 9)	150	132	yes	no	no		1,420
<b>PRACTICAL AUTOMATION INC.</b>								
8-Series	impact (9 x 7)	250	80	no	no	no	ASCII, European	675
<b>PRINTEK INC.</b>								
910	impact (9 x 9)	200	136, 227	yes	no	yes	96ASCII	1,595
920	impact (9 x 9)	340	136, 227		yes	yes	96ASCII	2,395
<b>PRINTER PRODUCTS DIV. OF CAPITOL CIRCUITS</b>								
100	impact (5 x 7)	65	27	no	yes	no		460
270	impact (5 x 7)	65	27	no	no	no		660
S100	impact (5 x 7)	65	27	no	yes	no		460
S400	impact (5 x 7)	150	40	no	no	no		775
S400L	impact (5 x 7)	48	40	no	no	no		845
S400T	impact (5 x 7)	150	40	no	no	no		775
<b>PRINTER SYSTEMS CORP.</b>								
PSC-M200	impact (7 x 7)	340	132	no	no	no	96USASCII	
PSC-MT1600	impact (7 x 9)	200	132	yes	no	no	96USASCII, European	
PSC-MT1800	impact (7 x 9, 40 x 18)	200, 50	132	yes	no	yes	96USASCII, European	
<b>QWINT SYSTEMS</b>								
RO 740 Series	impact (7 x 5)	65	140	yes	no			795
<b>RADIO SHACK</b>								
DMP 200	impact (N x 9)	120	132	yes	no			
DMP 2100	impact (16 x 11)	160	136	yes	no			1,995
DMP 400	impact (N x 9)	140	132	yes	no			
DMP 500	impact (N x 9)	220	132	yes	no			1,795
DMP 100	impact (7 x 5)	50	80	yes	no			399
<b>SANTEC CORP.</b>								
S700 Variflex	impact	32 to 390	236	yes	no	yes	scientific, graphics	3,600
<b>SCI SYSTEMS INC.</b>								
1110	electrosensitive (5 x 11)	2200	136	no	no	no		890 (Q100)
1180	electrosensitive	1100		no	no	no		1,005 (Q100)
<b>SIEMENS COMMUNICATIONS SYSTEMS INC.</b>								
PT-88-N2	impact (9 x 9)	80	80, 132	yes	no	no		765

# PIECE OF MIND

## CompuPro's System 816.

**The fastest, most cooperative computer you can buy.**

OEMs and systems integrators are busy people. Too busy to waste time with an uncooperative computer system. That's why every System 816 from **CompuPro** is built to work long and hard without a whine or a whimper.

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The System 816 squeezes more performance out of the IEEE-696/S-100 bus than any other system you can buy. A choice of CPUs—and up to 4 Mbytes of our exclusive M-Drive/H™ RAM disk—give multiple workstations all the speed and power they can ask for. Standard RAM memory is expandable to one megabyte or more.

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System 816 family supports Pascal, C, FORTH, BASIC, COBOL, PL/1, FORTRAN 77™ and more.

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**TWO INTERFACE OPTIONS:**  
4.84 MHz (NRZ I/O data) or 5.0 MHz (MFM I/O data, compatible to ST506/ST412). The transfer rates permit WREN to be matched with off-the-shelf controllers for easy systems integration.

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**HEADS** never land on data areas. All WREN drives use a dedicated media zone for head take-off and landing.

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The Model 9415 WREN disk drive gives you a host of value-added features. From microcomputer and LSI control logic to special-formula media, high technology has finally delivered a 5-1/4" winchester with more reliability.

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## MATRIX SERIAL PRINTERS

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets/code	Unit price (\$)
<b>SINGER DATA PRODUCTS</b>								
5010	impact	100	34	no	no	no	64ASCII	1,075
5010-463	impact	100	26	no	no	no	64ASCII	1,200
5080	impact (5 x 7, 10 x 7)	100	80	yes	no	no	96ASCII	395
<b>STAR MICRONICS INC.</b>								
Delta 10	impact (9 x 9)	160	80, 90, 136	yes	no	yes	96ASCII, international, graphics, italics	599
Delta 15	impact (9 x 9)	160	136, 164, 232	yes	no	yes		749
Gemini 10X	impact (9 x 9)	120	80, 96, 136	yes	no	yes	96ASCII, international, block graphics, italics	399
Gemini 15X	impact (9 x 9)	120	136, 164, 232	yes	no	yes	96ASCII, international, block graphics, italics	549
STX-80	thermal (5 x 9)	60	80	no	no	no	international, block graphics, 96ASCII	199
<b>SYNTEST CORP.</b>								
SP-2000	impact (7 x 5)	100	80	no	no	no	64ASCII	925
SP-302	impact (7 x 5)	50	40	no	no	no	64ASCII	482
SP-314	impact (7 x 5)	80	40	yes	no	yes	96ASCII	605
SP-400	thermal (7 x 5)	24	40	no	no	no	96ASCII	
<b>TELETYPE CORP.</b>								
43	impact (7 x 9)	30	132	no	no	no	ASCII	1,388
AP200	impact (7 x 7)	340	132	no	no	no	ASCII, EBCDIC	3,868
<b>TELPAR INC.</b>								
PL20C	thermal (5 x 8)	50	20	no	no	no	96ASCII	395
PS48C	thermal (5 x 7)	30	48	no	no	no	96ASCII	768
<b>TEXAS INSTRUMENTS INC.</b>								
743 RO	thermal (5 x 7)	30	80, 136	no	no	no		895
781 RO	thermal (5 x 7)	30	80	no	no	no		1,395
810 RO	impact (9 x 7)	150	132	no	no	no		1,645
840 RO	impact (9 x 7)	75	132	no	no	no		995
850 RO	impact (15 x 9, 9 x 9)	150	134	yes	no	yes		599
Enhanced 810 RO	impact (23 x 28)	225		yes	no	yes	Courier, Helvetica, elite	2,295
855	impact (9 x 9)	35, 150		yes		yes	96ASCII, Courier, Gothic, 10, 15, Prestige elite, Orator	
<b>TEXPRINT INC.</b>								
C-120	impact	180	165	yes	yes	yes		3,395
Decolor (kit)	impact	180	165	yes	yes	yes		995
Decplot (kit)	impact	180	165	yes	no	no		595
Texplot	thermal	30	80, 136	yes	no	no		450
<b>TRIFORMATION SYSTEMS INC.</b>								
LED-120	impact (2 x 3)	120	40	yes	no	no	Braille	14,500
<b>TRIVEX DIV. OF MOHAWK DATA SCIENCES</b>								
8087	impact	180	132	no	no	no	96EBCDIC, ASCII	4,500
<b>TWO DAY CORP. (TDC)</b>								
GPM-40-B	impact	100	40	yes	no	no		130 (Q1,000)
GPM-40-G/12	impact	100	40	yes	no	no		135 (Q1,000)
GPM-80-B	impact	150	80	yes	no	no		160 (Q1,000)
GPM-80-B/12	impact	100	80	yes	no	no		165 (Q1,000)
HPM-136	impact	150	136	yes	no	no		188 (Q1,000)
HPM-80 FT	impact	150	80	yes	no	no		

Matrix serial printers

## MATRIX SERIAL PRINTERS

Matrix serial printers

Company Model	Printing method (matrix size)	Printing speed (cps)	Chars./line	Graphics (yes/no)	Multicolor (yes/no)	Multipass (yes/no)	Character sets/code	Unit price (\$)
<b>WANG LABORATORIES INC.</b>								
2233/5533	impact (9 x 9, 9 x 7)	100, 120	158	no	no	no	draft	2,500, 3,500
2235/5535	impact (9 x 9, 9 x 7)	180, 220	132	no	no	no		3,500, 4,500
5577	impact (96 x 32, 48 x 16)	40 to 192	198	yes	no	yes	Courier, Prestige elite, draft	5,975
<b>WENGER DATENTECHNIK</b>								
Print S Matrix RO	impact (9 x 10)	160	80, 136	yes	no	no		940 (Q250)
WENGER 4/1	impact (18 x 36)	110, 400	136	yes	yes	no	data, OCR B, bar-code	2,490 (Q250)
<b>WESTREX OEM PRODUCTS</b>								
821	impact (7 x 5)	150	51	no	no	no	ASCII	230 (Q100)
840	impact (7 x 5)	150	40	no	no	yes	ASCII	202 (100)
<b>ZENITH DATA SYSTEMS</b>								
Z-125	impact (9 x 9)	150	217	no	no	yes	ASCII	1,499 (899 in kit form)

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# TEST YOUR I/O I.Q.

NAME *THE* WINCHESTER  
CONTROLLER COMPANY THAT:

- ✓ Increases your microcomputer system's I/O performance up to 5X;
- ✓ Delivers this performance for systems ranging from IBM PC/XT compatible machines up to UNIX-based multi-tasking systems;
- ✓ Provides the lowest cost controllers for each of these microcomputer system applications; and
- ✓ Is delivering, today, both ready-to-integrate VLSI-based controller boards, and chip sets to allow licensed manufacture or custom controller designs.

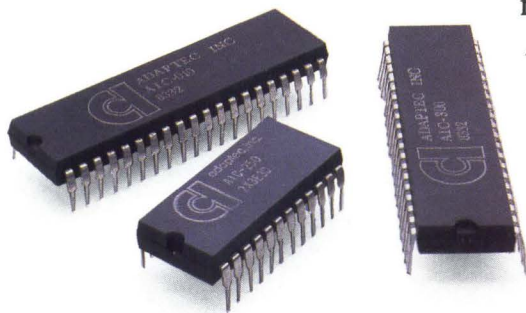


# TURN OUT THE LIGHTS

Adaptec's ACB-4000 high performance, low cost 5 $\frac{1}{4}$ " Winchester controller makes the competition look dim by comparison



**The Party's Over.** For our competition, that is. ACB-4000 features, like non-interleaved operation, provide up to 4X the performance of competitive controllers in I/O operations. Sector-level defect skipping slashes seek times while yielding more useable disk capacity. And extended SASI/ANSI SCSI compatibility means reduced system design time and device independent operation. So you can outshine your competition.



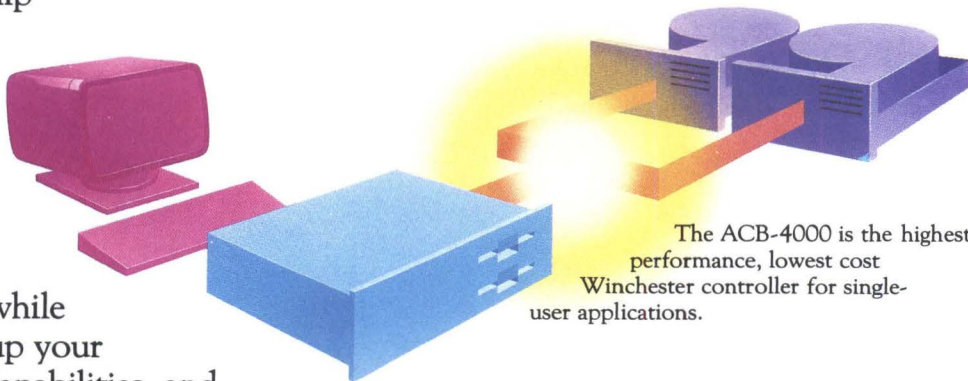
**The Lowest Cost.** At \$150.00 in high volume OEM quantities, the ACB-4000 is absolutely the lowest cost, high performance controller available. Its VLSI foundation means a reduced component count with only about half

the power consumption of competitive controllers. Fewer components also means higher reliability, further reducing cost of ownership.

**Make . . . Or Buy.** You can make the ACB-4000 for even less than \$150.00 using our ACS-4000 chip set, licensed firmware and PCB manufacturing information.

Of course, we'll get you to market fast with complete boards while you are ramping up your own production capabilities, and ramping down your costs.

Another bright idea from Adaptec.



The ACB-4000 is the highest performance, lowest cost Winchester controller for single-user applications.



## **BREAKING THE I/O BOTTLENECK.**

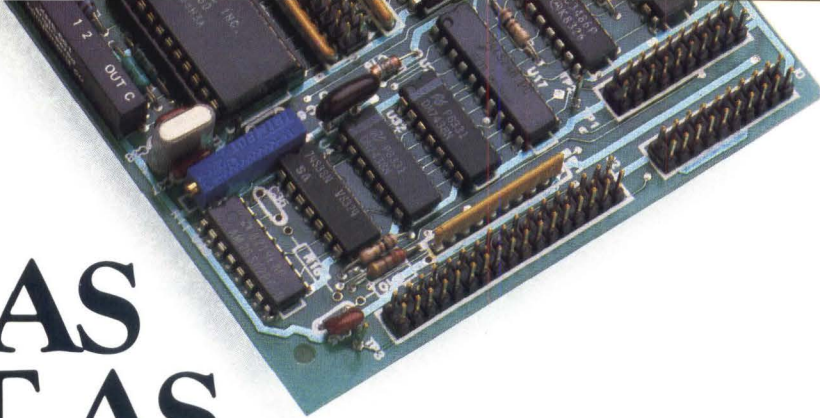
We broke the I/O performance and cost bottleneck with our \$150.00 ACB-4000 5¼" Winchester controller board. Now we've shattered it with the brightest, lowest cost family of controller products ever offered.

**A BRILLIANT FOUNDATION.** The stars of our controller products are 3 very special VLSI chips. Their architecture and functional partitioning allows us to quickly and inexpensively design boards or chip sets which optimize your system's potential.

**WE'RE DELIVERING NOW.** So take a look inside, then call us. Or clip and mail the coupon and we'll do the rest.

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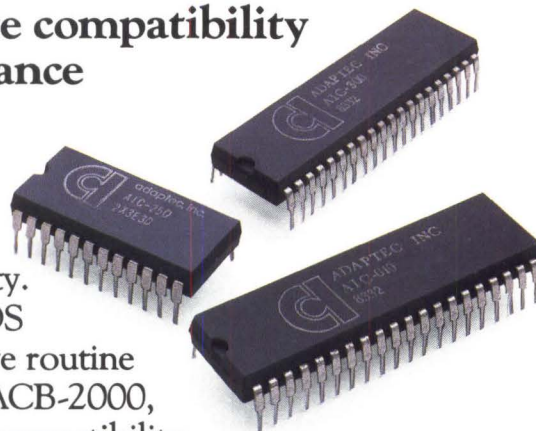




# SHINE AS BRIGHT AS IBM... OR BRIGHTER

Adaptec's IBM PC/XT compatible ACB-2002 and ACB-2000 offer *full compatibility*... or software compatibility with up to 5X system I/O performance

**Freedom of Choice.** Only Adaptec lets you deliver IBM PC/XT compatible systems two ways. The ACB-2002 controller board offers full software, hardware and magnetic compatibility. So you can implement your IBM compatible BIOS through the EPROM socket or run a custom drive routine through the PORT I/O. Your other choice, the ACB-2000, is also software compatible, but trades magnetic compatibility for more efficient disk formatting and throughput. The result is a 5X system I/O performance increase. And a competitive edge to help increase your customer base.



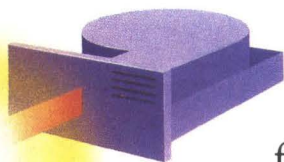
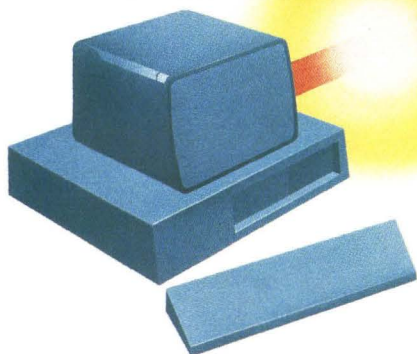
**Very Bright.** The ACB-2000 controller offers a host of smart features. Like non-interleaved operation, transferring data up to five times faster than competitive controllers. An auto-configure function allows you to interface any existing 5¼" fixed Winchester. And an improved ECC polynomial designed for sectors of 256 bytes to 2048 bytes virtually eliminates miscorrected data.

The ACB-2002 offers full IBM PC/XT compatibility. The ACB-2000 provides full software compatibility and 5X performance with any existing 5¼" fixed Winchester.

**The Lowest Cost.** ACB-2000 series boards are about \$225.00 in small OEM quantities. But you can drive costs even lower with our ACS-2000 VLSI chip set, licensed PCB manufacturing information and firmware.

VLSI also lets you reduce component count 30% and use a simple 2-layer board for lower power consumption and higher reliability.

Now that's bright.





# LET YOUR UNIX SYSTEM SHINE

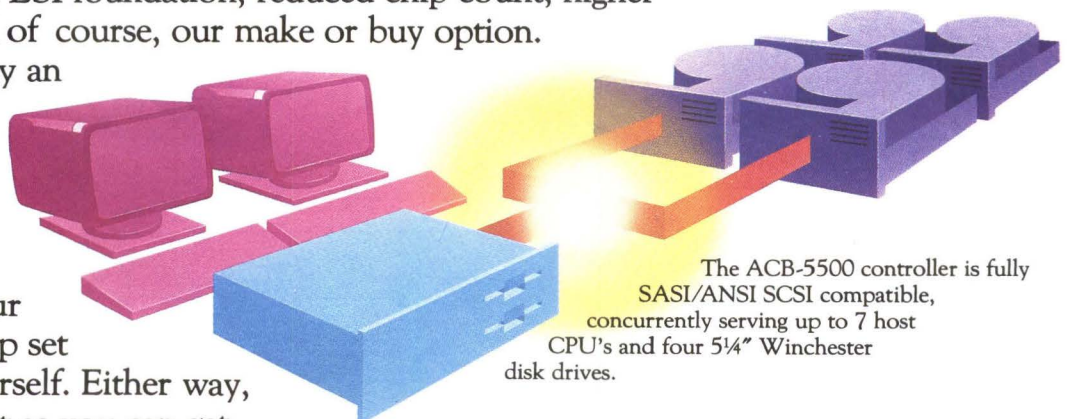
**Adaptec's ACB-5500 5 $\frac{1}{4}$ " Winchester controller brightens multi-user, multi-tasking system performance up to 5X**

**Star Light, Star Bright.** Your wish has come true in the ACB-5500. Now that multi-user/multi-tasking, file-server, or shared disk system has a controller that can show-off your hardware and software expertise. Full implementation of the SASI/ANSI SCSI bus specification, with arbitration and disconnect/reconnect, lets you increase performance up to 5X. Device independent operation means you can add up to four 5 $\frac{1}{4}$ " Winchesters of any capacity or manufacture, including fixed/removable drives. A reserve/release function allows disk or sector-level sharing while preserving data integrity. And that's not all...

**The Very Brightest.** The ACB-5500 is the most intelligent controller choice available. Additional features like command chaining minimizes host processor overhead by executing several controller commands with just one host command. An enhanced 32-bit ECC polynomial, plus parity, insures data integrity from the disk surface to the host CPU. Fully non-interleaved operation allows a complete read/write operation in only one disk rotation per track. Sector level defect skipping increases disk capacity and throughput. And that's still not all, so it must be expensive... right? Wrong.

**The Lowest Cost.** As with all Adaptec controllers, the ACB-5500 drives costs down with a VLSI foundation, reduced chip count, higher reliability, and of course, our make or buy option.

So you can buy an ACB-5500 for about \$300.00 in small OEM quantities. Or you can use our ACS-5500 chip set to build it yourself. Either way, this is as bright as you can get.



The ACB-5500 controller is fully SASI/ANSI SCSI compatible, concurrently serving up to 7 host CPU's and four 5 $\frac{1}{4}$ " Winchester disk drives.

For more information  
call Adaptec, Inc. at 408-946-8600 or  
clip and send the coupon below to



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## Please tell me more about Adaptec's disk controller products.

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Please send me additional information on the indicated Adaptec products.

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- ACB-2000 Controller Board and ACS-2000 Chip Set
- ACB-2002 Controller Board and ACS-2002 Chip Set
- ACB-4000 Controller Board and ACS-4000 Chip Set
- ACB-5000 Controller Board and ACS-5000 Chip Set

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- Marketing
- Other \_\_\_\_\_

My company manufactures

- Single-user computers
- Multi-user computers
- Disk drives
- Peripheral subsystems
- Other \_\_\_\_\_

What publication did you see us in? \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

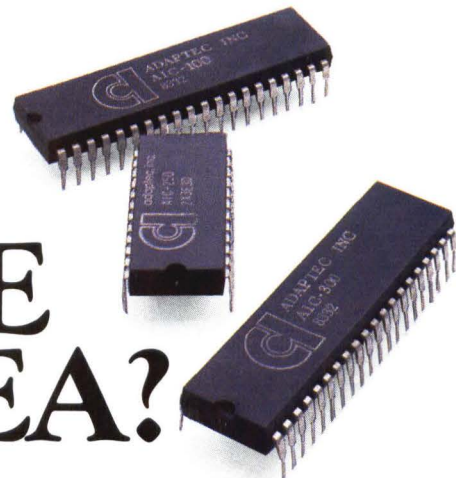
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# DO YOU HAVE A BRIGHT IDEA?



**For custom Winchester controller design, or licensed manufacture, Adaptec VLSI chips are a brilliant foundation**

**Powerful And Flexible.** Adaptec's powerful, flexible VLSI chip architecture and bright functional partitioning give you a brilliant foundation for custom controller design. How does a 10 Mbit/second data rate capability sound for starters? Or an enhanced ECC designed specifically for high density media? Or full support of non-interleaved operation and sector level defect skipping? And that's just the start.

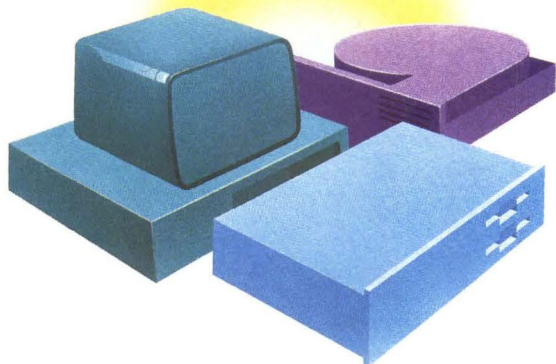
**For Any Application.** Adaptec's AIC-100 Winchester controller chip, AIC-250 Encode/Decode chip and AIC-300 Dual Port FIFO buffer controller chip support applications from single-user systems to multi-user/multi-tasking workstations. Their flexibility allows you to control 5¼" or 8" Winchesters with interfaces ranging from ST506 to the high performance ST412HP and ESDI. They can support SMD drives, too. You can even design your own host interface or implement full SASI/ANSI SCSI compatibility. You see, these chips will support even your brightest ideas.

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So you're shopping for disk drives. We'll bet you're looking for high-tech, high-quality drives from the Orient, right? And while you're at it, you'd like to find a supplier whose pipeline to the U.S. is as reliable as his product.

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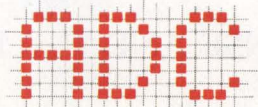
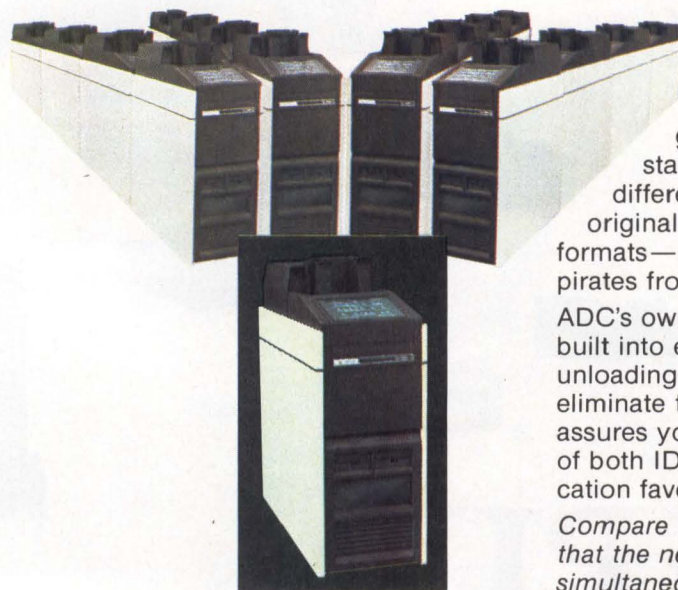
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CIRCLE NO. 31 ON INQUIRY CARD

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# Sony, Tandon and Shugart lead floppy drive market

ROBERT A. SEHR, Associate Editor

The last major roadblock to the crowning of the 3½-inch Sony Corp. microfloppy drive as a de facto standard appears to have been removed with IBM Corp.'s withdrawal of its 4-inch microfloppy. But, just a year ago, Seagate Technology threw the market into confusion by rejecting the 3½-inch Sony drive in favor of a 3¼-inch form factor introduced by Seagate's sister company, Tabor Corp., Westford, Mass.

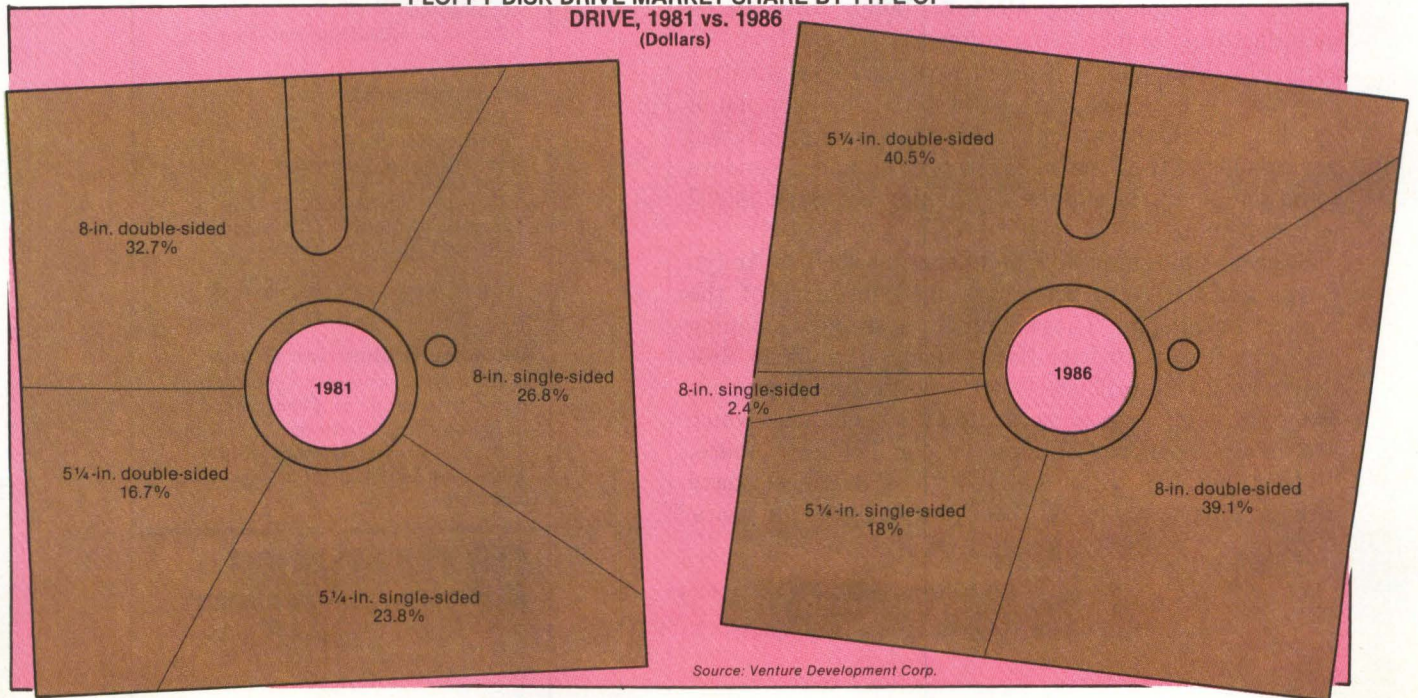
Now, the market has again settled. Thanks in part to Sony's \$30 million OEM contract with Hewlett-Packard Co. and industry cooperation, most manufacturers of sub-5¼-inch drives have opted for the Sony form factor. "Right now, Sony is the sub-5¼-inch market," remarks John Klonick, an analyst at research company Dataquest Inc. Klonick notes that HP will ship 60,000 of the 100,000 microfloppy drives expected to be shipped in the United States in 1983. The market is expected to grow to nearly 800,000 units in 1984.

Even Japanese companies such as Mitsubishi Electric have determined that the Japanese standard 3-inch microfloppy will not sell in the United States. In the case of Mitsubishi, it is selling 3-inch microfloppies in Japan and 3½-inch microfloppies in the United States.

When IBM introduced its non-standard 4-inch form factor drive, which has various rotational speeds and a non-standard interface, as an OEM product last spring,

**Double-sided drives are expected to dominate the floppy disk market in 1986, according to Venture Development Corp. forecasts. The 1986 market size is \$4.6 billion, compared with 1981's \$1.3 billion.**

FLOPPY DISK DRIVE MARKET SHARE BY TYPE OF DRIVE, 1981 vs. 1986 (Dollars)



competitors hoped that the company had blundered. Most analysts then agreed that the product had little hope of success because it was not introduced as part of an IBM system. At one time, the ill-fated drive was rumored to be a component of IBM's expected "Peanut" microcomputer. However, IBM not only had difficulty selling the drive to the OEM market, but it apparently had difficulty selling the drive within IBM.

While the sub-5¼-inch market continues to shape up, Tandon Corp., is continuing its market dominance in the 5¼-inch floppy market. The company recently signed a \$310 million contract—reportedly with IBM—for its minifloppy drives. This contract assures Tandon's leadership for the next year.

Shugart Corp., which pioneered the minifloppy drive and lost its one-time market dominance to Tandon, remains in second place. However, Shugart is facing new challenges from a revitalized Micro Peripherals Inc. (MPI) and Micropolis Corp., both of Chatsworth, Calif.

Technically, the largest maker of 5¼-inch disk drive mechanisms is Japan's Alps Electronics Ltd., which provides the mechanism for Apple Computer Inc.'s disk drives. However, Apple adds its own electronics and power supply to produce a disk drive.

In 1982, 5¼-inch floppy disk drives represented a \$772 million market, which is expected to grow to \$1.1 billion this year and to \$2 billion by 1986. The slower 8-inch floppy disk drive market—still dominated by Shugart—represented \$846 million in revenue in 1982 and \$993 million this year. It is expected to reach \$1.9 million in 1986, according to VDC.

The challenge facing all U.S. floppy disk drive manufacturers is increasing competition from Japanese suppliers. Dataquest's Klonick says Japanese penetration may be extensive by 1987. "With the exception of Tandon, which shares many of the offshore production advantages of the Japanese, I expect Japanese vendors to be the dominant suppliers of floppy drives in 1987," he comments.

Start-ups pursuing new technologies, such as Amlyn Corp. and Drivetec Inc., are meeting part of the Japanese challenge. Those companies are now shipping high-capacity, 3.2M-byte floppy drives. Vertimag Systems Corp., Santa Clara, Calif., and other companies are exploring vertical recording technologies, which are likely to increase floppy capacities even more. "Unfortunately," Klonick says, "the Japanese have already been working on these technologies for years." □

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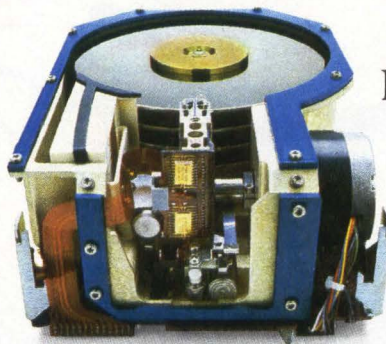
But thin-film media isn't the only reason to buy Evotek drives. With capacities up to 51.68 MB, they have such advanced features as high-torque precision motors. Superior brake force. Six-bearing linear actuator with a 49 ms average access time. Even an on-board microprocessor.

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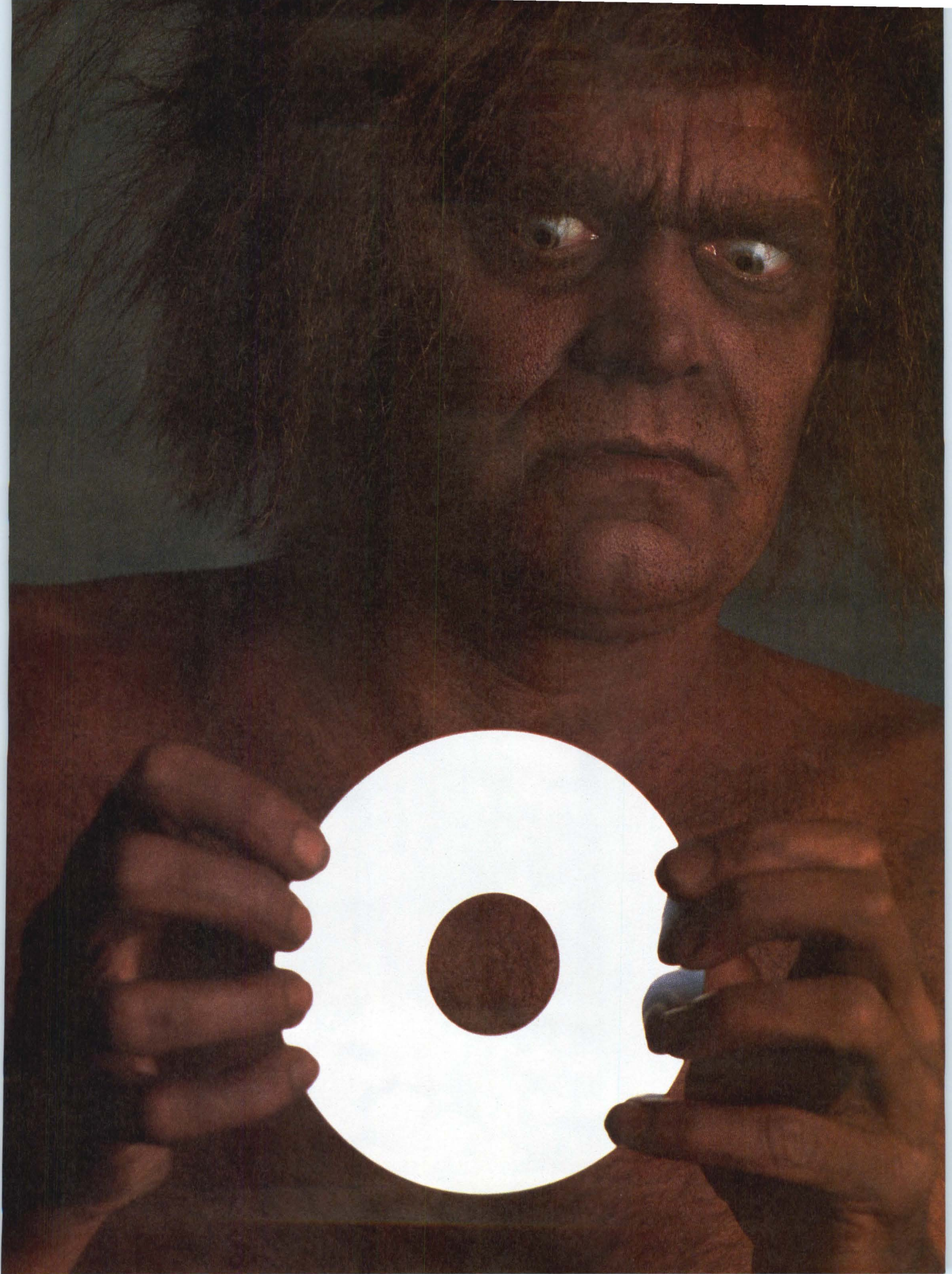


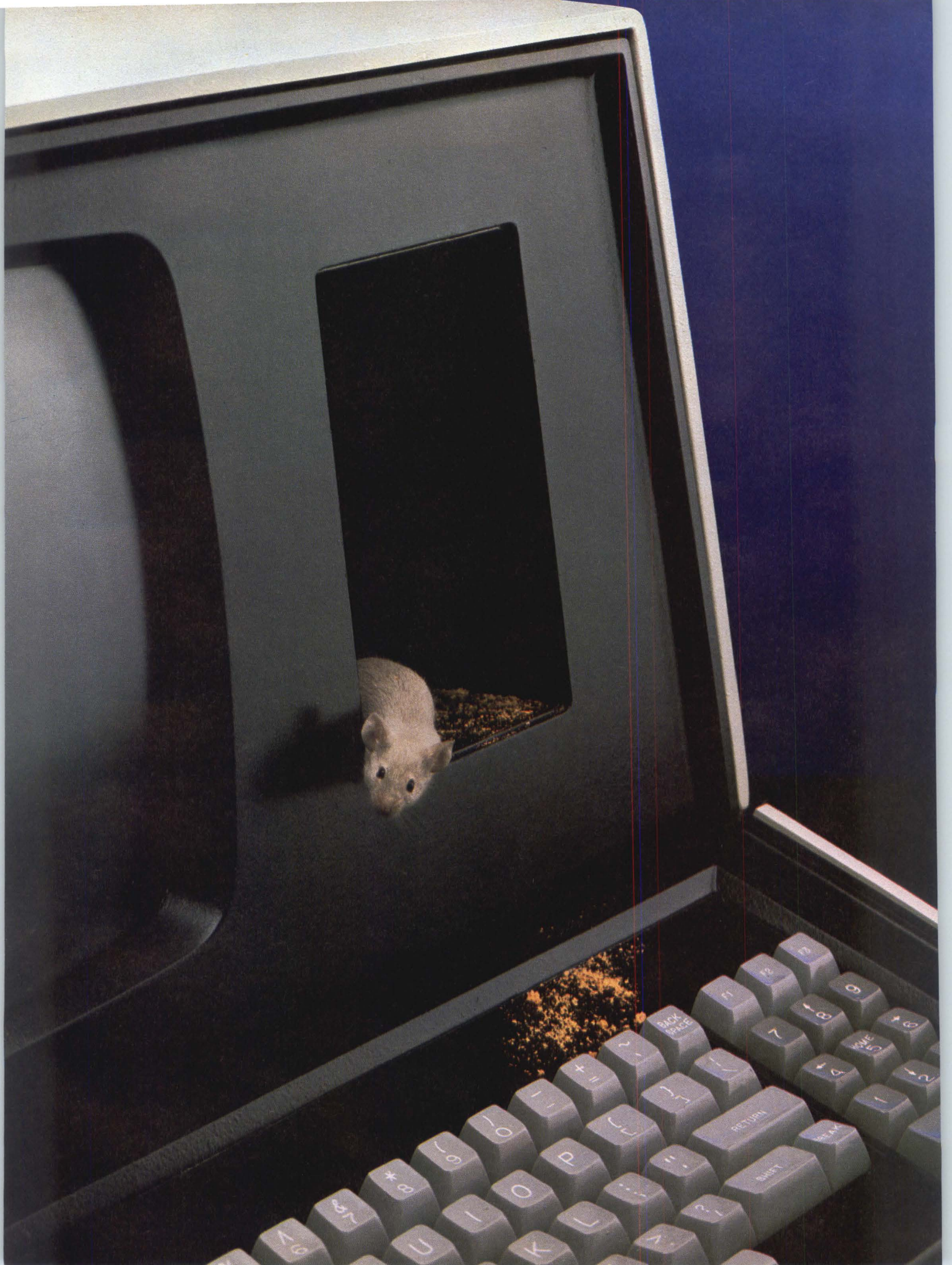
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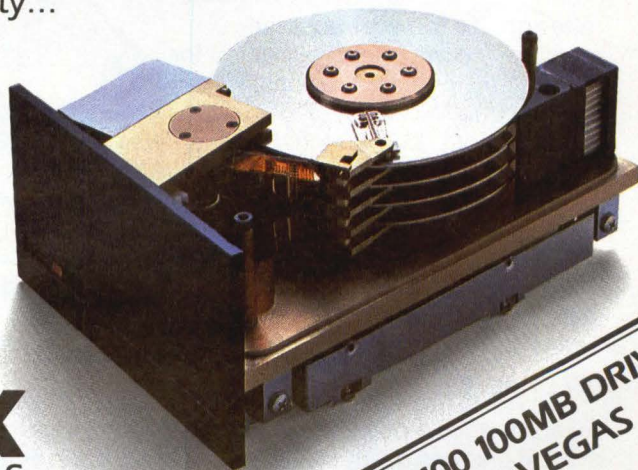
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others, are so precisely incorporated into the SuperMinifloppy™ that only one adjustment is required in the manufacturing process. That means enhanced manufactureability and serviceability.

For more information about the SuperMinifloppy, contact Ivo Adam, vice president of marketing, at (408) 942-1515. Or write DRIVETEC, 2140 Bering Drive, San Jose, CA 95131. It could make your system a super success.

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## 8-INCH DISKETTE DRIVES

Company Model	Capacity (K bytes)	Single-sided/ double-sided	Ave. access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD, inches)	Price (\$)	Notes, Features, Options
<b>ADVANCED ELECTRONIC DESIGN INC.</b>									
FLEX02	1000	double-sided	91	500	77	96	5.3 x 17.6 x 21	3,710 (Q1)	DEC RX02 emulation
WINC-05	1000	double-sided		500	77	96	5.2 x 17.6 x 16	5,033 (Q1)	DEC RX02, RL01, RL02 emulation
<b>BASF AG</b>									
6102	800	single-sided	152	500	77	48	4.625 x 10.5 x 14.25		
6104	1600	double-sided	152	500	77	48	4.625 x 10.5 x 14.25		
6105	1600	double-sided	76	500	77	48	2.3 x 8.55 x 13		
<b>BERING INDUSTRIES</b>									
2895	2400	double-sided	174	370	77	48	7.3 x 19 x 21.6	4,990 (Q1)	
<b>BILLINGS CORP. (formerly CALDISK)</b>									
142M	802	single-sided		500	77	48	4.9 x 8.4 x 15	550 (Q1)	
143M	802	double-sided		500	77	48	4.9 x 8.4 x 15	610 (Q1)	
842D	802	single-sided		500	77	48	4.9 x 8.4 x 15	495 (Q1)	
<b>BURROUGHS CORP.</b>									
MD-122	3131	double-sided	40		139	150	5.5 x 10 x 20.5		dual drive, single head positioning system
<b>CGRS MICROTECH</b>									
877-1	3200	single-sided	111	250	77	48	6 x 12.25 x 17	995 (Q1)	
<b>COMARK CORP.</b>									
MF85-DDS	200	double-sided	91	500	77	48	6.96 x 17.4 x 22.63	3,495 (Q1)	
MF85-DSS	1000	single-sided	210	500	77	48	6.96 x 17.4 x 22.63	2,995 (Q1)	
<b>CONTROL DATA CORP.</b>									
CDC 9404/-B	800	single-sided	260, 275	250, 500	77	48	4.97 x 8.78 x 14	425,330 (Q2500)	
CDC 9406-1/-4	1600	double-sided	40, 91	250, 500	77	48	4.97 x 8.78 x 14.2, 4.65 x 8.55 x 14	530,440 (Q2500)	
<b>DATA SYSTEMS DESIGN</b>									
440	512	single-sided	246	500	77	48	5.25 x 17.6 x 21	3,895 (Q1)	
480	1024	double-sided	296	500	77	48	5.25 x 17.6 x 21		
<b>DATAPoint CORP.</b>									
1402	500	single-sided		500	77		7.2 x 21.8 x 23	3,000 (Q1)	
1403	2000	double-sided		500	77		7.2 x 21.8 x 23	4,150 (Q1)	
1404	1000	single-sided		500	77		7.2 x 21.8 x 23	3,000 (Q1)	
<b>ELCOMATIC LTD.</b>									
ACP1500	3200	double-sided	91	500	154	96	4.4 x 8.5 x 12	550 (Q500)	
ACP700 (AC)	1600	double-sided	91	500	77	48	4.4 x 8.5 x 12	408 (Q500)	
ACP750 (AC)	1000	double-sided	91	500	77	48	4.4 x 8.5 x 12	442 (Q500)	
<b>HEWLETT-PACKARD CO.</b>									
9895A Dual	2300	double-sided	179	500	75	48	7.6 x 19 x 22.6	5,910 (Q1)	
9895A Opt. 010 Single	1150	double-sided	179	500	75	48	7.6 x 19 x 22.6	4,580 (Q1)	
<b>HONEYWELL INFORMATION SYSTEMS INC.</b>									
DIU 9603	512	double-sided	179	31.2	77	64	17.3 x 7.5 x 22	2,000 (Q1)	
<b>INNOTRONICS CORP.</b>									
410	802	double-sided	8		77	48	4.4 x 9 x 14		
<b>INSTOR CORP.</b>									
80		single-sided			77		6.5 x 11 x 15	3,000 (Q1)	IBM compatible
85		double-sided		219.2	77		13 x 7 x 17	3,500 (Q1)	
85P		double-sided			77		13 x 7 x 17	4,000 (Q1)	Prime interface, IBM compatible
SMDR		double-sided		219.2	77		13 x 7 x 17	3,500 (Q1)	
<b>IOMEGA CORP.</b>									
Alpha 10	14000	single-sided	35		343	300	4.5 x 8.5 x 14.1	1,080 (Q1000)	integrated SCSI, controller included

## 8-INCH DISKETTE DRIVES

8-in diskette drives

Company Model	Capacity (K bytes)	Single-sided/ double-sided	Ave. access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD, inches)	Price (\$)	Notes, Features, Options
<b>IRWIN/OLIVETTI INC.</b>									
FD502	500	double-sided	333	250	40	48	3.3 x 5.8 x 8	235 (Q500)	optional head load solenoid
<b>MATCHLESS SYSTEMS</b>									
SL-848-1	1300	single-sided	3	500	77	48	2.5 x 8.5 x 14		
SL-848-2	2600	double-sided	3	500	77	48	2.5 x 8.5 x 14		
<b>MEMOREX CORP.</b>									
550	802	double-sided	10		77	48	4.4 x 8.8 x 14		
651	312	single-sided	10		64	48	4.5 x 9 x 14		
<b>MICRO PERIPHERALS INC.</b>									
41	800	single-sided	91	500	77	48	2 x 8.55 x 11.5	305 (Q1000)	
42	1600	double-sided	91	500	154	48	2 x 8.55 x 11.5	350 (Q1000)	
<b>MILTOPE CORP.</b>									
DD 400	1000	double-sided	86	500	77	48	6 x 10 x 18	495 (Q1)	
<b>MITSUBISHI ELECTRONICS AMERICA INC.</b>									
M2894-63	1600	double-sided	91	500	77	48	4.625 x 8.5 x 14.125	370 (Q1000)	
M2896-63	1600	double-sided	91	500	77	48	2.25 x 8.5 x 12.4	370 (Q1000)	
<b>MODULAR COMPUTER SYSTEMS</b>									
4521	315	single-sided	290	31	77	48	26.7 x 48.56 x 49.68	4,300 (Q1)	
4522-1	630	single-sided	290	31	77	48	26.7 x 48.56 x 49.68	6,000 (Q1)	
4523-1	512	single-sided	260	62.5	77	48	26.42 x 48.56 x 49.68	3,850 (Q1)	
<b>MOTOROLA MICROSYSTEMS</b>									
EXORdisk III	1600	double-sided		250	77	48	6.96 x 17.75 x 23.5	5,195 (Q1)	
<b>NCR CORP.</b>									
7642	243	single-sided	260	31	73		11 x 19 x 21	2,050 (Q1)	
<b>NEC INFORMATION SYSTEMS INC.</b>									
FD 1164	800	single-sided		500	77	48	2.28 x 8.55 x 13.19	310 (Q1000)	
FD 1165	1600	double-sided		500	77	48	2.28 x 8.55 x 13.19	370 (Q1000)	optional VFO
<b>PERSCI INC.</b>									
277	1600	single-sided	93	500	76	45	8.6 x 4.4 x 15	1,050 (Q1)	dual disk drive, optional single or double density
299B	3200	double-sided	93	500	76	45	8.72 x 4.38 x 15.4	1,685 (Q1)	dual disk drive
<b>QUME CORP.</b>									
QumeTrak 841	800	single-sided	91	500	77	48	4.5 x 8.55 x 14.57	405 (Q500)	AC motor, optional DC motor
QumeTrak 842	1600	double-sided	91	500	77	48	4.5 x 8.55 x 14.57	445 (Q500)	AC motor, optional DC motor
<b>REMAX DIV./EX-CELL-O CORP.</b>									
RFD 2000	800	single-sided	91	500	77	48	4.56 x 8.55 x 14	300 (Q500)	plug-compatible with Shugart drives
RFD 4000	1600	double-sided	91	500	77	48	4.56 x 8.55 x 14	425 (Q500)	plug-compatible with Shugart drives
<b>SCIENTIFIC MICRO SYSTEMS INC.</b>									
FWT series	1600	double-sided	91	500	77	48	5.25 x 19 x 22	3,900 (Q1)	
<b>SHUGART CORP.</b>									
SA801	800	single-sided	210	500	77	48	4.62 x 8.55 x 14.25	376 (OEM)	
SA810	800	single-sided	89	500	77	48	2.31 x 8.55 x 12	365 (OEM)	half-height drive with industry-standard interface

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8-in diskette drives

Company Model	Capacity (K bytes)	Single-sided/double-sided	Ave access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD inches)	Price (\$)	Notes, Features, Options
SA851	1600	double-sided	91	500	77	48	4.62 x 8.55 x 14.25	453 (OEM)	
SA860	1600	double-sided	89	500	77	48	2.31 x 8.55 x 12	409 (OEM)	half-height drive with industry-standard interface
<b>SIEMENS CORP.</b>									
FDD 100-8	802	double-sided	6		77	48	4.5 x 8.6 x 14.3		
FDD 200-8	1600	double-sided	3		77	48	4.5 x 8.6 x 14.3		
<b>TANDON CORP.</b>									
TM848E-1	800	single-sided	91	500	77	48	2.30 x 8.55 x 12.2	250 (Q2500)	half-height drive
TM848E-2	1600	double-sided	91	500	77	48	2.30 x 8.55 x 12.2	305 (Q2500)	half-height drive
<b>TEXAS PERIPHERALS</b>									
01-0018	500	single-sided	10	500 KHz	76	48	4.5 x 8.5 x 14.75		
<b>TOSHIBA CORP.</b>									
ND-40D	1600	double-sided	94	500	77	48	8.55 x 2.24 x 12.13		
<b>Y-E DATA INC.</b>									
YD-174D	1600	double-sided	91	500	77	48	4.5 x 8.55 x 14.57		
YD-180	1600	double-sided	91	500	77	48	2.25 x 8.55 x 12.6		
<b>ZENITH DATA SYSTEMS</b>									
Z-207	1262	double-sided	90		77	48	7.75 x 13.75 x 20	1,599 (Q1)	

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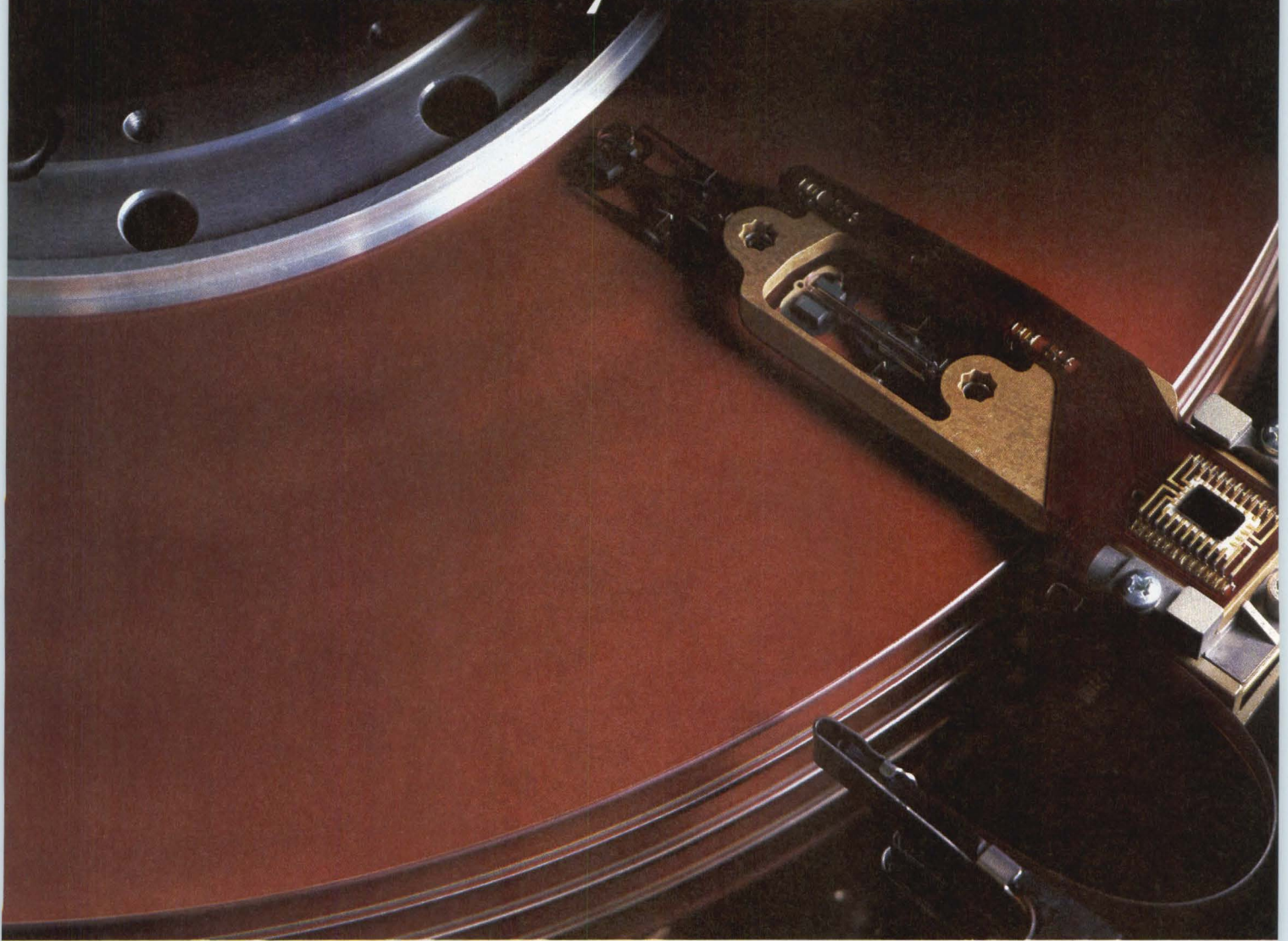
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And AMS-315 is more than twice as reliable as 300 megabyte removable pack disk drives used in the past. It plugs into the same SMD interface and operates with the same software as removable pack drives. This large capacity Winchester disk memory needs only one-third as much room to provide 300 megabytes of memory.



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Booth #3058.

Best of all, it costs one-third less than a removable pack drive and is now available in OEM quantities.

To configure a new computer system or upgrade an existing one, the AMS-315 is the memory to treasure.

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**Century Data Systems**

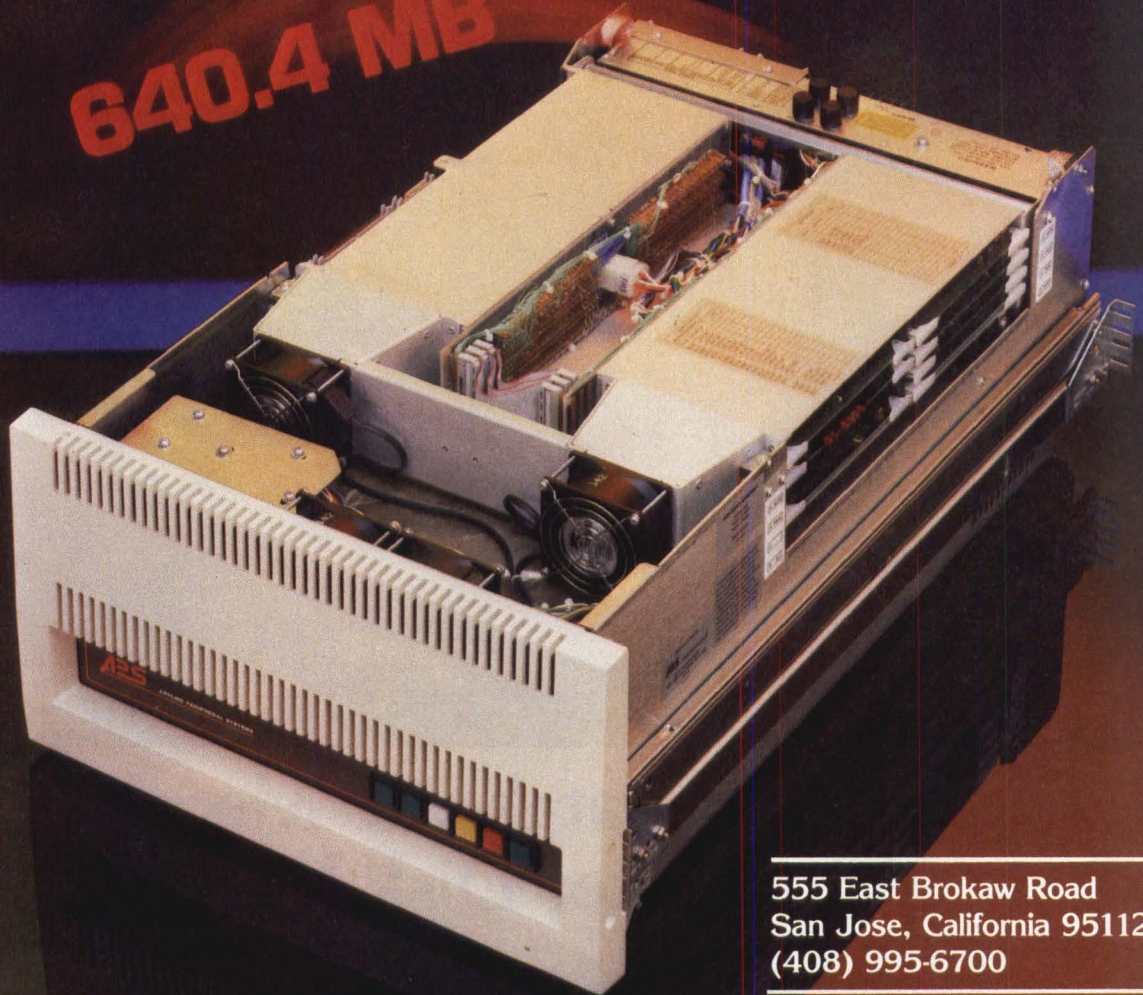
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## 4865 Disk Drive

640.4 MB



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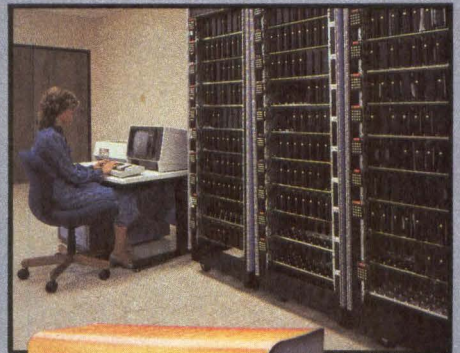
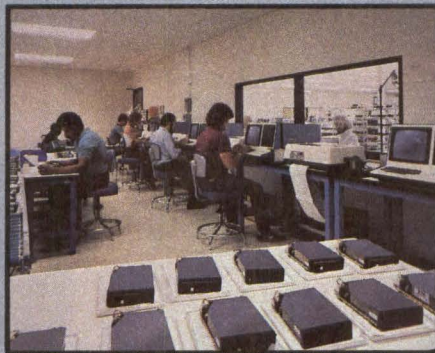
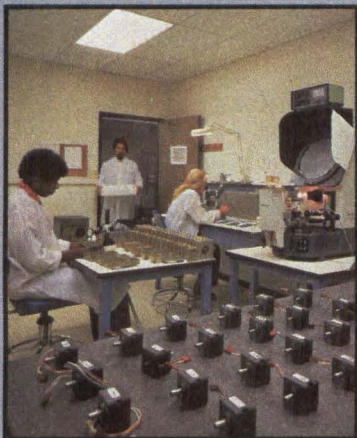
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# SYQUEST... THE INSIDE STORY

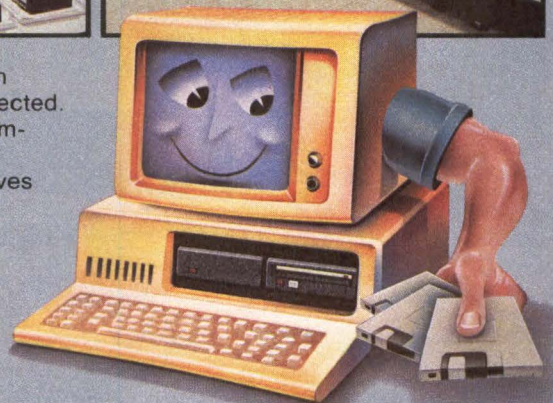


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HAMILTON/AVNET • U.S.A. CANADA AMPEC ELECTRONICS PTY LTD. • AUSTRALIA, NEW ZEALAND HAL COMPUTERS, LTD. • GREAT BRITAIN (U.K.) SOUTH CONTINENTAL DEVICES • SOUTH AFRICA KONTRON ELEKTRONIK GMBH • WEST GERMANY, AUSTRIA, SWITZERLAND SCANCOPTER AB • SWEDEN, FINLAND, DENMARK, NORWAY NORON, S.A. • BELGIUM, LUXEMBOURG, NETHERLANDS KONTRON ELECTRONIQUE • FRANCE COMPREL • ITALY RDT • ISRAEL BRASCOM • BRAZIL LATINDATA S.A. • ARGENTINA TAKACHICO KOHEKI CO., LTD., OR HIREL COMPANY, LTD. • JAPAN

# New ways to manage information from DTC

When end-users asked for faster access to computer-stored information, they got "database management." Many users were sorry they asked. What they got required highly structured data entry, more programming, and cumbersome retrieval techniques. For many, the so-called solution was just another problem. DTC gives you better answers. Simple solutions that help users get to the information they need. Solutions that you can sell.

## Managing information for the casual user.

"file base 3" software is for IBM PC, XT, and compatible computer users who want information from correspondence, reports, articles, and other text files. Unstructured key word entry and retrieval is so easy that even casual users can put information in and get it out. "Fuzzy searches" help them find the information they want, even when definitions are imprecise. And it's all accomplished on an ad hoc basis. No programming required.

We can give you even higher "file base 3" performance with add-in or add-on hard disk packages.

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The "DTC information machine" is a standalone system designed for librarians, researchers, and other people who need fast, frequent access to information. It does this one job better than a mini, yet it costs less than many micros.

The key to the system's performance is dedication to a single function—information access. Hardware and software have been designed to optimize throughput of data entry, retrieval, updating, and reporting. The result is a system that outperforms general purpose computers with DBMS software. The system can include terminal, floppy & hard disk storage, tape backup, printer, and a choice of specialized information management applications packages. Data can be input via RS-232 port, compatible floppy disks, or tape.

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## 5 1/4-INCH DISKETTE DRIVES

Company Model	Capacity (K bytes)	Single-sided/ double-sided	Ave. access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD, inches)	Price (\$)	Notes, Features, Options
<b>ALPS ELECTRIC CO. LTD.</b>									
AFD211	250	single-sided	156	250	40	48	1.61 x 5.75 x 8		half-height, optional analog control board
AFD212	500	double-sided	156	250	80	48	1.61 x 5.75 x 8		half-height
AFD221	500	single-sided	94	250	80	96	1.61 x 5.75 x 8		half-height
AFD222	1000	double-sided	94	250	160	96	1.61 x 5.75 x 8		half-height
<b>AMDEK CORP.</b>									
AMDISK V	500	double-sided	82	250	40	48	1.61 x 5.73 x 7.97	329 (Q1)	half-height
<b>ANALOG &amp; DIGITAL PERIPHERALS INC.</b>									
ADPI Easi-Disk	250 to 2,000	double-sided		110 to 200	40, 80	96	6.5 x 5 x 9.5	910+ (Q100)	
<b>ANDERSON JACOBSON INC.</b>									
460	204	double-sided			40		8 x 13.5 x 22.5	1,595 (Q1)	
<b>APPLE COMPUTER INC.</b>									
Disk II	140	single-sided		125	35	48	3.25 x 5.75 x 8	545 (Q1)	
Disk III	140	single-sided		125	35	48	4.12 x 6.35 x 8.8	435 (Q1)	
<b>BASF AG</b>									
6106	250	single-sided	156	125	40	48	2.21 x 5.91 x 7.74		2/3-height, optional ejector
6108	500	double-sided	156	250	40	48	2.21 x 5.91 x 7.74		2/3-height, optional ejector
6116	500	single-sided	158	125	80	96	2.26 x 5.75 x 7.74		optional ejector
6118	1000	double-sided	158	250	80	96	2.26 x 5.75 x 7.74		optional ejector
6138	1000	double-sided	79	125, 250	80	96	1.32 x 5.91 x 8.7		
6238	1000	double-sided	79	125, 250	80	96	2.26 x 5.91 x 8.7		2/3-height, low power, separate positioning system
<b>C. ITOH ELECTRONICS INC.</b>									
YD-380T	1600	double-sided	91	500	77	96	1.6 x 5.8 x 8	350 (Q1,000)	half-height
<b>CANON USA INC.</b>									
MDD 211	500	double-sided	100	250	40	48	1.32 x 5.9 x 8.7	400 (Q1)	push-button loading, optional half-height front panel
MDD 221	1000	double-sided	100	250	80	96	1.32 x 5.9 x 8.7	495 (Q1)	push-button loading, optional half-height front panel
MDD 423	200	double-sided	100	250	80	96	2.3 x 5.9 x 8.7	745 (Q1)	dual diskette drive with one drive motor, two stepper motors
<b>CGRS MICROTECH</b>									
540-1	250	single-sided	335	250	40	48	6 x 3.5 x 11	595 (Q1)	
<b>COLUMBIA DATA PRODUCTS</b>									
400	180	single-sided	463	250	35	48	5.3 x 7 x 13.5	2,195 (Q1)	optional current loop, 220V power, rack mount
<b>COMMODORE BUSINESS MACHINES</b>									
2031	170	single-sided		125	35	48		595 (Q1)	
4040	330	double-sided		125	35	48	7.1 x 15 x 15.5	1,295 (Q1)	
8050	1050	single-sided		125	77	96	7.1 x 15 x 15.5	1,795 (Q1)	
8250	2100	double-sided		125	77	96	7.1 x 15 x 15.5	2,195 (Q1)	
<b>COMREX INTERNATIONAL INC.</b>									
1000	160	single-sided		250	35	48	2.1 x 14.9 x 10.1	699 (Q1)	dual diskette drive
<b>CONTROL DATA CORP.</b>									
9408	125, 250	single-sided	80	125, 250	40	48	3.38 x 5.88 x 8	175 (Q2,500)	star or daisy-chains as many as four drives
9409	250, 500	double-sided	80	125, 250	40	48	3.38 x 5.88 x 8	210 (Q2,500)	star or daisy-chains as many as four drives

5 1/4-in diskette drives

## 5¼-INCH DISKETTE DRIVES

5¼-in diskette drives

Company Model	Capacity (K bytes)	Single-sided/ double-sided	Ave access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD inches)	Price (\$)	Notes, Features, Options
9409T	500, 1000	double-sided	132	125, 250	80	96	3.38 x 5.88 x 8	283 (Q2,500)	star or daisy-chains as many as four drives
9428	250, 500	double-sided	80	125, 250	40	48	1.625 x 5.88 x 8	160 (Q2,500)	half-height
9429	500, 1000	double-sided	95	125, 250	80	96	1.625 x 5.88 x 8	190 (Q2,500)	half-height
<b>CROMEMCO INC.</b>									
CFD	390	double-sided	300	250	40		3.38 x 5.87 x 8	595 (Q1)	
<b>DRIVETEC INC.</b>									
320	3330	double-sided	118	500	160	192	1.62 x 5.75 x 8	333 (Q500)	half-height
<b>EPSON AMERICA INC.</b>									
SD 320	250 to 500	double-sided	220	125, 250		48	1.1 x 5.7 x 9.3		half-height
SD 570	1000	double-sided	96	250		96	1.6 x 5.7 x 7.7		half-height
SD 560	1600	double-sided	93	500		96	1.6 x 5.7 x 7.7		half-height
SD 521	250 to 500		97	125, 250		48	1.6 x 5.7 x 7.7		half-height
<b>HEWLETT-PACKARD CO.</b>									
82901M Dual Drive	875	double-sided	187	250	33	48	4.31 x 16.75 x 14.74	2,230 (Q1)	dual drive 437.5K bytes per diskette
82902M Single	437.5	double-sided	187	250	33	48	4.32 x 11 x 14.74	1,520 (Q1)	
9130A	437.5	double-sided	187	250	33	48	4.72 x 7.09 x 10.5	860 (Q1)	
<b>HI-TECH PERIPHERALS CORP.</b>									
548-25	250	single-sided	95	250	40	48	1.66 x 5.75 x 8	127 (Q10,000)	half-height, automatic disk eject
548-50	500	double-sided	95	250	40	48	1.66 x 5.75 x 8	159 (Q10,000)	half-height, automatic disk eject
596-05	500	single-sided	95	250	80	96	1.66 x 5.75 x 8	155 (Q10,000)	half-height, automatic disk eject
596-08	800	single-sided	92	500	77	96	1.66 x 5.75 x 8	178 (Q10,000)	half-height, automatic disk eject
596-10	1000	double-sided	95	250	80	96	1.66 x 5.75 x 8.0	211 (Q10,000)	half-height, automatic disk eject
596-16	1600	double-sided	92	500	77	96	1.66 x 5.75 x 8.0	243 (Q10,000)	half-height, automatic disk eject
<b>HONEYWELL INFORMATION SYSTEMS INC.</b>									
DIU 9607	650	double-sided	250	20.5	80	96	8.8 x 5 x 10	1400 (Q1)	
<b>MICRO PERIPHERALS INC.</b>									
101	525	single-sided	150	250	84	100	3.25 x 5.75 x 7.75		
102	1050	double-sided	150	250	168	100	3.25 x 5.75 x 7.75		
500/900 series	500	double-sided	3, 6, 20	125, 250	160	96	1.68 x 5.75 x 7.5		half-height
51	250	single-sided	84	250	40	48	3.25 x 5.75 x 7.75	160 (Q1,000)	
52	500	double-sided	84	250	80	48	3.75 x 5.75 x 7.75	200 (Q1,000)	
91	500	single-sided	150	250	80	96	3.25 x 5.75 x 7.75	200 (Q1,000)	
92	1000	double-sided	150	250	160	96	3.25 x 5.75 x 7.75	255 (Q1,000)	
<b>MICRO-SCI DIV. STANDUN CONTROLS</b>									
A2	143	single-sided		250	35	48	3.75 x 6 x 8.75	345 (Q1)	optional controller, Apple compatible
A3	143	single-sided		250	35	48	3.75 x 6 x 8.75	379 (Q1)	may daisy-chain, for use with Apple III only
A40	164	single-sided		250	40	48	3.75 x 6 x 8.75	379 (Q1)	optional controller, Apple compatible
A70	286	single-sided		250	70	96	3.75 x 6 x 8.75	529 (Q1)	optional controller, Apple compatible

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# RODIME's exciting new dimension... 3 1/2"



## Introducing the ultra-compact, 3 1/2" Winchester disk drive with up to 10 megabytes formatted capacity

There's an exciting new dimension to Winchester disk drives. With one-fourth the volume of a standard 5 1/4" Winchester disk drive and the same height as a half-height 5 1/4" drive, our new RO 350 3 1/2" Winchester disk drive brings high capacity storage (up to 10 megabytes formatted) to applications you never thought of before. Its light weight, low power requirements and 85 millisecond access time open up a whole new world of Winchester applications. Portable computers. Compact desk top systems. Intelligent terminals. Point-of-sale terminals. Industrial controllers. Navigation and guidance systems. Portable instrumentation. (In fact, there are few places our light weight, ultra-compact 3 1/2" Winchester disk drives can't be used.)

### A new dimension of design versatility

The RO 350 gives you tremendous freedom and flexibility in designing systems. Take a look at the number of ways this compact approach can work:

- Uses industry-standard ST506 interface which makes it compatible with all major

5 1/4" Winchester controllers.

- Is a compact 3 1/2" drive for those tight spots other drives cannot fit.
- Directly replaces half-height 5 1/4" disk drives (with Rodime sub-frame).
- When faced with space problems, the RO 350 plus controller card will fit into the same space as a standard 5 1/4" Winchester disk drive.
- Two RO 350 drives easily fit in the same space as a standard 5 1/4" Winchester disk drive.

### A new dimension of technical excellence

RODIME's reputation for technical excellence is further enhanced with the design of this ultra-compact Winchester disk drive. Using advanced large-scale integration, the entire electronics for the drive are on a single, compact board. In addition to its compact size and weight (about one-third the weight of a standard 5 1/4" drive), there are other design innovations. Power consumption is only 13 watts—half of a 5 1/4" drive's power requirements. Access time is 85 milli-

seconds. The rugged design of the RO 350 translates to high resistance to shock, an important consideration for portable computer systems.

### Our no-nonsense tradition

Our ultra-compact, 3 1/2" Winchester disk drive continues our no-nonsense tradition. It's a philosophy that has made our family of 5 1/4" Winchester disk drives, with capacities up to 54 megabytes, the preferred drives of OEMs and system integrators worldwide. It's a philosophy built on quality, reliability and performance.

To find out how our new 5 and 10 megabyte 3 1/2" Winchester disk drives can add a new dimension to your system design, or for details of our entire Winchester disk drive line, call or write today.

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CIRCLE NO. 42 ON INQUIRY CARD

See Rodime Drives at  
Comdex, Booth #H7357.

# RODIME

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## 5¼-INCH DISKETTE DRIVES

Company Model	Capacity (K bytes)	Single-sided/ double-sided	Ave. access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD, inches)	Price (\$)	Notes, Features, Options
A73	286	single-sided		250	70	48	3.75 x 6 x 8.75	529 (Q1)	may daisy chain, for use with Apple III only
A82	328	double-sided		250	40	48	3.75 x 6 x 8.75	569 (Q1)	for Apple II, IIe
A143	572	double-sided		250	140	96	3.75 x 6 x 8.75	659 (Q1)	may daisy chain, for use with Apple III only
<b>MICROPOLIS CORP.</b>									
1115-V	500	single-sided		250	80	96	3.25 x 5.75 x 8	175 (Q5,000)	
1115-VI	1000	double-sided		250	80	96	3.25 x 5.75 x 8	205 (Q5,000)	
1117-VI	1700	double-sided		500	80	96	3.25 x 5.75 x 8	300 (Q1,000)	
<b>MITSUBISHI ELECTRONICS AMERICA INC.</b>									
M4851	500	double-sided	94	250	40	48	1.61 x 5.75 x 8	210 (Q1,000)	half-height
M4852	1000	double-sided	94	250	80	96	3.25 x 5.75 x 8	240 (Q1,000)	
M4853	1000	double-sided	94	250	80	96	1.61 x 5.75 x 8	240 (Q1,000)	half-height
M4854	1600	double-sided	91	500	77	96	1.61 x 5.75 x 8	300 (Q1,000)	half-height
M4855	2000	double-sided	94	500	80	96	1.61 x 5.75 x 8	320 (Q1,000)	half-height
<b>NISSEI SANGYO AMERICA</b>									
FB501	250	single-sided	81.2	250	40	48	1.61 x 5.75 x 8.23	112 (Q5,000)	half-height
FB502	500	single	87.3	250	80	96	1.61 x 5.75 x 8.23	118 (Q5,000)	half-height
FB503	500	double-sided	81.2	250	40	48	1.61 x 5.75 x 8.23	137 (Q5,000)	half-height
FB504	1000	double-sided	87.3	250	80	96	1.61 x 5.75 x 8.23	170 (Q5,000)	half-height
<b>PHILIPS DATA SYSTEMS</b>									
H1100	438	double-sided	5		35	48	2.3 x 5.9 x 8.4		
<b>PLESSEY PERIPHERAL SYSTEMS</b>									
PM-XS31/B	1000	double-sided	91		77		5.25 x 19 x 24		diskette subsystem with controller, two diskette option
PM-XS21/B, XSV21/B	512 to 1,000	double-sided	334		77		5.25 x 19 x 24		replaces DEC RX211, RXV21
<b>QUME CORP.</b>									
QumeTrak 142	500	double-sided	160	250	40	48	1.59 x 5.75 x 8	185 (Q500)	half-height
QumeTrak 542	500	double-sided	175	250	40	48	3.24 x 5.75 x 8	210 (Q500)	
QumeTrak 592	1000	double-sided	95	250	80	96	3.24 x 5.75 x 8	315 (Q500)	
<b>REMEX DIV./EX-CELL-O CORP.</b>									
RFD 480	500	double-sided	80	250	40	48	2.11 x 5.75 x 8	255 (Q500)	
RFD 481	250	single-sided	80	250	40	48	2.11 x 5.75 x 8	220 (Q500)	
RFD 485	500	double-sided	80	250	40	48	1.61 x 5.75 x 8	210 (Q500)	half-height
RFD 486	250	single-sided	80	250	40	48	1.61 x 5.75 x 8	160 (Q500)	half-height
RFD 960	1000	double-sided	147	250	80	96	2.11 x 5.75 x 8	295 (Q500)	
RFD 961	500	single-sided	147	250	80	96	2.11 x 5.75 x 8	255 (Q500)	
RFD 965	1000	double-sided	94	250	80	96	1.61 x 5.75 x 8	255 (Q500)	half-height
RFD 966	500	single-sided	94	250	80	96	1.61 x 5.75 x 8	210 (Q500)	half-height
RFD 1600	1600	single-sided	100	500	154	170	3.25 x 5.75 x 8		8-in. interface
RFD 3200	320	double-sided	100	500	154	170	3.25 x 5.75 x 8		
<b>SHUGART CORP.</b>									
SA200	250	single-sided	358	250	40	48	2.05 x 5.75 x 7.87	135 (Q OEM)	¾-height with minifloppy-compatible interface

5¼-in diskette drives

## 5 1/4-INCH DISKETTE DRIVES

5 1/4-in diskette drives

Company Model	Capacity (K bytes)	Single-sided/ double-sided	Ave. access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD inches)	Price (\$)	Notes, Features, Options
SA400F	250	single-sided	93	250	40	48	3.25 x 5.75 x 8.25		
SA410	500	single-sided	173	250	80	96	3.25 x 5.75 x 8.25	245 (OEM)	
SA 455	500	double-sided	93	250	40	48	1.63 x 5.75 x 8	197 (OEM)	half-height with mini-floppy-compatible interface
SA460	1000	double-sided	173	250	80	96	3.25 x 5.75 x 8.25	273 (OEM)	
SA465	1000		94	250	80	96	1.63 x 5.75 x 8	246 (OEM)	half-height with minifloppy-compatible interface
<b>SIEMENS CORP.</b>									
FDD 100-5	250	double-sided	20		40	48	3.3 x 5.8 x 8.3		
FDD 196-5	500	double-sided	10		80	96	3.3 x 5.8 x 8.3		
FDD 200-5	500	double-sided	20		40	48	3.3 x 5.8 x 8		
FDD 296-5	1000	double-sided	10		80	96	3.3 x 5.8 x 8.3		
<b>TANDON CORP.</b>									
TM50-1	250	single-sided	287	250	40	48	1.625 x 5.75 x 8	110 (Q2,500)	half-height
TM50-2	500	double-sided	98	250	40	48	1.625 x 5.75 x 8	137 (Q2,500)	half-height
TM55-2	500	double-sided	90	250	40	48	1.625 x 5.75 x 8	170 (Q2,500)	half-height
TM55-4	1000	double-sided	90	250	80	96	1.625 x 5.75 x 8	198 (Q2,500)	half-height
TM100-1	250	single-sided	75	250	40	48	3.38 x 5.87 x 8.29	137 (Q2,500)	
TM100-2	500	double-sided	75	250	40	48	3.38 x 5.87 x 8.29	187 (Q2,500)	
TM100-3	500	single-sided	90	250	80	96	3.38 x 5.87 x 8.29	187 (Q2,500)	
TM100-4	1000	double-sided	90	250	80	96	3.38 x 5.87 x 8.29	248 (Q2,500)	
TM101-4	1000	double-sided	90	250	80	96	3.38 x 5.87 x 8.29	220 (Q2,500)	microprocessor-controlled
TM102-2	2000	double-sided	90	500	80	96	3.38 x 5.87 x 8.29	286 (Q2,500)	microprocessor-controlled
<b>TEAC CORP.</b>									
FD-55A	250	single-sided	93	250	40	48	1.625 x 5.75 x 8	298 (Q1)	half-height
FD-55B	500	double-sided	93	250	40	48	1.625 x 5.75 x 8	360 (Q1)	half-height
FD-55E	500	single-sided	94	250	80	96	1.625 x 5.75 x 8	360 (Q1)	half-height
FD-55F	1000	double-sided	94	250	80	96	1.625 x 5.75 x 8	395 (Q1)	half-height
FD-55G	1600	double-sided	91	500	77	96	1.625 x 5.75 x 8	455 (Q1)	half-height
<b>TECHTRAN INDUSTRIES INC.</b>									
980X	200	single-sided	85	286	35	46	5.25 x 10 x 11.75	1,485 (Q1)	
980XX	400	double-sided	85	268	35	46	5.25 x 10 x 11.75	1,585 (Q1)	
981X	200	single-sided	85	268	35	46	5.25 x 10 x 11.75	1,985 (Q1)	
<b>TERMINAL DATA CORP.</b>									
	125	single-sided	100	125	40	18	14 x 9 x 8.5	895 (Q1)	designed primarily for terminal storage; plugs into LA 120, VT 100, others
<b>TEXAS PERIPHERALS</b>									
01-0053	173	single-sided	5	250	40	48	3.38 x 5.87 x 8		
<b>TOSHIBA CORP.</b>									
ND-04D	500	double-sided	80	250	40	48	5.75 x 1.61 x 8.27		
ND-06D	1000	double-sided	97	250	80	96	5.75 x 1.61 x 8.27		
<b>WESTERN TELEMATIC INC.</b>									
DataMate II	328	single-sided			80	96	5.75 x 12 x 14	1,995 (Q1)	
MiniMate III	816	double-sided			80	96	4.75 x 8.75 x 12.5	1,475 (Q1)	

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Cogito System's 5¼" Winchester is **half the height** of regular disk drives but consumes only **half the power**. The CG912 offers **12.76 MB** on two platters to enable future upward enhancement to higher capacities. Industry standard ST 506/ST 412 interface ensures controller compatibility.

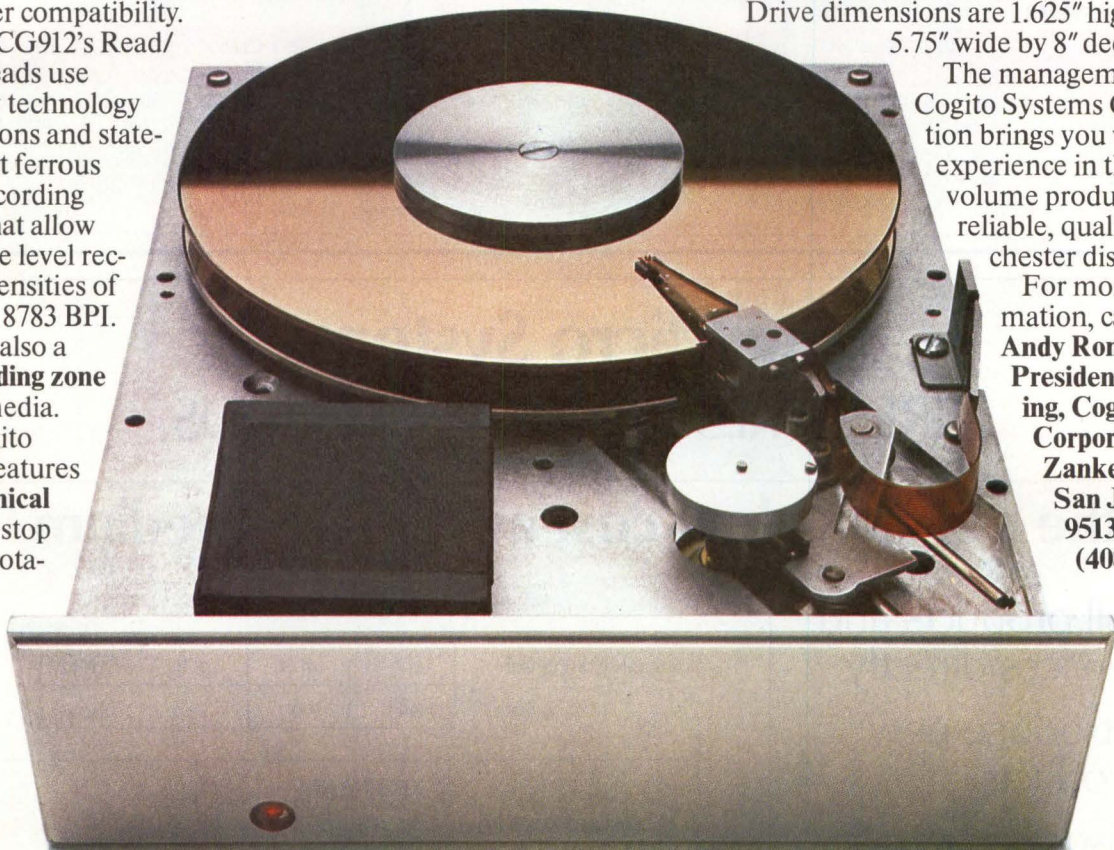
The CG912's Read/Write heads use Whitney technology suspensions and state-of-the-art ferrous oxide recording media that allow moderate level recording densities of 345 TPI, 8783 BPI. There is also a **head landing zone** on the media. The Cogito CG912 features a **mechanical brake** to stop spindle rota-

tion. An **actuator lock** secures the actuator during drive transportation and shipment. A buffered seek stepper achieves **85 milliseconds** average access time. The complete drive electronics, including two microprocessors, reside on one single PC board.

Drive dimensions are 1.625" high by 5.75" wide by 8" deep.

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For more information, call or write **Andy Roman, Vice President of Marketing, Cogito Systems Corporation, 2355 Zanker Road, San Jose, CA 95131. (408) 942-8262.**



## (ACTUAL SIZE)

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## 5¼-INCH DISKETTE DRIVES

5¼-in diskette drives

Company Model	Capacity (K bytes)	Single-sided/double-sided	Ave. access time (msec)	Transfer rate (K bits/sec)	Tracks/surface	Tracks/inch	Dimensions (HxWxD, inches)	Price (\$)	Notes, Features, Options
<b>WORLD STORAGE TECHNOLOGY</b>									
Zeus FDD 111-5/211-5	250 to 500	single-sided	80	125, 250	40	48	3.25 x 5.75 x 8		daisy chains as many as four drives
Zeus FDD 121-5/221-5	500 to 1,000	single-sided	146	125, 250	80	96	3.25 x 5.75 x 8		daisy chains as many as four drives
Titan FDD 112-5	125 to 250	single-sided	280	125, 250	40	48	1.62 x 5.75 x 8	140 (Q1,000)	half-height, daisy chains as many as four drives
Titan FDD 212-5	250 to 500	double-sided	280	125, 250	40	48	1.62 x 5.75 x 8	170 (Q1,000)	half-height, daisy chains as many as four drives
<b>Y-E DATA INC.</b>									
YD-274	500	double-sided	281	250	40	48	3.25 x 5.75 x 8		
YD-280	1000	double-sided	95	250	80	96	3.25 x 5.75 x 8		
YD-380	1600	double-sided	91	500	77	96	1.61 x 5.75 x 8		half-height
YD-480	1000	double-sided	95	250	80	96	1.61 x 5.75 x 8		half-height
YD-580	500	double-sided	148	250	40	48	1.61 x 5.75 x 8		half-height
<b>ZENITH DATA SYSTEMS</b>									
Z-37	1360	double-sided	260	250	80	96	6.125 x 13.25 x 13.25	1,699	dual floppy drive 640K bytes per diskette
Z-87	200	single-sided	433	128	40	48	6.125 x 13 x 13	999 (Q1)	dual floppy drive 100K bytes per diskette (as much as 160K bytes with Z89-37 controller card)

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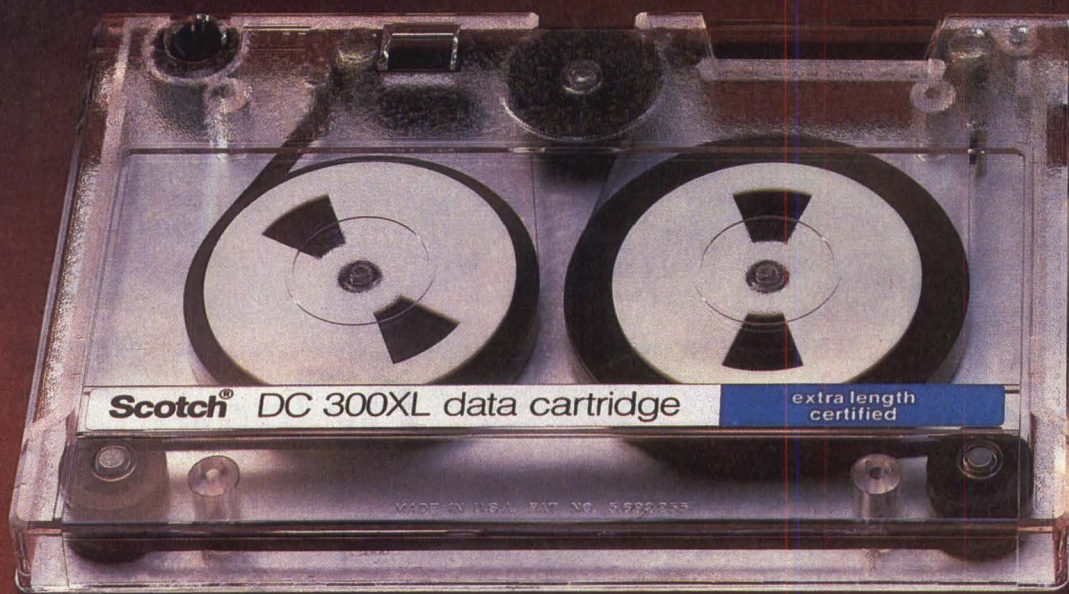
The new 5 1/4" IMI 5650H Winchester provides an astounding 51 Mbytes of storage and an average access time of 49 msec with proven stepper motor reliability.

And the new 5 1/4" IMI 2306H and 2313H Winchesters pack 6 and 12 Mbytes of storage, respectively, in half-height configurations ideal for integration into today's PCs and portables. Access time is 85 msec.

Both new IMI Winchester families have full shock mount systems, enhanced thermal design (4°-50°C.) and head mounted preamplifiers - traditional IMI features that give you durability, data integrity and reliability that's nothing less than the best. For more information, call or write: International Memories Incorporated, 10381 Bandlely Dr., Cupertino, CA 95014. (408) 446-9779. TWX: 910-338-7347.



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designers are finding it the perfect choice for backing up Winchester drives. 45 megabytes of data can be transferred from disk to tape in under nine minutes — with no time lost for media changes. One cartridge does it all! It would take a stack of 38 eight-inch floppies\* to hold the same amount of data. The cartridge

is small enough to fit in a coat pocket — and rugged enough to be transported that way, too.

**New rules of standardization.**

Industry standards are now being formulated which will improve interchangeability of 1/4" recorded data cartridges across most major manufacturers' 1/4" drive systems.



# back-up that eliminates stack-up.

This means concerns about compatibility are diminishing.

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The 1/4" data cartridge is the logical choice for designers specifying back-up systems for Winchester drives. It's small, reliable, easy to handle and transport, and has a very low cost per megabyte.

These high capacity cartridges are useful for archival storage and program loading, too. So don't wait, give your customers the future. Put this innovative technology to work in the next computer system you design. Data cartridge drives are available from over 30 manufacturers throughout the world.

## **For more information:**

For more information on how 3M 1/4" data cartridges can save your customers time, space, and money, write to Chris Binner, National Sales Manager — OEM Market, Data Recording Products Division, Building 223-5N, 3M Center, St. Paul, MN 55144.

\*Double sided/double density 1024 format 8" diskettes.

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CIRCLE NO. 46 ON INQUIRY CARD



## MICRO DISKETTE DRIVES

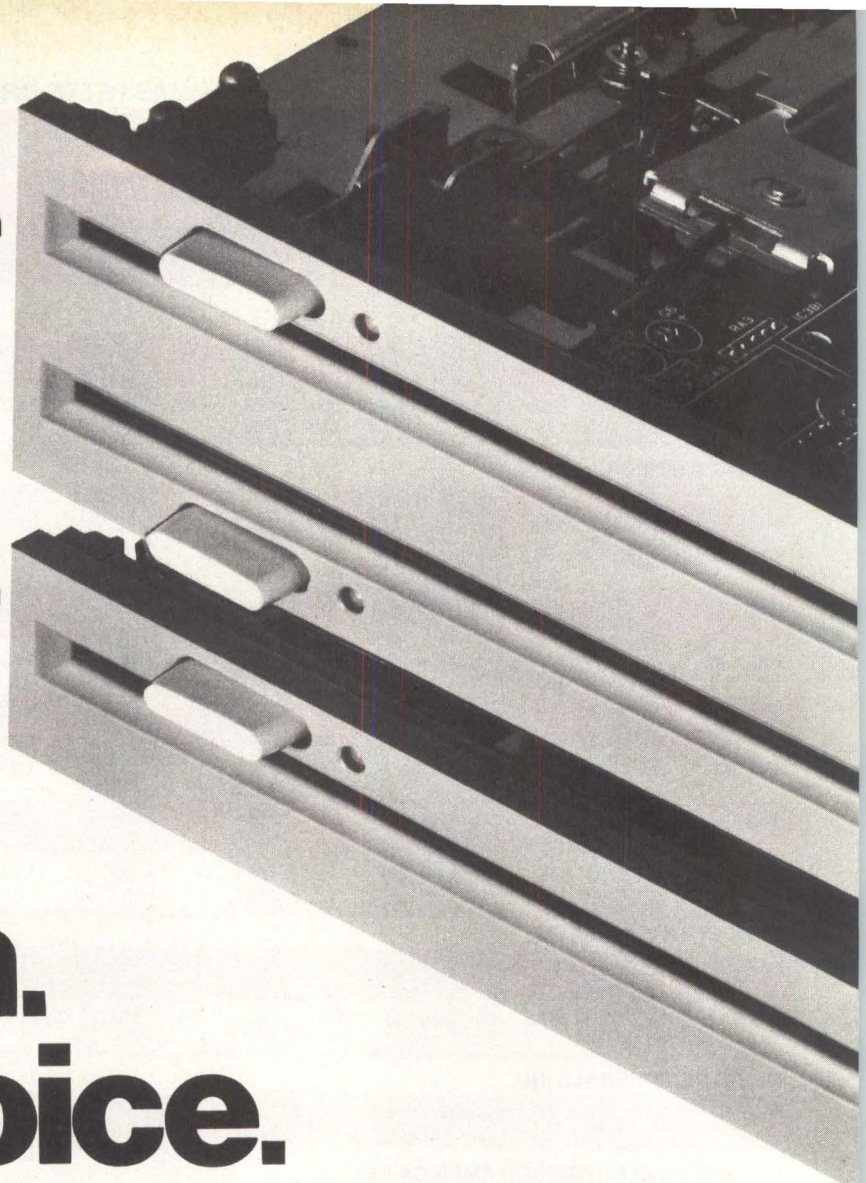
Company Model	Microdiskette size (inches)	Capacity (M bytes)	Single-sided/double-sided	Avg. access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (H x W x D, inches)	Price (\$)	Notes, Features, Options
<b>AMDEK CORP.</b>										
Amdisk III	3	250	single-sided	55	125	40	100	4.25 x 7.5 x 8.75	499 (Q1)	
Amdisk OEM	3	250	single-sided	55	125, 250	40	100	1.77 x 3.74 x 6.02	299 (Q1)	
<b>EPSON AMERICA</b>										
SMD 110	3.5	125, 250	single-sided	97	125, 250		67.5	1.6 x 4 x 6		
SMD 120	3.5	250, 500	single-sided	97	125, 250		67.5	1.6 x 4 x 6		
SMD 130	3.5	250, 500	double-sided	96	125, 250		135	1.6 x 4 x 6		
SMD 140	3.5	500, 1000	double-sided	96	125, 250		135	1.6 x 4 x 6		
SMD 150	3.5	125, 250	single-sided	97	125, 250		67.5	1.6 x 4 x 6		
SMD 160	3.5	250, 500	single-sided	97	125, 250		67.5	1.6 x 4 x 6		low power for battery operation
SMD 170	3.5	250, 500	double-sided	96	125, 250		135	1.6 x 4 x 6		low power for battery operation
SMD 180	3.5	500, 1000	double-sided	96	125, 250		135	1.6 x 4 x 6		low power for battery operation
<b>HEWLETT-PACKARD CO.</b>										
9121D	3.5	875	single-sided	415	500	66	135	2.99 x 12.8 x 11.2	1,270 (Q1)	dual-floppy 437.5K bytes per drive, auto-shutter, open/close media
9121S	3.5	437.5	single-sided	415	500	66	135	2.99 x 12.8 x 11.2	900 (Q1)	auto-shutter, open/close media
<b>MICRO PERIPHERALS INC.</b>										
321/2	3.25	500, 1000	single-sided, double-sided	6	250	80	140	1.625 x 4 x 5.5		
<b>MITSUBISHI ELECTRONICS AMERICA INC.</b>										
MF351	3.5	250	single-sided	94	125, 250	80	135	1.6 x 4 x 5.2	190 (Q1,000)	
<b>SANKYO SEIKI MFG. CO. LTD.</b>										
FDU-300-DA	3	500	double-sided		250	80	100	1.57 x 3.54 x 5.9	152 (Q10,000)	
FDU300-SA	3	250	single-sided		250	40	100	1.57 x 3.54 x 5.9	142 (Q10,000)	
<b>SHUGART CORP.</b>										
SA300	3.5	500	single-sided	158	250	80	135	1.62 x 4 x 6	200 (OEM)	minifloppy-compatible interface
<b>SONY CORPORATION OF AMERICA</b>										
OA-D32V	3.5	500	single-sided	350	500	80	135	2 x 4 x 5.1	230 (Q500)	Sony standard interface
OA-D32W	3.5	1000	double-sided	350	500	80	135	2 x 4 x 5.1	299 (Q500)	Sony standard interface
<b>TABOR CORP.</b>										
TC 500	3.25	500	single-sided	6	250	80	140	1.625 x 4 x 5.5	225 (Q1)	low power requirements, flexible jacket microfloppy
TC 1000	3.25	1000	double-sided	6	250	80	140	1.625 x 4 x 5.5	295 (Q1)	low power requirements, flexible jacket microfloppy
<b>TANDON CORP.</b>										
TM35-1	3.5	500	single-sided	94	250	80	135	1.625 x 4 x 6	182 (Q2,500)	5.25-inch industry-standard interface
TM35-2	3.5	1000	double-sided	94	250	80	135	1.625 x 4 x 6	209 (Q2,500)	5.25-inch industry-standard interface
TM35-3	3.5	500	single-sided	94	500	80	135	1.625 x 4 x 6	182 (Q2,500)	Sony OA-D30V interface
TM35-4	3.5	1000	double-sided	94	500	80	135	1.625 x 4 x 6	209 (Q2,500)	Sony OA-D30V interface

57.5 mm

MODELS MDD 423 & 413

33.5 mm

MODELS MDD 221 & 211



# Canon. The choice.

Canon gives you lots of choices with their 5-1/4" floppy drives and lots of reasons why they should be your choice.

**The choices:**

- Standard half-height panels — or panels 20% thinner than half height: 33.5 mm.
- 96 TPI — or 48 TPI.
- Single drive — or double drive.
- Double drive with two stepper motors.

**The reasons a Canon floppy drive should be your choice:**

Our single drive is only 33.5 mm high — 20% less than a standard half-height drive; our double drive is only about two-thirds the height of a full size drive.

The single drives weigh 1.2 Kg, the double drives 1.9.

The single drives use 0.8A (12V and 5V); the double drives 0.9A (5V) and 1.3A (12V). As you can see, our double drives use 25% less power than two separate single drives — even ours!

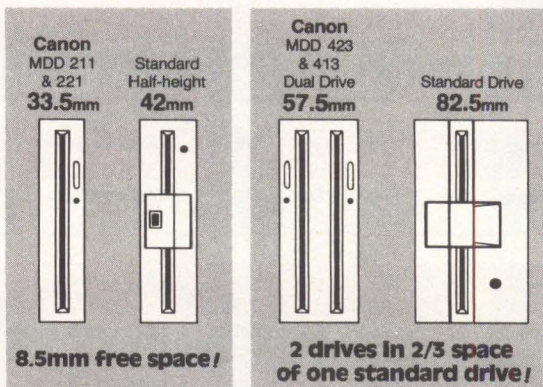
Single-pushbutton media locking and ejection, and anti-crunch mechanism to prevent damage to improperly inserted media. Pushbutton is locked while heads are loaded, automatically.

Extremely thin wear- and shock-resistant head — designed and manufactured by Canon. Soft-landing head mechanism eliminates tap damage...brushless direct drive motor...low parts count...quiet operation...total head shielding...circuit design minimizes noise interference.

Further, our single drives can be used in existing designs because they're available with half-height front panels. The electronics of all our drives are compatible with an industry standard interface.

Canon offers its single drives with track densities of 96 TPI, double density, double side, which can store 1 Mbyte per disk; and its new 48 TPI-drive which can store 0.5 Mbyte per disk. Both of these are available, in quantity, now.

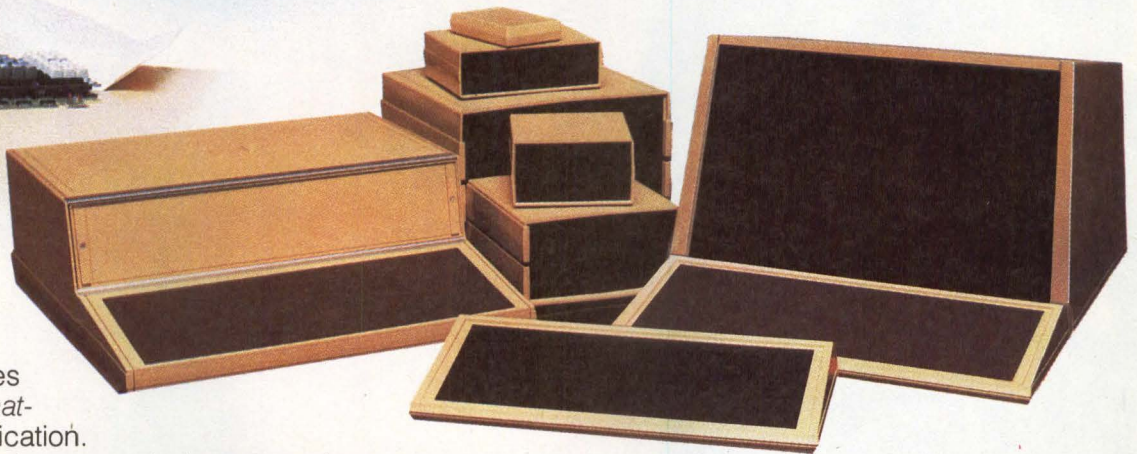
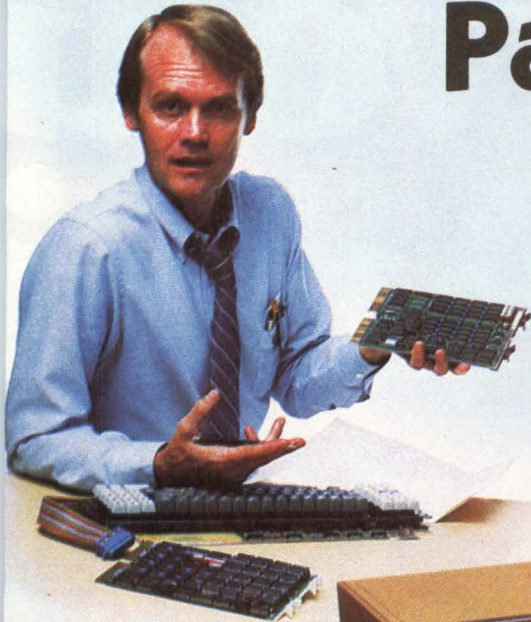
We have much more to tell you about these drives. Call Lee Heller at (516) 488-6700, Ext 4958, Canon U.S.A., Inc., Disk Drive Division, One Canon Plaza, Lake Success, NY 11042.



CIRCLE NO. 47 ON INQUIRY CARD

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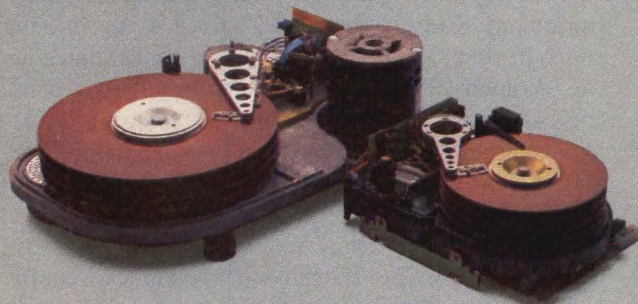
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CIRCLE NO. 49 ON INQUIRY CARD

# Manufacturers of 8-inch Winchesters hang future on 5¼-inch models

ROBERT A. SEHR, Associate Editor

When Al Shugart and Finis Conner founded Seagate Technology in Scotts Valley, Calif., with a modest 5M-byte Winchester disk drive that fit neatly into a minifloppy form factor, they began a second California gold rush—one that stretched all the way to Maynard, Mass., and to Tokyo. Thanks to a little help from IBM Corp.'s Personal Computer group in Boca Raton, Fla., the three-year-old market is expected to top \$300 million this year and nearly \$500 million in 1984, estimates James Porter, disk drive industry analyst and author of the *Disk/Trend Report*. Seagate itself had revenues of \$110 million in the fiscal year ending June 30—all from 5¼-inch Winchester disks. Seagate's closest rival, Tandon Corp., Chatsworth, Calif., earned \$140 million in revenues in fiscal year 1983 from both rigid and floppy drives.

Although all independent analysts have not completed 1983 reports, indications are that Miniscribe Corp., Longmont, Colo., which had only a 4 percent market share in 1982, may be breathing down Tandon's neck in the 5¼-inch Winchester competition. This is primarily the result of Miniscribe's contract to supply 10M-byte Winchesters for IBM Corp.'s XT personal computer. IBM reportedly accounts for as much as 95 percent of Miniscribe's business. Because Miniscribe has been privately held and is now in a quiet period preceding its first public offering, these reports cannot be confirmed.

Other heavyweights in the competitive low-end 5¼-inch Winchester market include Computer Memories Inc., Chatsworth, Calif., Rodime Pl., Glenrothes, Scotland, International Memories Inc. (IMI), Cupertino, Calif., and Disctron Inc., Milpitas, Calif., a subsidiary of Computer & Communications Technology Corp. (CCT), Santa Barbara, Calif. Behind them are many smaller companies. "Nowadays, it is simply a

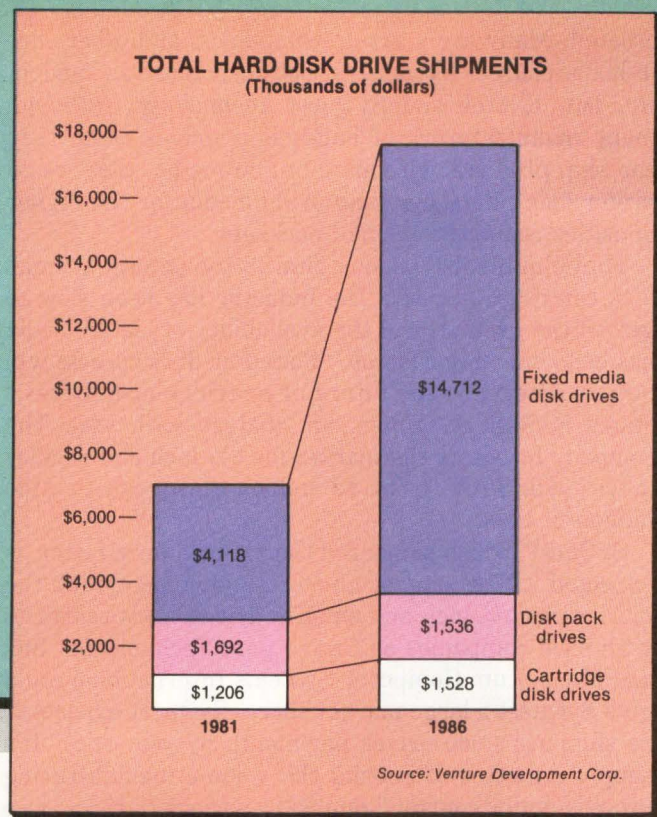
matter of who the survivors will be," observes John Klonick, a former analyst with Dataquest Inc., a San Jose, Calif., market research company, who recently left to join a disk drive company. "I think it will be those companies who keep an eye on the fundamentals of business practice and keep themselves focused in their particular market."

For most low-end manufacturers, the fundamentals include cutting costs by increasing automation, offshore production and vertical integration. Despite "bargain-basement" pricing, customers still demand high-quality products. As a result, comments Scott Holt, vice president of marketing at Seagate, "we don't spend a lot of money on technology—only on manufacturable technology."

The bottom line of the low-end Winchester market is volume. Seagate, Tandon and Miniscribe have succeeded by creating huge assembly lines able to produce as many as 1,000 drives per day. While one eye watches the balance sheet, the other must constantly monitor the process. "I have to be able to bet that you can open any one of our drives on the loading dock and find not a single defect," asserts Holt.

That is even more important in the emerging high-end 5¼-inch Winchester market, in which closed-loop servos and lower track and recording densities are cause for caution in assembly. Unlike 70M-byte, 8-inch and 150M-byte, 14-inch drives, high-end 5¼-inch Winchesters are destined for very high-volume production to meet the needs of a new generation of 32-bit desktop systems with massive operating-system software.

Unlike the low-end market, there are no clear leaders in the high-end 5¼-inch Winchester market, which is jammed with start-ups and newcomers to the 5¼-inch form factor. Among the start-ups are Atasi Corp., one



The 5¼-inch Winchester disk drive market is growing, challenging companies with 8-inch products to expand their lines with the smaller form factor devices. Despite manufacturers' interest in producing high-end 5¼-inch Winchesters, one market analyst predicts these drives will represent less than 20 percent of 5¼-inch drive shipments over the next two years. The 8-inch Winchesters are expected to address a \$2 billion market by 1986, according to Venture Development Corp. forecasts. That market, however, will grow more slowly than the 5¼-inch market, the company predicts.

of the first to ship a 30M-byte, 5¼-inch drive, while Maxtor Corp. was one of the first to ship a 140M-byte drive. Evotek Corp. and Vertex Peripherals have also begun shipments of their drives positioned between those of Atasi and Maxtor.

Low-end heavyweights, such as Seagate and Tandon, are also migrating into the high end. Tandon announced a 50M-byte Winchester at last May's National Computer Conference, and Seagate is expected to introduce a high-end drive late this year or early next year. Meanwhile, companies successful in the 8-inch form factor, such as Priam Corp., Fujitsu America Inc. and Quantum Corp., have announced high-end 5¼-inch drives. Despite the industry interest, analyst Porter believes that high-end drives will represent less than 20 percent of 5¼-inch shipments for at least the next two years. In addition, the industry must first sort out various high-end interface proposals such as the Maxtor-proposed enhanced small-disk interface (ESDI), Priam/Xebec Systems Inc. version of the American National Standards Institute (ANSI) standards proposal for 8-inch drives and Seagate's successor to its pioneer ST-506 interface. For high-end, very high-capacity drives like those of Maxtor and Priam, an interface is critical to a product's success.

Those companies wishing to survive the perceived market for 8-inch Winchesters are hedging their bets by offering 5¼-inch products as well. Quantum, Milpitas, Calif., along with Priam, Micropolis Corp. and Fujitsu is an unscathed survivor of the high-end market for 8-inch Winchesters that saw more than its share of

failures. Despite a forecast of a \$2 billion market for 8-inch Winchesters by 1986, according to Venture Development Corp. (VDC), a Wellesley, Mass., market research company, the 8-inch Winchesters' growth will be slower than that of 5¼-inch products. As a result, Quantum has repackaged its 8-inch Q2000 series into a 20M- to 40M-byte, 5¼-inch drive. Priam, another heavyweight in the 8-inch market, has also introduced a series of high-end 5¼-inch drives ranging from 70M to 110M bytes. The company continues to ship large volumes of its successful 8-inch product. Even Memorex Corp., a long-time competitor in the market for the 14-inch IBM plug-compatible products, has entered the high-end 5¼-inch arena with a 70M-byte drive.

IMI, which announced the first 8-inch Winchester in 1978, has slowly shifted itself into the 5¼-inch market. The company is still a major supplier of 8-inch drives to such customers as Corvus Systems Inc. and Hewlett-Packard Co., but indications are that it will no longer introduce 8-inch products.

Fujitsu has boosted its highly successful 85M-byte, 8-inch Eagle drive to 160M bytes and entered the market for 5¼-inch drives with an 85M-byte product.

Shugart Corp., which lost its market window and finally dropped the 8-inch, 30M-byte SA1100, still dominates the low-end 8-inch market with its SA1000 series. It is now betting its future in the low-end 5¼-inch Winchester market on its half-height 10M-byte drive.

The market for half-height drives is only now emerging, with Miniscribe receiving the largest order so far—a \$35 million contract from TeleVideo Systems Inc. Dataquest's Klonick expects 1983 shipments of half-height drives to be limited. He believes the real thrust will come next spring as the portable computer

market emerges. One of the largest manufacturers of portable computers, Non-Linear Systems Inc.—maker of KayPro portable computers—has signed an \$85 million contract with Tandon for both half-height floppy and half-height, 10M-byte hard drives.

All major participants in the low-end Winchester market have announced plans for half-height Winchesters, and three start-ups have joined them. Cogito Systems Corp. and Microscience International Corp. have begun shipping half-height, 10M-byte drives. The third start-up, Tulin Corp., plans a half-height, 20M-byte drive for introduction at this fall's Comdex show, with production scheduled for early 1984.

The limiting factor in production of half-height drives has been concern about an adequate supply of plated media. For more than a decade, Ampex Corp. and Poly-Disc Systems have been two of the few plated-media suppliers. With the rising demand during the past year, however, plated-media companies are being formed in large numbers. As many as 26 new suppliers of both plated and sputtered thin-film media have been

created. Many are start-up companies, and others are in-house sources for captive customers, such as Tandon, HP, IMI, Evotek and SyQuest Technology. Although many manufacturers of half-height drives claim they can ship products without thin-film media, they would prefer using it rather than oxide media for the higher densities required by small packages.

Thin-film media remains vital to the emerging small disk cartridge market. The industry has been slow to get off the ground, and the availability of plated media has been one major factor. "Plated media's success will largely determine the future of cartridge disk drives," states Melissa A. Yonge, an analyst with VDC. The company forecasts the market for 5¼-inch and smaller drives will grow from \$3 million this year to \$165 million in 1986.

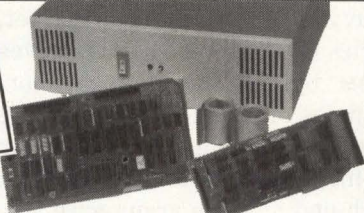
SyQuest, which pioneered the 3.9-inch form factor, is expected to be one of the chief benefactors of the market for 5¼-inch and smaller drives. OEM contracts with such companies as Convergent Technologies Inc. and Momentum Computer Systems International could give SyQuest a large market share. SyQuest expects to be shipping 3,000 drives per month by year-end. "It's simply a matter of getting the volume manufacturing process under control," opines Lawrence Sarisky, vice president of marketing. "We are off and running."

DMA Systems Corp., Santa Barbara, Calif., has been shipping its 5M-byte cartridges since March and now reports shipments of 1,500 drives a month. Cynthia Peripheral Corp., the U.S. marketing arm of French computer giant Cii Honeywell Bull, has cut its 10½-inch cartridge in half to fit the 5¼-inch form factor. Cynthia was expected to begin shipments of its cartridge this fall, as was start-up Athenaeum Technology Inc., Braintree, Mass.

"Price is a paramount issue because the hard disk cartridge market revolves around small computer systems," says VDC's Yonge. "This customer base is more concerned with the price of the overall system and its capabilities than the type of memory."

The market for 8-inch cartridges is not expected to grow as fast, according to VDC. The market is reported to have \$36 million in revenues, which is expected to grow to \$280 million by 1986. Control Data Corp. (CDC) experienced problems with the 8-inch form factor in its fixed/removable Lark I. The company expects to overcome those problems with the Lark II, offering 25M bytes of fixed and 25M bytes of removable storage. Century Data Systems Inc., a Xerox Corp. subsidiary, followed its first 8-inch, 16M-byte cartridge and 32M-byte fixed drive with a new product that offers a 25M-byte cartridge and 50M bytes of fixed storage. The newest player in the 8-inch cartridge market is Amcodyne Inc., Longmont, Colo., which began producing its 25M-byte fixed/25M-byte removable cartridge this summer and now ships about 500 units a month. To support its cartridge business, the company will also introduce its first fixed product, a 160M-byte, 8-inch drive. □

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AVG. POSITIONING TIME (ms)	27	18	20	70	83
TRANSFER RATE (K Bytes/s)	1,012	1,859	1,229	593 / 1,200*	625
INTERFACE	SMD	Modified SMD	SMD	SA4000	ST506/SA4000
POSITIONING METHOD	Rotary Voice-Coil	Rotary Voice-Coil	Rotary Voice-Coil	Buffered Stepper	Buffered Stepper

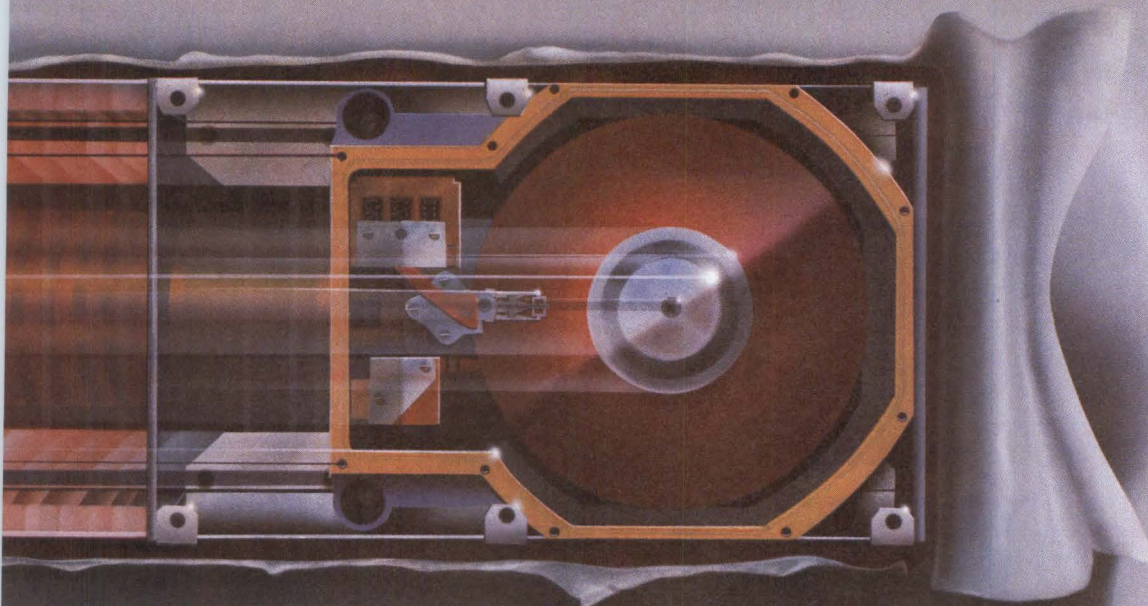
\*48 M Bytes Configuration available only in 1200 K Bytes/s



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	804	105	42ms
	5¼"	502	55
503		71	32ms
504		86	32ms
505		111	32ms

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## 8-INCH AND LARGER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>ADVANCED ELECTRONICS DESIGN INC.</b>									
Winc 08	8.0	47.6	70	1.75		stepper	Q-bus	9,430 (Q1)	disk subsystem, RL02 emulation
<b>ALPHA DATA</b>									
80-8-128/512	8	2.0, 8.0	8	8.19			(See Features)	7,700 (Q1); 18,000 (Q1)	disk subsystem compatible with DG, DEC Unibus, HP, Perkin-Elmer, TI, Modcomp, General Automation, Univac V77
Atlas	8	128.0	18	10.0			SMD, ANSI	8,700 (Q1)	
<b>AMPEX CORP.</b>									
Capricorn C-165/330	14	165.9, 330.3	30	9.67	5, 8	linear motor	SMD		rack mount, self-test diagnostics
<b>APPLIED PERIPHERAL SYSTEMS</b>									
4830	14	337.1, 404.5	25	9.6	5, 6	linear	SMD	8,923 (Q100)	thin film-heads, self-diagnostics, RLL record
4835	14	337.1, 405.5	25	16.16	5, 6	linear	SMD	8,923 (Q100)	thin film-heads, self-diagnostics, RLL recording code techniques, internal power supply
4865	14	640.4	25	16.16	10	linear	SMD	10,423 (Q100)	thin film-heads, self-diagnostics, RLL recording code techniques, internal power supply
<b>CENTURY DATA SYSTEMS</b>									
AMS 315	14	315.2	25	9.66	19	linear voice coil	SMD	6,220 (Q200)	9766-compatible, dual access SMD
AMS 513	14	513.7	25	10.24	19	linear voice coil	SMD	6,600 (Q200)	dual access SMD, A-M soft-sectoring
AMS 571	14	571.0	25	15.36	10	linear voice coil	SMD	8,400 (Q200)	universal power supply
M40	14	40.32	65	7.68	8	stepper	proprietary	2,030 (Q200)	X Marksman 8-bit parallel transfer, optional formatter for disk/tape streamer
M80	14	80.64	50	7.68	6	rotary voice coil	SMD, proprietary	3,040 (Q200)	X Marksman 8-bit parallel transfer, optional formatter for disk/tape streamer
M160	14	161.0	50	10.24	6	rotary voice coil	SMD, proprietary	3,675 (Q200)	Marksman 8-bit parallel transfer, optional formatter for disk/tape streamer
<b>CHARLES RIVER DATA SYSTEMS</b>									
DK-32F	8	40	50	1.64	4	rotary torque	SASI	10,500 (Q1)	disk subsystem compatible with Versabus, includes 1.2M byte 8-inch floppy disk drive
<b>COMPUTER DYNAMICS</b>									
SA 1002	8	5.3	70		2	stepper	ST 506	400 (Q10)	
WIN5	8	5.3	70		2	stepper	IBM-PC, S-100, STD, Apple, Heath	1,400 (Q10)	disk subsystem compatible with IBM-PC, Apple, Heath; S-100 and STD bus
<b>CONTROL DATA CORP.</b>									
9410-1K	8	24.8, 31.0	42	4.34	4, 5	rotary voice coil	SA1000	1,625 (Q500)	variable sectoring
9410-3F	8	8.0, 24.0, 32.0, 40.0	42	6.45	1, 3, 4, 5	rotary voice coil	FDI, LDI, SMD, ISI	1,350 (Q500)	variable sectoring, integral data recovery
9412	8	80.4	25	9.67	5	rotary voice coil	LDI, SMD, ISI	2,770 (Q500)	variable sectoring, integral data recovery
9715-160	9.0	165.9	30	9.6	10	rotary voice coil	SMD, ISI, SDI	4,405 (Q500)	rack mount, fixed/variable sectoring, dual channel access
9715-340	9	344.0	20	9.6	12	linear voice coil	SMD, SDI	6,475 (Q500)	rack mount, fixed/variable sectoring, dual channel access, thin-film heads
9715-500	9	516.0	20	14.4	12	linear voice coil	SMD, ISI, SDI	7,510 (Q500)	thin-film heads, rack mount, fixed/variable sectoring
9730	14	80.0, 160.0	30	9.6	3, 5	rotary voice coil	SMD	4,515 (Q500); 5,180 (Q500)	integral power supply, rack mount

8-in and larger disk drives

## 8-INCH AND LARGER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec)	Transfer rate (M bits sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
9771	14	825.0	16	14.4	8	linear voice coil	SMD, ISI, SDI	9,840 (Q250)	thin-film heads, rack mount
9775	14	679.0	25	9.6	20	linear voice coil	SMD	14,860 (Q500)	internal test and diagnostics, fixed/variable sectoring
<b>CVM SYSTEMS</b>									
M80-F	8	80.0	25	9.6	5	rotary voice coil	SMD	4,450 (Q1)	operator control front panel, rack-mount shelf
<b>CYNTHIA PERIPHERAL CORP.</b>									
D160	10.5	60.0, 90.0, 120.0	40	7.36	2, 3, 4	linear voice coil	proprietary	3,500 (Q100)	optional SASI controller, subsystem packaging available
<b>DATA GENERAL CORP.</b>									
6160/61, 6214	14	73.0, 147.0, 675.0	38	9.6	3		proprietary	18,000 (Q1); 24,000 (Q1); 50,000 (Q1)	
<b>DATA SYSTEMS DESIGN</b>									
880	8	17.8, 20.4, 31.2	65		8	stepper	SA1000	5,495 (Q1); 8,495 (Q1)	Q-bus- and Unibus-compatible disk subsystem, includes single- or double-sided floppy disk drives
890	8	31.2	65		8	stepper	SA1000	8,995 (Q1)	Q-bus compatible disk subsystem, includes 16.25M byte start/stop 1/4-inch cartridge tape drive
<b>DIGITAL DEVELOPMENT CORP.</b>									
530M	14	11.0		2.69	4				militarized head per track
750	14	4.8		9.6	2				ruggedized head per track
M6000	10.5	4.8		4.8	4	pneumatic			ruggedized head per track
<b>DISC TECH ONE INC.</b>									
3306	14	80.0	38	7.96	6		SMD, Priam, OSI	4,000 (Q1)	integrated power supply
4160	14	160.0	38	8.23	5		SMD, Priam	5,000 (Q1)	power supply, rack mount rails
4300	14	300.0	38	10.22	7		SMD, Priam	6,000 (Q1)	power supply
<b>DISCTRON, INC.</b>									
DP400	8.0	46.4	60	7.0	4	linear voice coil	Data Peripherals	1,540 (Q1,000)	
D1600	8.0	157.5	30	9.6	7	linear voice coil	SMD		
<b>DISK MEMORY TECHNOLOGY INC.</b>									
601		5.5	240	3.49	1	stepper motor	ANSI	15,000 (Q1)	ruggedized subsystem compatible with DG, DEC, HP, Perkin-Elmer, TI, Computer Automation, IEEE-488
<b>EMULEX CORP.</b>									
2284/94	14.0	134.8, 268.4	27	9.6	10, 16	voice coil	SMD	7,900 (Q1); 10,500 (Q1)	dual port
2312	8	67.4	20.0	9.6	7	linear motor	SMD	6,675 (Q1)	dual port
9715	8	134.8	30	9.6	10	rotary voice coil	SMD	7,755 (Q1)	dual port
2351	10.5	413.8	18	14.4	20	linear motor	SMD	12,950 (Q1)	dual port
9730/160	14	134.8	30	9.6	10	rotary voice coil	SMD	8,995 (Q1)	dual port
9775	14	551.0	5	9.6	40	linear motor	SMD	21,600 (Q1)	dual port
<b>FUJITSU AMERICA INC.</b>									
M2280/84/94	14.0	84.3, 168.6, 335.5	27	8.0	5, 10, 16	rotary voice coil	SMD		cooling fan

8-in and larger disk drives



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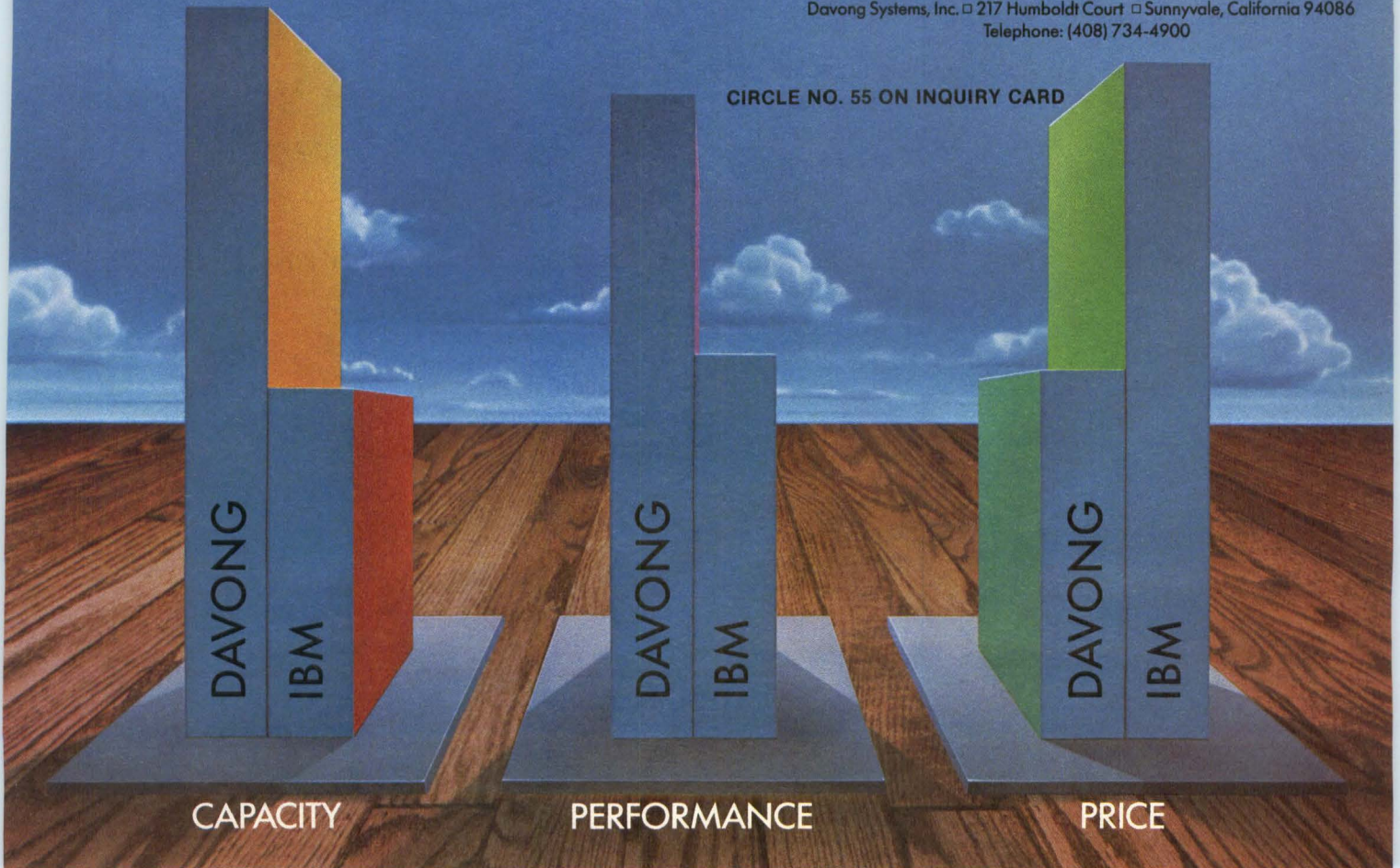
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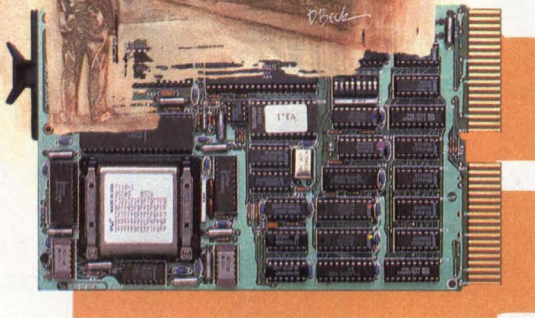
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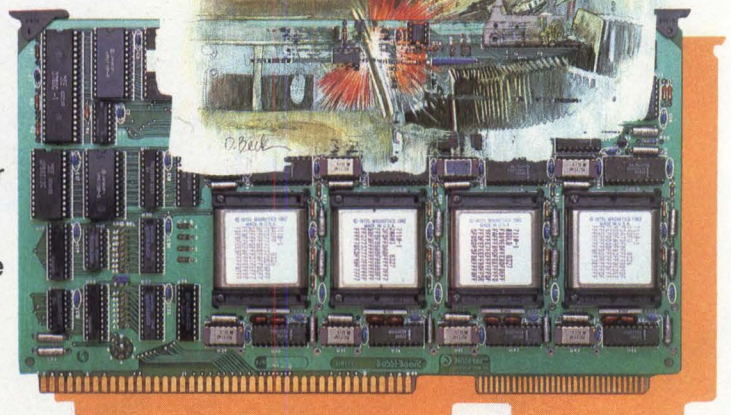
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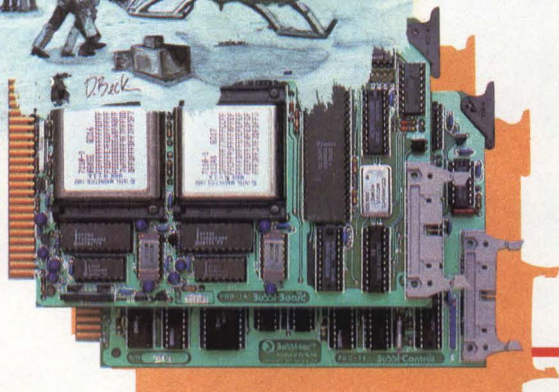
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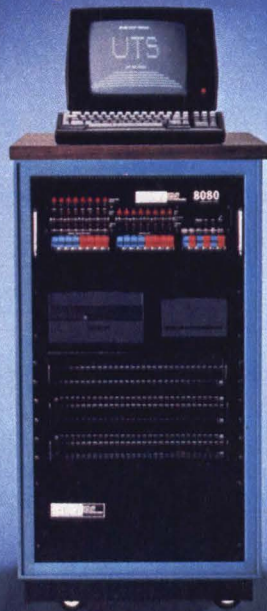
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## 8-INCH AND LARGER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
M2301/02/03	8	11.9, 23.7, 47.5	70	9.6	2, 4, 8	stepper	SA4000		
M2311/12/22	8	48.2, 84.4, 168.6	20	9.8	4, 7, 10	rotary voice coil	SMD		
M2351	10.5	474.2	18	14.87	20	rotary voice coil	modified SMD		universal power supply
<b>HARRIS CORP., COMPUTER SYSTEMS DIVISION</b>									
5332/52	14	80.0, 160.0	30	9.6	5	linear voice coil	SMD	19,900 (Q1); 23,700 (Q1)	includes controller
5662	14	675.0	33	9.6	20	linear voice coil	SMD	31,900 (Q1)	includes controller
<b>HEWLETT-PACKARD CO.</b>									
7914P	14	132.0	36	8.0	4	rotary	IEEE-488	19,500 (Q1)	internal diagnostics, includes internal 67M-byte streaming tape cartridge
<b>HIGHTRACK COMPUTER</b>									
40/80/160	8	48.0, 80.0, 160.0	30	9.6	3, 5, 10	rotary	SMD		
<b>HITACHI AMERICA LTD.</b>									
DKU-97S	14	551.0	20	9.92	20	VCM rotary	SMD	14,000 (Q500)	dual actuator, diagnostic microprocessor
DK8125-5/8/12	8	40.5, 67.4, 94.4	25	9.6	3, 5, 7	VCM rotary	SMD	2,260 (Q1,000); 2,930 (Q1,000); 3,440 (Q1,000)	
DK812S-17	8	134.8	25	9.6	10	VCM rotary	SMD	3,960 (Q1,000)	
<b>IBIS SYSTEMS INC.</b>									
1400 (OEM)	14	1,400.0	16	9.6	16	split-linear motor	custom		
5380-B4	14	2,520.0	16	24.0	30	split-linear motor	bit serial	68,020 (Q1)	
<b>IBM CORP.</b>									
3310 Series	8.0	64.5	27	8.24	11	rotary	proprietary	14,280 (Q1)	
3344B2	14.0	280.0	25	7.0	15	linear radial	proprietary	41,600 (Q1)	
3350A2	14.0	635.0	25	9.58	15	linear radial	proprietary	41,600 (Q1)	
3370A1	14.0	571.3	20	14.87	12	linear	proprietary	44,350 (Q1)	
3375A1	14.0	819.7	19	14.87	12	linear	proprietary	50,720 (Q1)	
3380AA4	14	1,520.0	16	24.0	15	linear	proprietary	116,050 (Q1)	
<b>INTERTEC DATA SYSTEMS</b>									
DSS 10	8	8.6		4.34	4		Compustar	3,095 (Q1)	disk subsystem compatible with Compustar
<b>KENNEDY CO.</b>									
4055/8055	8	33.67, 67.4	38.3	9.6	5	rotary voice coil	SMD, ANSI, Pico Bus	5,800 (Q1); 6,600 (Q1)	includes 1/4-inch cartridge tape drive, rack mountable cabinet, includes power supply
5380/160	14	67.4, 134.8	40	8.0	5, 10	rotary voice coil	SMD	4,595 (Q1); 5,750 (Q1)	rack mountable, includes power supply
6172/73	8	22.6, 37.7	48.3	6.4	3, 5	linear voice coil	SMD, ANSI, Disk Bus	1,995 (Q1); 3,195 (Q1)	

8-in and larger disk drives

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- Computer Manufacturers
- System Integrators

Applied Circuit Technology's UTS-Unit Test Station provides you with the expandability and sheer number of test slots to maximize your test room throughput while breaking the test room bottleneck. Each UTS comes configured to test 4 devices simultaneously. The optional networking capability allows the UTS to link up to 8 systems together in a master/slave configuration, providing simultaneous testing of up to 32 devices. The UTS' industry-leading design and electronics provide the power to perform any level of test required; therefore, insuring the performance and reliability of any rotating memory device. The UTS combines the highest degree of correlation of test results from slot to slot and system to system, and a detailed test data sheet with floppy back-up for archival purposes. The exclusive versatility of the UTS system will provide your testroom with a productive, useful tool.

- Final Production Test
- Receiving Test
- Engineering Development

Disk drive manufacturers can use the UTS to insure the throughput to make shipments while assuring final production reliability. Computer manufacturers and system integrators can use the UTS to insure drive and interface performance on incoming devices before they get into the production line, keeping productivity high. Engineering departments can use the UTS to test and verify prototype designs and to troubleshoot failed production units. Overall flexibility and portability (it's caster mounted) will make the UTS the most sought after test system in your company. Since the UTS is totally software-driven, applications can be changed in the time it takes to call up a new program. With the UTS' built-in 10 megabyte Winchester drive, the process is quick and easy. The UTS' ability to provide both hardcopy and floppy test results allows you to track and analyze failures.

- Hard Disk
- Floppy Disk
- Tape Devices

By means of a simple board change, the UTS employs *all* of its power and flexibility to test any hard disk, floppy disk or tape device, regardless of interface, storage capacity or transfer rate. Applied Circuit Technology's systems today test more than 2,000 5¼" Winchester drives daily. They have greatly contributed to an under-3% return rate for manufacturers, and are quickly becoming the industry standard for rotating memory device test. The UTS system has no planned obsolescence . . . its three (or should we say nine) personalities allow the system to expand and fill the needs of your production, receiving or engineering departments with maximum efficiency and minimum conversion time. *The UTS is competitively priced while providing features the competition can't touch.*



**Applied  
Circuit  
Technology**

2931 La Jolla St., Anaheim, CA 92806  
(714) 632-9230

**Achieve the Standard with Applied Circuit Technology's UTS—The Only System with Three (nine) Personalities.**

Regional sales offices: Westlake Village, CA (805) 496-8778; San Jose, CA (408) 287-8720; Boulder, CO (303) 466-1763

**CIRCLE NO. 57 ON INQUIRY CARD**

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## 8-INCH AND LARGER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
7340, 7380	8	33.67, 67.4	38.3	9.6	5	rotary voice coil	SMD, ANSI, Pico Bus	3,200 (Q1); 3,995 (Q1)	
<b>LOBO DRIVES INT'L</b>									
1850M	8	8.2	70	4.3	4		Apple II	3,085 (Q1)	disk subsystem compatible with Apple II
<b>MEGAVAULT</b>									
16/48/83	8	16.5, 49.7, 82.9	45	9.6	1, 3, 5	rotary voice coil	SMD, ANSI, SCSI	2,200 (Q500); 2,480 (Q500); 2,690 (Q500)	optional dual access
26/80/116	8	26.5, 79.6, 116.1	45	9.6	1, 3, 7	rotary voice coil	SMD, ANSI, SCSI	2,310 (Q500); 2,610 (Q500); 2,900 (Q500)	optional dual access
132/186/212	8	132.7, 185.7, 212.4	45	9.6	5, 7, 8	rotary voice coil	SMD, ANSI, SCSI	3,045 (Q500); 3,150 (Q500); 3,240 (Q500)	optional dual access
MVP132	8.0	132.2, 212.2	45	38.68	8	rotary voice coil	SMD	6,500 (Q500); 7,500 (Q500)	reads and writes with up to four heads simultaneously
<b>MEMOREX CORP.</b>									
101/02	8	9.99, 19.98	70	4.74	4, 8	stepper	SA4000	1,450 (Q100); 1,700 (Q100)	
114	8	39.9	70	9.6	8	stepper	SA4000	2,075 (Q100)	
213/14	8	38.6, 67.5	20	9.6	4, 7	rotary voice coil	SMD	3,465 (Q100); 3,675 (Q100)	closed loop servo system, actuator lock, rack
223/26	8	67.4, 134.8	20	9.6	3, 6	rotary voice coil	SMD	4,500 (Q100); 5,200 (Q100)	rack mountable, automatic actuator lock
680	14	132.0	16	24.0	15	linear voice coil	ISI/IPI	25,100 (Q100)	includes portable maintenance terminal, dual port
<b>MICROPOLIS CORP.</b>									
1400 ANSI	8	83.0, 166.0	22	9.68	5, 10	balanced rotary	ANSI	2,295 (Q1,000)	
1400SMD	8	83.0, 166.0	22	9.68	5, 10	balanced rotary	SMD	2,350 (Q1,000)	
1420	8	92.0, 184.0	26	7.38	5, 10	balanced rotary	proprietary	2,435 (Q1,000)	
<b>MITSUBISHI ELECTRONICS AMERICA INC.</b>									
M2860-1/-2	8	21.73, 50.71	35	6.44	3, 7	linear	SMD		
M2860-3	8	85.37	30	9.6	7	linear	SMD		
<b>MODULAR COMPUTER SYSTEMS</b>									
4177-3	14	67.4	30	9.6	5	linear motor		30,200 (Q1)	optional dual port and computer interfaces
<b>MOHAWK DATA SCIENCES CORP.</b>									
2174	14	10.0	87	7.11	2		parallel	8,200 (Q1)	expandable from 10M to 20M bytes
<b>NATIONAL MEMORY SYSTEMS CORP.</b>									
NMS-02.5, 02, 03	14	84.0, 168.0, 335.0	27	1.012	4, 6, 10	rotary	SMD		dual port option allows two controllers to share access to same drive

8-in and larger disk drives

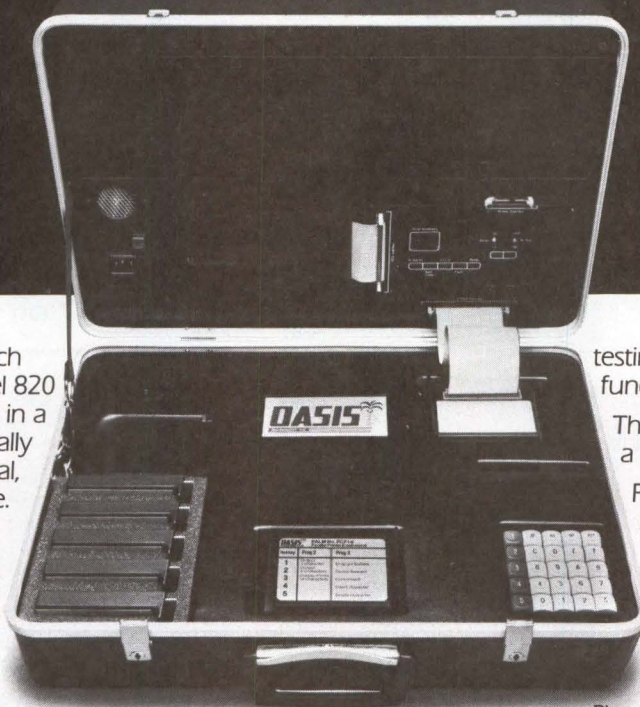
## 8-INCH AND LARGER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec)	Transfer rate (M bits/sec)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
NMS-04	10.5	474.2	18	1.86	10	rotary	SMD		
NMS-01, 01.5	8	48.0, 84.0		1.229	6, 8	voice coil rotary	SMD		two NMS-01's can be mounted horizontally side by side in a 19-inch rack
<b>NEC INFORMATION SYSTEMS INC.</b>									
D1510/50	14	331.5, 663.0	20	9.6	15	linear voice coil	SMD	9,800 (Q100); 13,500 (Q100)	
D2246/50	8	85.0, 167.0	25	9.6	6, 8	rotary voice coil	SMD	3,200 (Q100)	
D2200/30	8	25.0, 42.5	30	9.6	3, 5	rotary voice coil	SMD	2,375 (Q100); 2,735 (Q100)	
<b>NORTHERN TELECOM INC.</b>									
MFD/8202/4/6/10	8	34.77, 69.54, 104.32, 139.0, 173.86	25	9.67	2, 4, 6, 8, 10	rotary	SMD	3,340 (Q500); 3,656 (Q500); 4,045 (Q500); 4,317 (Q500)	dedicated head landing zone
<b>PLESSEY PERIPHERAL SYSTEMS</b>									
850	8	84.0	28.3					10,800 (Q1)	disk subsystem compatible with Plessey 6600/6700 and DEC LSI-11/23 based systems, controller emulates DEC RK06, RK07 and RM02 14-inch drives, compact 5.25-inch high rack mount.
<b>PRIAM CORP.</b>									
3350/6650/15450	14	34.0, 68.0, 158.0	46	8.32	1.5, 3.5	linear voice coil	PRIAM, SMD, SMART	1,900 (Q500); 2,235 (Q500); 3,440 (Q500)	dedicated head landing zone
806/07	8	180.0, 330.0	25	14.5	6, 11	linear voice coil	PRIAM, ANSI, SMD		
3450	8	35.5	42	6.44	5	linear voice coil	PRIAM, ANSI, SMD	2,325 (Q100)	
7050	8	70.5	39	6.44	5	linear voice coil	PRIAM, ANSI, SMD	2,920 (Q100)	
803	8	85.68	35	9.6	5	linear voice coil	PRIAM, ANSI, SMD	3,065 (Q100)	
804	8	105.7	39	9.6	5	linear voice coil	PRIAM, ANSI, SMD	3,280 (Q100)	
805	8	160.0	39	14.51	5	linear voice coil	PRIAM, ANSI, SMD		
<b>QUANTUM CORP.</b>									
Q2010/20/30	8	8.4, 16.8, 25.2	60	4.34	2, 4, 6	rotary torque	SA1000	1,175 (Q500); 1,475 (Q500); 1,775 (Q500)	
Q2040	8	33.6	65	4.34	8	rotary torque	SA1000	2,075 (Q500)	
Q2080	8.0	67.41	40	4.34	7	rotary torque	SA1000	2,450 (Q500)	automatic actuator lock
<b>SCIENTIFIC MICRO SYSTEMS</b>									
FWT 80000	8	37.7		4.34	2, 8	IEEE-796			disk subsystem
FWT-0100	8	71.4	70	4.34	4, 8		LSI-11, PDP-11		disk subsystem compatible with DEC PDP-11, LSI-11
FWT-50000	8	71.4		4.34	2, 8		Shugart 1403D		disk subsystem compatible with DEC PDP-11, LSI-11, Multibus

8-in and larger disk drives

# UNIVERSAL PERIPHERAL TESTER

It's portable.  
It tests all  
peripherals.  
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anywhere.



Never has so small tested so much for so little. The new Oasis Model 820 is a universal tester and exerciser in a portable briefcase that tests virtually any computer peripheral to actual, real use specifications. Anywhere.

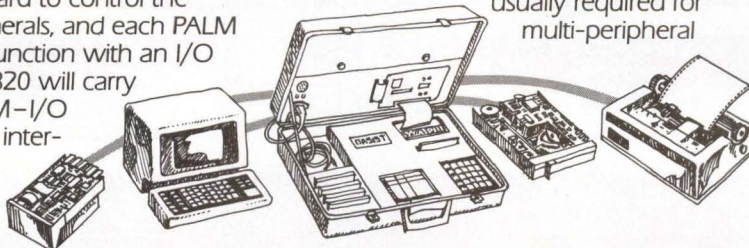
And at a price that is the most cost effective in the industry.

**BIG POWER.** This one portable case will test 5¼" ST-506 Winchester disc drives, parallel and serial printers, 5¼" and 8" floppys, and RS-232C CRT's. The micro-processor is driven by an expanding range of program cartridge modules (PALMs) with non-volatile memory. These PALMs which hold programs for each application are commanded via the keyboard to control the various peripherals, and each PALM works in conjunction with an I/O module. The 820 will carry up to six PALM-I/O modules with interface cables.



**SMALL CASE.** It's portable. This 15 pound multi-peripheral tester and exerciser makes an ideal field service tool.

**TINY PRICE.** Because the Oasis 820 replaces the many dedicated devices usually required for multi-peripheral



testing, it has the lowest cost per test function.

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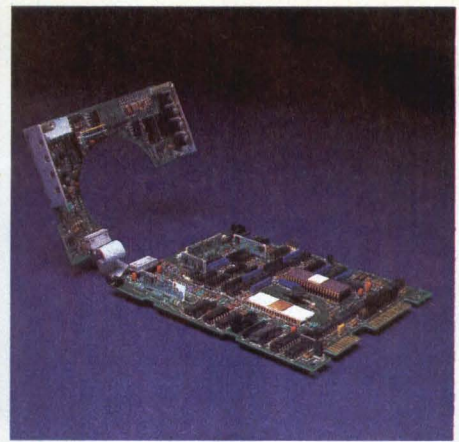
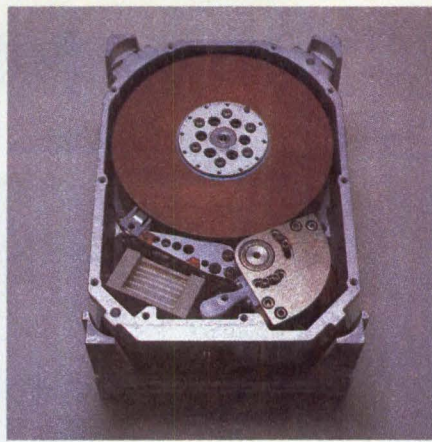
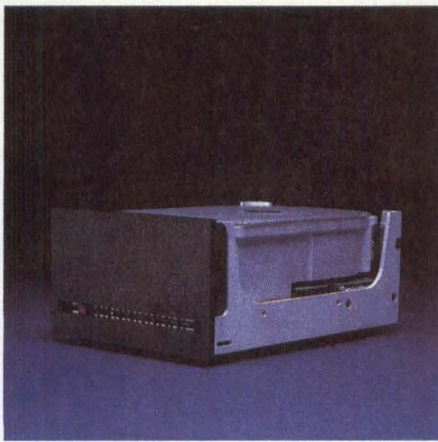
**EUROPE:** HAL COMPUTERS LIMITED Invinible Road, Farnborough, Hants, U.K., 0252-517175, Telex: 858404. MINI-MICRO SYSTEMS/Fall 1983 **CIRCLE NO. 58 ON INQUIRY CARD**

## 8-INCH AND LARGER FIXED DISK DRIVES

8-in and larger disk drives

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>SHUGART CORP.</b>									
SA1002/04	8	4.2, 8.4	70	4.34	2, 4	band	SA1000	988 (QOEM)	
SA4004/08	14	12.4, 24.8	65	7.1	2, 4	band	SA1000	1,365 (QOEM); 1,759 (QOEM)	
<b>STORAGE TECHNOLOGY</b>									
8654	14	1,270.0	23	9.58	30	linear voice coil	native interface	32,125 (Q100)	
8775	14	635.0	23	9.58	15	linear voice coil	ANSI, SMD	12,715 (Q100)	extensive diagnostics, one microprocessor-controlled adjustment
<b>SYSTEM INDUSTRIES</b>									
3100-94	14	277.0	33.3	9.6	10	linear	SMD		interfaces to Data General Nova, Eclipse
9900-94	14	256.0	33.3	9.6	10	linear	SMD		interfaces to DEC VAX, PDP-11
3100-84	14	147.0	37.12	8.0	5	rotary	SMD		interfaces to Data General Nova, Eclipse
9900-51	10.5	414.0	25.58	14.88	10	rotary	SMD		interfaces to DEC VAX, PDP-11
3100-51	10.5	380.0	25.58	14.88	10	rotary	SMD		interfaces to Data General Nova, Eclipse
<b>TECMAR INC.</b>									
41200	8	10.0	100	6.4	4	linear stepping motor	ST506	3,995 (Q1)	one floppy expansion chassis
42200	8	10.0			4	linear stepping motor	ST506	4,995 (Q1)	two floppy expansion chassis
<b>TECSTOR INC.</b>									
Series 3/83/ 100/166/199/ 315/332	14	83.0; 100.0; 166.0; 199.0; 315.0; 332.0	29	9.6	5, 6, 10, 12, 19, 20	rotary	SMD	4,400 (Q100); 4,500 (Q100); 4,850 (Q100); 5,000 (Q100); 5,600 (Q100); 5,700 (Q100)	RETMA rack, diagnostics, common spares
<b>TELEFILE COMPUTER PRODUCTS</b>									
T3283	14.0	256.2	30	9.6	19	linear voice coil	SMD	28,320 (Q1)	hard or soft sectoring; single-phase power requirement
T3285	14	553.0	23	9.58	15	linear voice coil	SMD	43,938 (Q1)	hard or soft sectoring; self-test diagnostics
<b>3M/DATA RECORDING DIV.</b>									
8533	8	60.0	29	7.46	4	rotary voice coil	ANSI 1226	3,380 (Q100)	
8432	8	20.0	65	7.46	4	rotary stepper	ANSI 1226	1,735 (Q100)	
<b>TOSHIBA CORP.</b>									
MK80F-10/20/30	8	15.3, 23.0, 38.3	40	9.6	2, 3, 5	rotary voice coil	SMD		
MK182F	8	83.0, 116.1, 165.9	35	9.6	5, 7, 10	rotary voice coil	SMD		
<b>U.S. DESIGN</b>									
CSS-835/70	8	35.0, 70.0	42	800.0	5	voice coil	Q-bus, Unibus, Multibus	8,995 (Q1); 9,995 (Q1)	22M-byte 1/4-inch cartridge tape drive
<b>WANG LABORATORIES INC.</b>									
2265V-3	14	640.0	25	9.6	20	linear voice coil	SMD	38,000 (Q1)	





What could be more natural?

As a leading supplier of high-performance 8" Winchesters, it was only logical that we offer a 5¼" version. And give it ST506/412 compatibility.

Not to mention speed. The Micropolis 1300 Series, with capacities of 25.9, 43.2, and 51.9 megabytes, guarantees an honest 33 msec seek time including settling, and features our proven FASEEK™ actuator control system. Which makes the 1300 ideal for high-performance applications like multi-user/multi-tasking, CAD/CAM, and local

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And the 1300 is built to last. Thanks to a unique, independently suspended chassis-within-a-chassis design and balanced rotary voice coil positioner, which minimize its susceptibility to the shock and vibration hazards of today's office computer environment. What's more, the 1300's adaptive electronics package allows adjustment-free installation. And complete microprocessor control coupled with an electronics-free HDA

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So, if you're looking for a 5¼" Winchester with the proven design features and manufacturing expertise of our 8" drives, look to Micropolis.

Because we're the only company that can give them to you.

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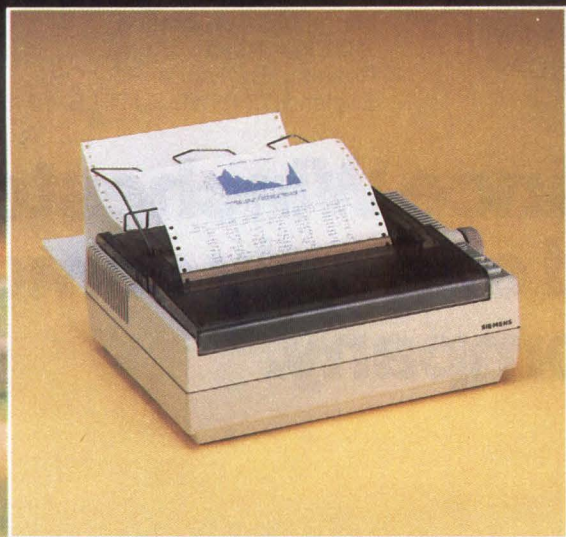
**A 5¼" high-performance Winchester  
this fast and rugged can only come  
from one company.**

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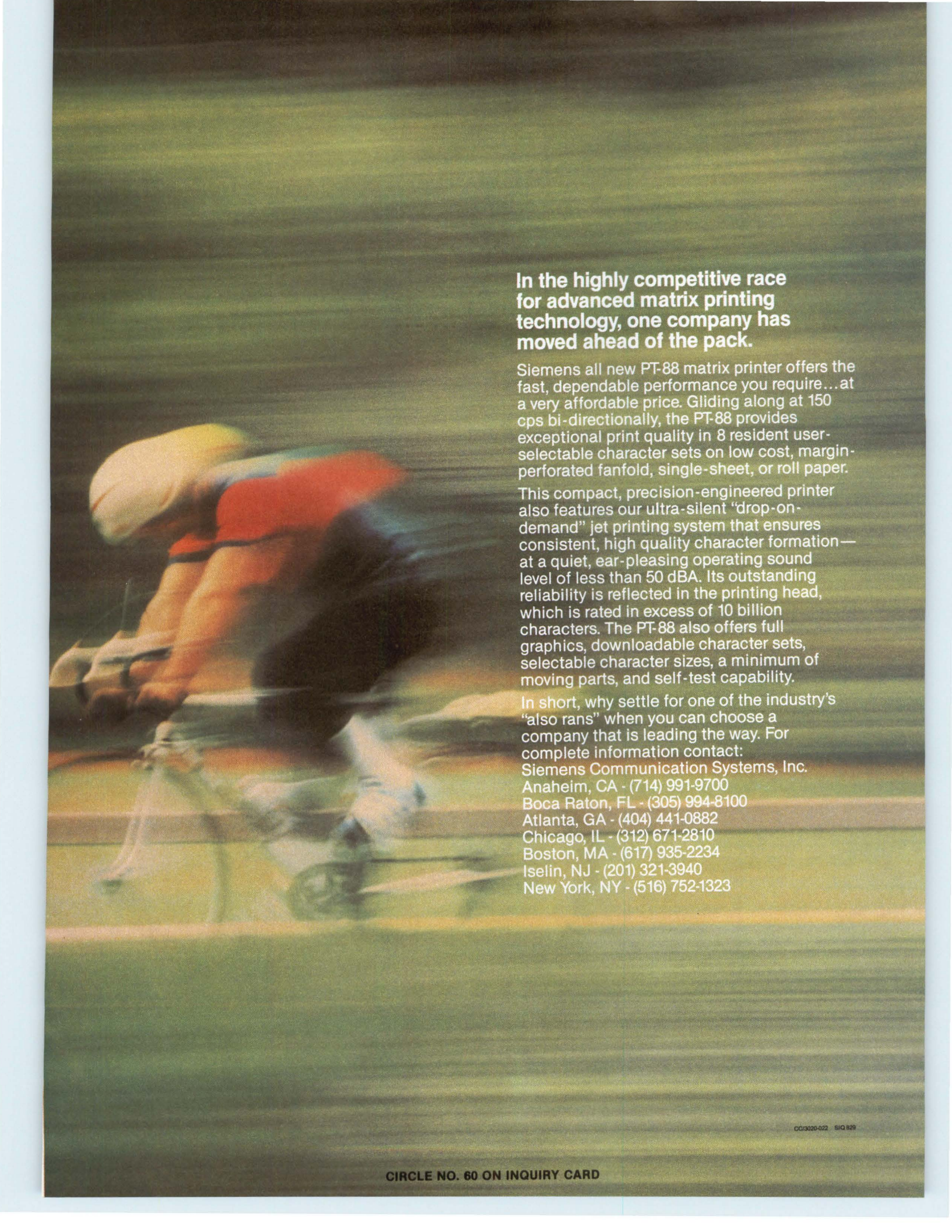
CIRCLE NO. 59 ON INQUIRY CARD

SIEMENS

# Built for Speed.



The silent PT-88 jet printer...  
from Siemens.



**In the highly competitive race for advanced matrix printing technology, one company has moved ahead of the pack.**

Siemens all new PT-88 matrix printer offers the fast, dependable performance you require... at a very affordable price. Gliding along at 150 cps bi-directionally, the PT-88 provides exceptional print quality in 8 resident user-selectable character sets on low cost, margin-perforated fanfold, single-sheet, or roll paper.

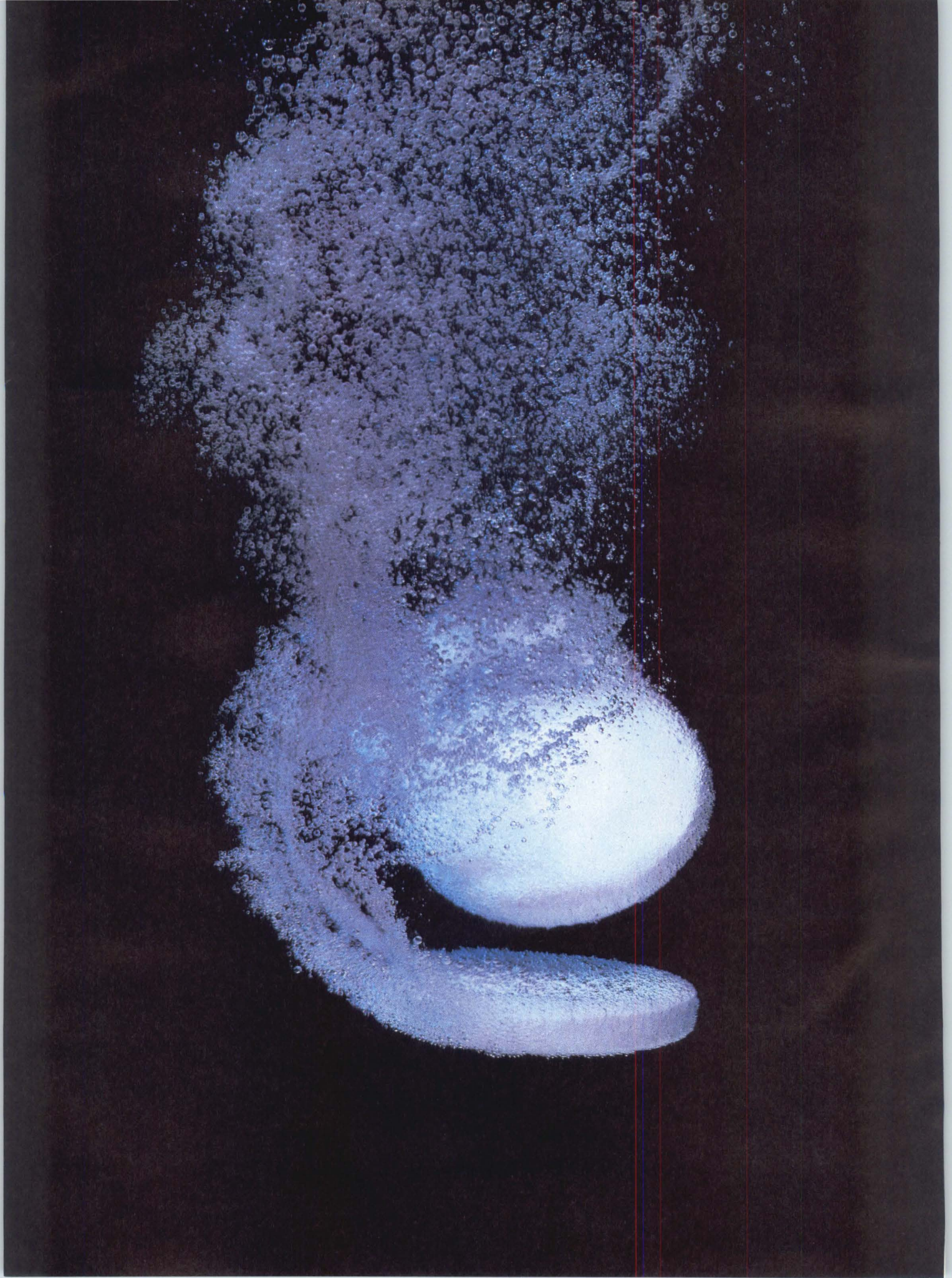
This compact, precision-engineered printer also features our ultra-silent "drop-on-demand" jet printing system that ensures consistent, high quality character formation — at a quiet, ear-pleasing operating sound level of less than 50 dBA. Its outstanding reliability is reflected in the printing head, which is rated in excess of 10 billion characters. The PT-88 also offers full graphics, downloadable character sets, selectable character sizes, a minimum of moving parts, and self-test capability.

In short, why settle for one of the industry's "also rans" when you can choose a company that is leading the way. For complete information contact:

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CO/3020-022 SIQ 829

CIRCLE NO. 60 ON INQUIRY CARD



# HOW TO BUILD A STATE OF THE ART SYSTEM WITHOUT LIVING IN A STATE OF ANXIETY.

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Which is one of the reasons Intel is the one company uniquely qualified to relieve your worries.

Another is because when we produce the leading edge in commercial & military microprocessors (which is rather often), we don't do it in a vacuum.

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Because if you're going to push the state of the art, you should do it with someone who knows how it feels.

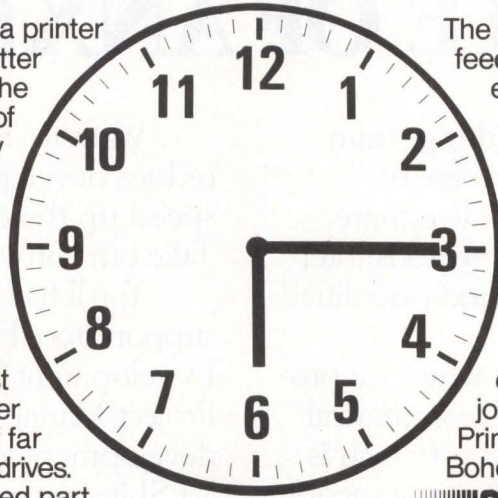
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# Primage I for the long run.

In high volume situations, where a printer must work overtime producing letter quality documents, Primage I is the winner hands down. As a matter of fact, it's the only high-quality daisy wheel printer on the market that runs at 45 cps—all day every day—yet sells for under \$2,000 with a fully automatic sheet feeder.

This cost-performance breakthrough is the result of an exclusive patented control technology which enables relatively low-cost stepping motors to drive the printer with the speed and precision of far more expensive servo-type motor drives. The simplified design and reduced part count increases the printer's reliability as well as reducing its cost.



The controls are simplified. Paper feeding is easier. The choice of fonts is expanded. And the unique 100-spoke daisy wheel provides selectable multiple languages that can be changed by a remote host system.

It's running circles around printers with sheet feeders that cost up to 50% more. So contact Primages and find out what Primage I can do for your operation its very first day on the job—and for the long run ahead.

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## 5 1/4 INCH AND SMALLER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>ADVANCED DIGITAL CORP.</b>									
5 1/4 Disk Subsystem	5.25	5.0, 20.0					S-100	1,800 ; 2,000 (Q1) (Q1)	disk subsystem compatible with S-100 bus
<b>ADVANCED ELECTRONICS DESIGN INC.</b>									
Winc 05	5.25	12.38	93	2.07		stepper motor	Q-bus	5,033 (Q1)	disk subsystem, includes 500K byte floppy drive, RL01, RX02 emulation
<b>A.M. ELECTRONICS</b>									
6.7 Mini Winchester	5.25	5.0	75	5.0	4			1,200 (Q1)	disk subsystem compatible with Apple II. IIe; IBM PC; TRS-80 III
<b>AMPEX CORP.</b>									
Pyxis P-7/P-13/ P-20/P-27	5.25	5.24, 10.48, 15.72, 20.96	90	5.0	2, 4, 6, 8	stepper motor	ST506		built-in diagnostics
<b>APPARAT INC.</b>									
IBM Hard Disk Subsystem	5.25	10.0, 26.0	80	5.0	6, 8		IBM PC	1,995 ; 3,395 (Q1) (Q1)	disk subsystem compatible with IBM PC
Radio Shack Hard Disk Subsystem	5.25	5.0, 10.0, 15.0, 26.0	80	5.0	2, 4, 6, 8		Radio Shack	1,489 ; 1,735 (Q1) (Q1) 1,945 ; 2,499 (Q1) (Q1)	disk subsystem compatible with Radio Shack TRS-80 I, III
<b>APPLE COMPUTER INC.</b>									
Profile	5.25	5.0	95	5.0	4		Apple	2,195 (Q1)	disk subsystem compatible with Apple III
<b>A.R. BUSINESS SYSTEMS</b>									
DS105/10/20	5.25	5.0, 10.0, 20.0		5.0	2, 4, 8			2,495 ; 2,695 (Q1) (Q1) 3,350 (Q1)	disk subsystem compatible with Apple II; TRS-80 I, II, III; IBM PC
<b>ATASI CORP.</b>									
3020/33/46	5.25	15.6, 26.0, 36.4	30	5.0	3, 5, 7	linear voice coil	ST506/412	1,350 ; 1,500 (Q1,000) (Q1,000) 1,650 (Q1,000)	standard 5.25 inch form factor, automatic carriage lock, head landing zone
<b>ATHENAEUM TECHNOLOGY INC.</b>									
Aegis 30	5.25	30.0	35	5.0	6	linear voice coil	ST506	1,300 (Q1,000)	soft sectoring
<b>BERING INDUSTRIES</b>									
Series 3000	5.25	5.0, 10.0, 15.0	48.3	1.39	2, 4, 6	voice coil	ST506	2,860 (Q1)	disk subsystem includes HP-IB controller
<b>B.T. ENTERPRISES</b>									
200505/10/15/20	5.25	5.0, 10.0, 15.0, 20.0		5.0	2, 4, 4, 8		Radio Shack	2,399 ; 2,549 (Q1) (Q1) 2,699 ; 2,950 (Q1) (Q1)	disk subsystem compatible with Radio Shack TRS-80 I, II, III, IV and 16
<b>CAMEO ELECTRONICS</b>									
2005/20	5.25	5.0, 20.0		5.0	2, 4			2,295 ; 4,195 (Q1) (Q1)	disk subsystem compatible with Victor 9000, NEC APC, Zenith Z-100, Xerox 820-2, IBM PC, Apple II, Radio Shack TRS-80 II
<b>CMC INTERNATIONAL</b>									
Targa 50-1, 100-3, 150-3	5.25	5.0, 10.0, 15.0		5.0	4, 6, 6			1,550 ; 2,390 (Q1) (Q1) 2,850 (Q1)	disk subsystem compatible with IBM PC, S-100 systems
<b>COGITO SYSTEMS</b>									
906	5.25	5.0	85	5.0	2	buffered stepper motor	ST506/412	795 (Q100)	head landing zone, actuator lock
912	5.25	10.0	85	5.0	4	buffered stepper motor	ST506/412	895 (Q100)	head landing zone, actuator lock
<b>COMMODORE BUSINESS</b>									
D9060, D9090	5.25	4.98, 7.47		5.0	2		Com- modore	2,995 ; 3,495 (Q1) (Q1)	disk subsystem compatible with Commodore IEEE models

5 1/4-in disk drives

## 5 1/4 INCH AND SMALLER FIXED DISK DRIVES

5 1/4-in disk drives	Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>COMPUKIT</b>										
	5, 10, 15 Megabyte Hard Drive	5.25	5.0, 10.0, 15.0	85		2, 4, 6			1,295 ; 1,495 (Q1) ; 1,695 (Q1)	compatible with TRS-80 I, II, III, 12, 16, IBM PC, Apple II, Iie, Lobo Max 80
<b>COMPUTER MEMORIES INC.</b>										
	4213/26	5.25	10.5, 26.7	75	5.0	2, 4	rotary torque	ST506		closed loop servo, manganese-zinc heads
	5206, 5412, 5619	5.25	6.4, 12.8, 19.1	80	5.0	2, 4, 6	open loop stepper	ST506		manganese-zinc heads
	6213, 6426, 6640, 8660, 8880	5.25	13.3, 26.7, 40.0, 60.0, 80.0	40	5.0	2, 4, 6, 8	rotary torque	ST506		manganese-zinc heads
<b>COMPUTER PRODUCTS INTERNATIONAL</b>										
	11mb Hard Disk	5.25	11.0	15.5	5.0			DEC Rainbow	2,795 (Q1)	disk subsystem compatible with DEC Rainbow
<b>COMREX INTERNATIONAL INC.</b>										
	CR-1510	5.25	10.0	85	5.0	4		Epson QX-10	2,295 (Q1)	disk subsystem compatible with Epson QX-10
<b>CONTROL DATA CORP.</b>										
	9270-6	3.5	6.38	117	5.0	2	band	ST506	510 (Q5,000)	plated media, thin-film heads, measures 1.625 x 4
	9415-3/21; -3735	5.25	21.17, 35.12	45	4.84	3, 5	rotary voice coil	FDI, LDI, ISI, ESDI	1,175 ; 1,485 (Q500) (Q500)	head landing zone, variable sectoring
	9415-3/83	5.25	83.19	35	4.84	9	rotary voice coil	FDI, LDI, ISI, ESDI	1,875 (Q500)	head landing zone, variable sectoring, thin-film heads
	9415-5/21; -5/36	5.25	21.7, 36.29	45	5.0	3, 5	rotary voice coil	ST506	1,175 (Q500)	head landing zone, variable sectoring
	9415-5/85	5.25	85.96	35	5.0	9	rotary voice coil	ST506	1,875 (Q500)	head landing zone, variable sectoring, thin-film heads
<b>CORONA DATA SYSTEMS INC.</b>										
	Personal Hard Disk 5/10	5.25	5.0, 10.0	85	5.0	2		ST506	2,195 ; 2,695 (Q1) (Q1)	disk subsystem compatible with IBM PC, Corona PC, and IBM PC compatibles
	Starfire 5/10	5.25	5.0, 10.0	85	5.0	2		ST506	2,195 ; 2,695 (Q1) (Q1)	disk subsystem compatible with Apple II and Apple II compatibles
<b>CORVUS SYSTEMS INC.</b>										
	6	5.25	7.0	125	7.68	4	stepper motor	IMI	2,195 (Q1)	disk subsystem compatible with Corvus Workstations, Apple, Atari 800, IBM PC, DEC VT-180/LSI-11 Rainbow, NEC PC-800, Osborne 1, Radio Shack, Xerox 820, S-100
	11, 20	5.25	14.0, 21.0	72	5.5	4, 6	stepper motor	IMI	2,995 ; 3,995 (Q1)	disk subsystem compatible with Corvus Workstations, Apple, Atari 800, IBM PC, DEC VT-180/LSI-11 Rainbow, NEC PC-8000, Osborne 1, Radio Shack, Xerox 820, S-100
<b>CROMEMCO</b>										
	HD-20	5.25	18.0	49	5.0	6		S-100	3,995 (Q1)	compatible with S-100 systems
<b>CYNTHIA PERIPHERAL CORP.</b>										
	D530/50/70	5.25	30.8, 51.4, 72.0	30	5.0	3	rotary voice coil	ST412/506, SASI	1,480 ; 1,880 (Q100) (Q100) ; 2,200 (Q100)	subsystem packaging available
<b>DATAFLUX</b>										
	5800R	5.25	40.0	68	5.5	6	stepper motor	ST506	9,975 (Q50)	dual drives in a ruggedized, militarized chassis with controller for LSI-11



## 5¼ INCH AND SMALLER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>DATAMAC</b>									
DD6/12/18	5.25	5.0, 10.0, 15.0	5.0	2, 4, 6				1,895 ; 2,395 (Q1) 2,695 (Q1)	disk subsystem compatible with IBM PC, Columbia, Compaq
<b>DATAPoint CORP.</b>									
9301	5.25	20.0	75	5.08			Microbus	8,000 (Q1)	integrated 20M-byte tape drive for backup
9313/15	5.25	5.0, 10.0	85	5.08			Microbus	3,950 (Q1)	integral 1M-byte floppy diskette for backup
<b>DAVONG SYSTEMS INC.</b>									
Universal External Hard Disk	5.25	5.2, 10.4, 15.6, 21.8, 32.6	110, 40	5.0	2, 4, 6		IBM PC, Apple II, IIe, III; Osborne 1	1,995 (Q1)	power supply, optional 18M byte streaming tape back-up
Internal Hard Disk	5.25	5.2, 10.4, 15.6, 21.8, 32.6	110, 40	5.0	2, 4, 6		IBM PC, XT	1,645 (Q1)	optional power supply
<b>DIGITAL EQUIPMENT CORP.</b>									
RCD-50A	5.25	5.0		5.0	2		DEC	3,500 (Q1)	disk subsystem compatible with DEC Professional 350
<b>DISCTRON INC.</b>									
507/14/19/26	5.25	6.38, 12.75, 19.13, 25.5	77	5.0	2, 4, 6, 8	rotary stepper motor	ST506/412	555 ; 655 (Q1,000) 755 ; 895 (Q1,000)	
D-700 Series	5.25	26.9, 44.9, 62.7	35	5.0	3, 5, 7	linear voice coil	ST 412		dedicated head landing zone, uses same form factor and mountings as a standard minifloppy
<b>EVOTEK CORP.</b>									
ET-5510/20/40	5.25	7.81, 15.62, 31.24	49	5.0	2, 4, 8	stepper motor/linear actuator	ST506		thin-film plated media, on-board diagnostics
ET-5810/20/30/40	5.25	12.90, 25.83, 38.75, 51.68	49	8.2	2, 4, 6, 8				thin-film plated media, on-board diagnostics
ST-5530	5.25	23.43	49	5.0	6	stepper motor/linear actuator	ST506		thin-film plated media, on-board diagnostics
<b>FUJITSU AMERICA INC.</b>									
M2230/33/34/35	5.25	6.7, 13.3, 20.0, 26.6	83	5.0	2, 4, 6, 8	stepper motor	ST506		SA 4000 I/O
<b>HEWLETT-PACKARD CO.</b>									
9133A & B	5.25	4.6, 9.6	168	5.0	2	stepper motor	HP-IB	3,040 ; 3,950 (Q1) (Q1)	includes 437.5K-byte, 3½-inch floppy disk drive
9133V & XY	5.25	4.6, 14.5	85	5.0	2	stepper motor	HP-IB	3,040 ; 3,650 (Q1) (Q1)	includes 437.5K-byte, 3½-inch floppy disk drive
9134A	5.25	4.8	168	5.0	2	stepper motor	HP-IB	3,040 (Q1)	
9134B & XY	5.25	9.6, 14.5	85	5.0	2	stepper motor	HP-IB	3,345 (Q1)	
9135A	5.25	4.6	168	5.0	2	stepper motor	HP-IB	3,950 (Q1)	
<b>INTERFACE INC.</b>									
I²BM-5, -10, -15	5.25	5.3, 10.6, 15.9	85		1, 2, 3		IBM PC/XT, Apple II	1,695 ; 1,995 (Q1) (Q1) 2,295 (Q1)	disk subsystem compatible with IBM PC, XT, Apple II
<b>INTERNATIONAL MEMORIES INC.</b>									
2306/12	5.25	5.0, 10.0	68	5.0	4	stepper motor	ST506/412	615 (Q500)	half-height
5006H/12H	5.25	5.0, 10.0, 15.0	68	5.0	2, 4, 6	stepper motor	ST506/412	535 ; 615 (Q500) (Q500) 715 (Q500)	
5650H	5.25	41.0	49	5.0	8	stepper motor	ST506/412	990 (Q500)	

5¼-in disk drives

# ACCORDING TO OUR THIS IS IM



Since we first entered the Winchester market two years ago, we've accomplished many things our competition claimed were impossible.

It was impossible, they said, for a floppy disk company to make a significant dent in the highly competitive Winchester market.

We've not only made a dent, we're the second-largest company in the business, and we have the capacity in place to be first.

It was impossible to expand our production capacity from 0 to 60,000 drives a month practically overnight. But we did it.

It was impossible to sell Winchesters at

such a low cost. But last year our 500 series drives were introduced at under \$500, 30% under then-standard industry costs. And since then, we've led the industry to ever-lower costs on full and half-height drives.

It was impossible to produce and ship high-performance plated media drives in high volume at prices lower than most vendors are charging for oxide media drives. One of our competitors backed away from plated media because they couldn't buy enough of it to build drives in efficient quantities.

We solved that problem by building our

# OUR COMPETITION, POSSIBLE.



own plated media factory dedicated to plated media production in high volume. Because we make our own, our costs are low and we are independent of outside vendors for supply.

It was impossible for a start-up company to produce and ship a broad line of products: full and half-height drives, open and closed-loop, from 6.4 to 50 MB. But we've done it. With the help of one of the industry's best-funded R&D programs. And with our steady supply of plated media, we will soon be offering 5¼" drives that push Winchester technology to the limits of its

capacity. In high volume. At prices that are pure Tandon.

Impossible?

For our competition, yes.

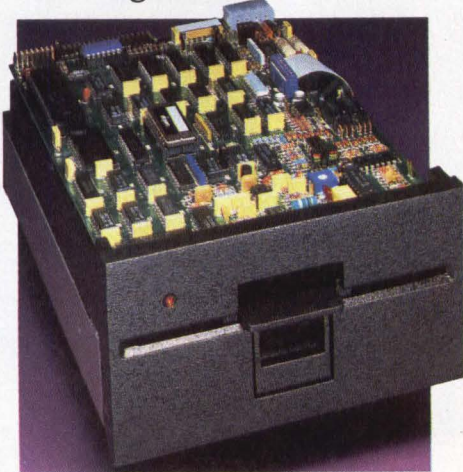
But not for the Tandon Winchester Company.

**TANDON WINCHESTER COMPANY.**

**Tandon**  
THE MOST SUCCESSFUL DRIVE  
COMPANIES YOU EVER HEARD OF.

# Only One Ultra-High Capacity Floppy Drive Has A Track Record You Can Bet On.

## The Amlyn 3.2 Megabyte 5¼" Single Diskette Drive...



### 18 months of solid proof: Amlyn's 170tpi runs as dependably as 48tpi.

It's a fact.

Amlyn's super-high-density floppy drive technology is not merely state-of-the-art. It's also tried and true.

Because when you're putting together a new system, you're staking your reputation. So it's nice to know that thousands of Amlyn high-density drives are already out in the world. Specifically, our 8 megabyte MiniPac drives—using the same 170tpi technology as our new single-diskette model.

And the record shows they're working like champs. Just like good old 48tpi. So well, in fact, that several second sources are already employing our techniques.

The reliability data is actually pretty remarkable. And a copy is yours free, just for the asking.

### Keep it simple and you keep it reliable.

We know what floppy disk drives have to go through.

That's why we keep ours clean and uncomplicated. With conservative design. No pushing of technology beyond reliable limits.

That's why we've focused on the

fundamentals. Like fast access times and rock-solid accuracy. That's why we've used an elegantly simple closed-loop servo. A Mylar optical scale integrated into the carriage, to internally compensate for any environmental changes.

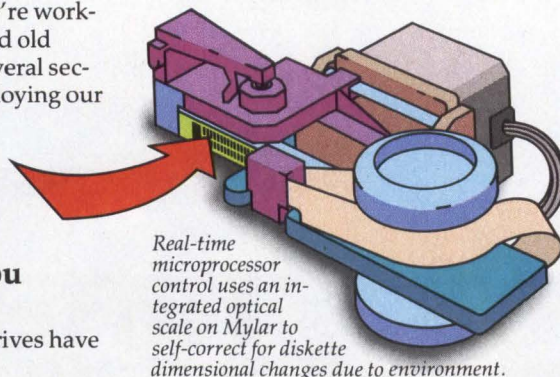
A single-reference-track diskette that's readily available from multiple suppliers. And which provides incredible tracking precision without head alignment hassles. A microprocessor-controlled stepper motor that gives 88ms average access time. And virtually eliminates audible noise.

### Terrific system-cost advantages. And it's easy to integrate.

The price is more good news. Amlyn memory has one of the best price-performance ratios in the business.

And when you consider the design-time economies of simplified interface and formatting, the savings really begin to multiply. Amlyn's standard SA850 interface and 500Kbit transfer rate need only the most minimal controller and software modifications.

In other words, don't be surprised when you have an Amlyn diskette drive running on your prototype in two days to two weeks. Seriously.



*Real-time microprocessor control uses an integrated optical scale on Mylar to self-correct for diskette dimensional changes due to environment.*

### Evaluate it immediately on your Apple or IBM PC.

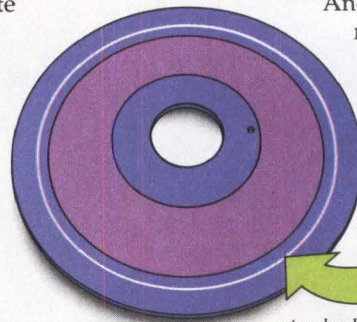
If you have an annual requirement for 100 or more units, we've got a deal for you:

**CIRCLE NO. 63 ON INQUIRY CARD**

Right now you can buy up to five units at some rather attractive trial-offer discounts. And that includes both drives and evaluation subsystems.

These ready-to-go Success Kits let you plug in and play on any Apple II or IBM PC that might be available.

And, believe it or not, even a non-technical person can have them up and operating in less than two hours.



*Amlyn drives use industry-standard UHR-II diskettes with a single reference track. No need for you to embed additional servo information in data tracks. (Of course, Amlyn also reads existing 48-, 96- and 100tpi diskettes.)*

Model 1860 Single-Diskette Drive: 3.2Mbyte Double-Sided	\$300.
Model 9710 Success Kit: Evaluates the 1860 on Apple II	\$795.
Model 9720 Success Kit: Evaluates the 1860 on IBM PC	\$795.
Model 5850 Five-Diskette Drive: 8Mbyte Single-Sided MiniPac	\$500.
Model 9610 Success Kit: Evaluates the 5850 on Apple II	\$995.
Model 9620 Success Kit: Evaluates the 5850 on IBM PC	\$995.

### Call now.

Don't wait.

Because the sooner you get an Amlyn ultra-high capacity floppy drive into your system, the sooner you get the jump on your competition.

And isn't that what this business is all about?

Amlyn Corporation, 2450 Autumnvale Drive, San Jose, California 95131  
Phone: (408) 946-8616  
TWX: 910-379-0029, TLX: 171627  
In Europe, call: (32) (2) 513 87 94

**amlyn**  
Advancing flexible disk drive technology

See Us at Comdex, Booth #566.

MINI-MICRO SYSTEMS/Fall 1983

## 5¼ INCH AND SMALLER FIXED DISK DRIVES

Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>IQ SYSTEMS</b>									
Graymatter 5, 10, 20	5.25	5.0, 10.0, 20.0	85	5.0	4, 8			1,995; 2,495; 3,695 (Q1)	disk subsystem compatible with Apple II, IBM PC, TRS-80 II, Osborne, Xerox 820
<b>J &amp; M SYSTEMS LTD.</b>									
JHD-5/10/15	5.25	5.0, 10.0, 15.0		5.0	2, 4, 6		Radio Shack	1,795; 1,995 (Q1) (Q1) 2,195 (Q1)	disk subsystem compatible with Radio Shack TRS-80 III, IV
<b>LEADING EDGE</b>									
Hard Disk III	5.25	6.4	85	1,000		split band stepper	IBM-PC, TRS-80	1,995 (Q1)	disk subsystem for IBM-PC, TRS-80; 12.8 and 19M byte versions available
<b>LOBO DRIVES INTERNATIONAL</b>									
950 M	5.25	4.9	170	5.0	4		Apple II	2,405 (Q1)	disk subsystem compatible with Apple II
<b>MAEZON — DIVISION OF KONAN CORP.</b>									
V5000/10000/15000	5.25	6.38, 12.76, 19.14	85	5.0	2, 4, 6	stepper motor		1,995 (Q1)	
<b>MAXTOR CORP.</b>									
EXT-4075/4175/4280/4380	5.25	76.4, 178.4, 280.4, 382.4	30	10.0	3, 7, 11, 15	rotary voice coil	ESDI	1,295 (Q1,000)	
XT-1065/1105/1140	5.25	66.9, 105.1, 143.4	30	5.0	7, 11, 15	rotary voice coil	ST506/412	1,520 ; 2,100 (Q1,000) (Q1,000) 2,690 (Q1,000)	
XT-2085/2140/2190	5.25	89.2, 140.2, 191.2	30	5.0	7, 11, 15	rotary voice coil	ST506/412	1,670 ; 2,295 (Q1,000) (Q1,000) 2,955 (Q1,000)	
<b>MEMOREX OEM</b>									
306/10/13	5.25	5.24, 7.86, 10.52	95	5.0	4, 6	stepper motor	ST506/412	550 ; 630 (Q1,000) (Q1,000) 655 (Q1,000)	
321	5.25	5.24, 10.49, 15.73	95	5.0	2, 4, 6	stepper motor	ST412	545 ; 655 (Q500) (Q500) 765 (Q500)	buffered fast step
512/13/14	5.25	23.62, 39.36, 55.11	25	5.0	3, 5, 7	linear voice coil	ST412/SECA	1,100 ; 1,400 (QOEM) (QOEM) 1,700 (QOEM)	built-in diagnostics
<b>MICRO MAINFRAME</b>									
MFSDF	5.25	5.2, 10.6	40	5.0	2			2,495; 2,795 (Q1) (Q1)	disk subsystem compatible with Z80 computers
<b>MICROPOLIS CORP.</b>									
1302/03/04	5.25	25.9, 43.2, 51.9	33	5.0	3, 5, 6	balanced rotary	ST506/412	975 ; 1,250 (Q1,000) (Q1,000) 1,450 (Q1,000)	
<b>MICROSCIENCE INTERNATIONAL CORP.</b>									
HH-612	5.25	10.0	85	5.0	2	band & stepper motor	ST506/412	525 (Q10,000)	half-height, low power requirements
<b>MINISCRIBE CORP.</b>									
2006/12; 5338	5.25	5.0, 10.0, 30.0	85	5.0	2, 4, 6	rack & pinion	ST412/506	474 ; 563 (Q1,000) (Q1,000) 895 (Q1,000)	
3006/12	5.25	5.0, 10.0	85	5.0	2	rack & pinion	ST412/506	425 ; 499 (Q1,000) (Q1,000)	half-height drive
5451	5.25	40.0	90	5.0	8	rack & pinion	ST412/506	980 (Q1,000)	
<b>MITSUBISHI ELECTRONICS AMERICA INC.</b>									
M4863-2/-3	5.25	6.66, 10.0	75	5.0	4, 6		SA600, ST506		

5¼-in disk drives

# SHARE THE WEALTH WITHOUT SPENDING A FORTUNE.

The Peripheral Processor Link from Ranyan. It lets PDP-11, LSI-11 and VAX computers share memory. Without making you invest in a whole new system.

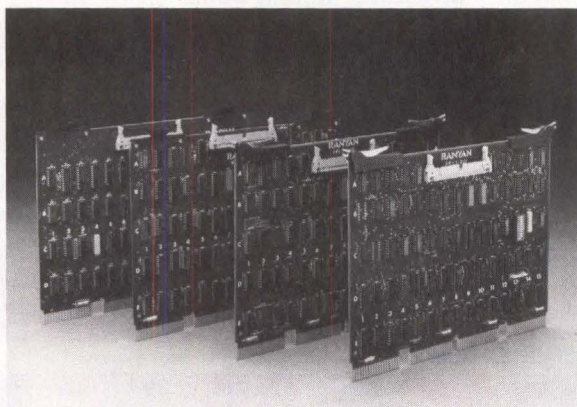
**Two for the price of one.** Ranyan's PPL-1 and PPL-2 allow DEC users to share memory for vastly improved system performance. Without the drawbacks of DMA links, multi-ported memories, local area networks, or other communications links. By providing a comprehensive interface between any of DEC's LSI-11, PDP-11 and VAX computer systems, the Peripheral Processor Link makes one computer's memory available to the other, as if it were its own. And allows you to maintain the valuable investment in your existing system, often without having to upgrade at enormous expense for more power.

**Unforgettable performance.** By allowing Unibus or Q-Bus computers to share memory, the Peripheral Processor Link not only dramatically adds computing power, but also provides for parallel processing. Or redundancy computing with one system backing up another so there's never any lost data. Plus data communications and data acquisition system front-ending to keep a host from wasting valuable overhead on menial protocol chores. And unlike other "so-called" means of memory sharing, no special software is required with the Peripheral Processor Link.

**More sharing.** To add sophistication in a multiple system environment we offer our MSM-1/5 Multi-Shared Memory Series. This intelligent shared memory subsystem allows the clustering of up to 4 DEC CPU's in 5 configurations, and comes complete with a processor, memory and shared memory links, housed in a 5 1/4" rack-mountable chassis. Up to 3 additional backplane slots are available for custom interfacing.

**Memorable users.** When we introduced the Peripheral Processor Link series nearly two years ago, some very big names took notice. And action. Industry giants like Teledyne, General Electric, Raytheon, and Western Electric; plus scientific labs at Cal Tech and the University of Wisconsin are all using it in their systems. But you don't have to be a big name to take advantage of its big benefits. Especially with its very small price.

For more about the Peripheral Processor Link or any of our DEC system enhancements, call or write Ranyan today. And start sharing the wealth. Ranyan Corporation, 15239 Springdale Street, Huntington Beach, CA 92649. 714-895-5504.



# RANYAN

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## 5 1/4 INCH AND SMALLER FIXED DISK DRIVES

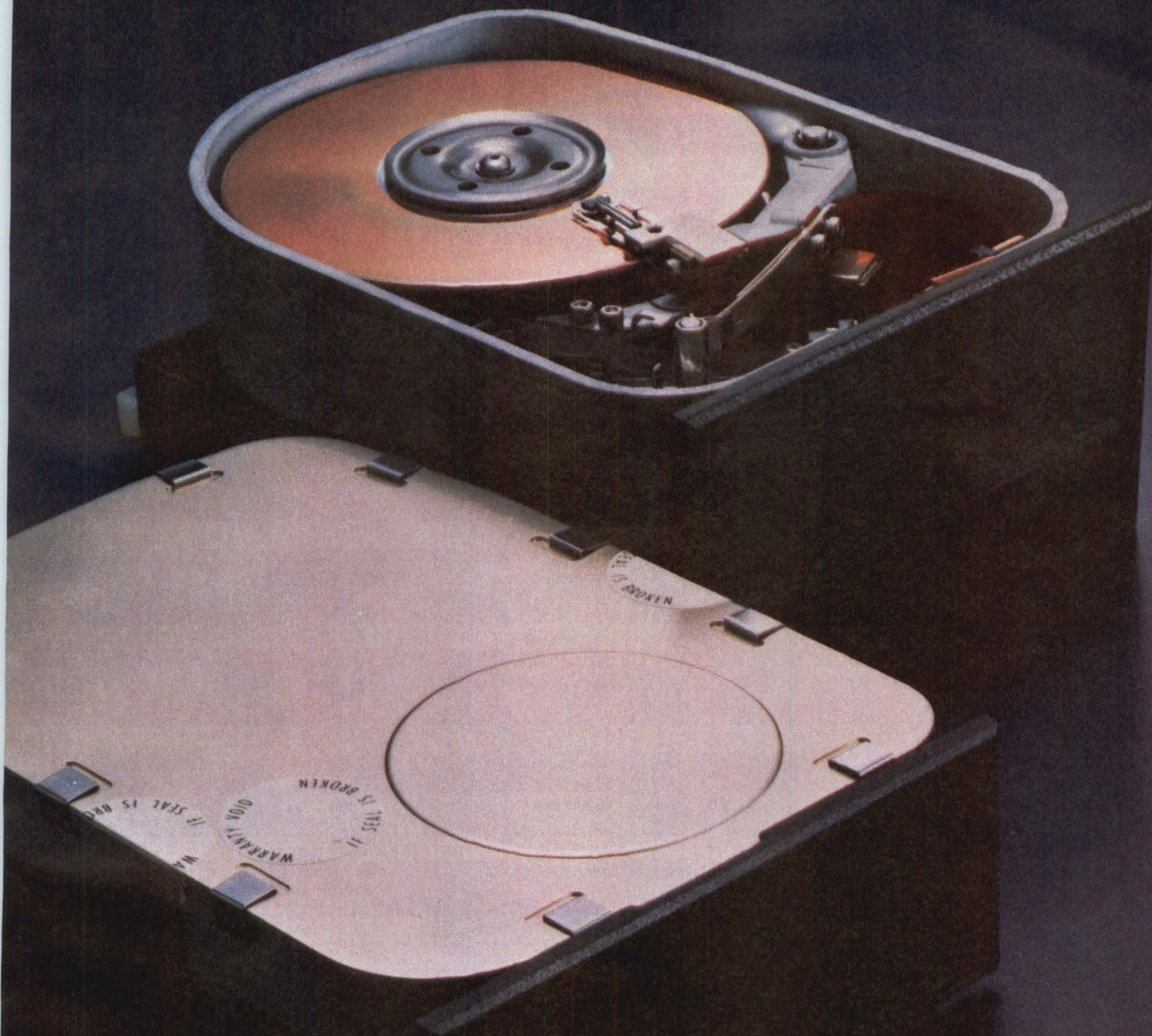
Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>MODULAR COMPUTER SYSTEMS</b>									
4185-2	5.25	20.2	158	5.0	2	rotary		8,300 (Q1)	optional second 20.2M-byte disk or 653K-byte floppy disk
<b>MOUNTAIN COMPUTER</b>									
ST 506, 406, 412, 419	5.25	2.5, 5.0, 10.0, 15.0	85	5.0	4, 2, 4, 6			1,100 ; 965 (Q1) (Q1) 1,215 ; 1,465 (Q1) (Q1)	disk subsystem compatible with IBM PC; Apple II, III
<b>MYARC</b>									
WDS100	5.25	5.0, 10.0, 15.0		5.0	2, 4, 6		T1 99	2,599 ; 2,999 (Q1) (Q1) 3,399 (Q1)	disk subsystem compatible with T1 99
<b>NEC INFORMATION SYSTEMS INC.</b>									
5214/24/34/44	5.25	6.45, 12.91, 19.37, 25.83	85	5.0	2, 4, 6, 8	split band/stepper	ST506/406		optional data separator
<b>NETRONICS R &amp; D LTD.</b>									
Auto-Patch 6/12	5.25	5.0, 10.0		5.0	4		S-100	2,995 ; 3,495 (Q1) (Q1)	disk subsystem compatible with S-100 computers
<b>NIPPON ELECTRIC INDUSTRY CO. LTD.</b>									
RD-4064/4127/4191/4225	5.25	6.4, 12.7, 19.1, 25.5	85	5.0	2, 4, 6, 8		ST412		WD-1000 compatible disk controller
RD-5067/5133/5100	5.25	6.7, 10.0, 13.3	70	5.0	4		ST506		WD-1000 compatible disk controller
<b>PERCOM DATA</b>									
PHD-5/10/20	5.25	5.0, 10.0, 20.0	85	5.0	2, 4, 8		Apple, IBM, TRS-80	1,895 ; 2,295 (Q1) (Q1) 2,995 (Q1)	disk subsystem compatible with Apple, IBM, TRS-80
<b>PLESSEY PERIPHERAL SYSTEMS</b>									
FDV21H	5.25	10.4	70	5.0	6	stepper motor	Q-bus		RL01, RL02 emulator, expands to 40M bytes
PM FSV21	5.25	10.4	70	5.0	6		Q bus		emulates DEC RLV11/RL01-RL02, available with either 1/4-inch tape drive and tape backup with utility program or two slimline double-sided double-density floppies
<b>POLYMORPHIC SYSTEMS</b>									
HD/18	5.25	18.0	70	5.0	4		ST506	4,439 (Q1)	cabinet, controller, power supply, cables, software
<b>PRIAM CORP.</b>									
502/04	5.25	55.0, 86.0	32	5.0	7, 11	linear voice coil	ST412	1,550 ; 1,950 (Q500) (Q500)	dedicated head landing/shipping zone
503/05	5.25	71.0, 111.0	32	6.45	7, 11	linear voice coil	ANSI/PRIAM	1,850 ; 2,500 (Q500) (Q500)	dedicated head landing/shipping zone
<b>QUALITY COMPUTER SERVICE</b>									
DSK 62/63/64	5.25	12.0, 20.0, 40.0		5.0	2, 4, 4			2,599 ; 2,999 (Q1) (Q1) 4,499 (Q1)	compatible with Altos; Apple II; Epson; Heath/Zenith 89, 90; IBM PC; Lobo Max 80; TRS-80 I, II, III, 16
<b>QUANTUM CORP.</b>									
Q520/30/40	5.25	16.78, 25.17, 33.55	45	5.0	4, 6, 8	rotary torque	ST412/506	895 ; 995 (Q1,000) (Q1,000) 1,095 (Q1,000)	
<b>QUASAR DATA PRODUCTS INC. (QDP)</b>									
HD-10/15/30	5.25	10.0, 15.0, 30.0	80	5.0	4, 8	stepper motor	QDP	3,995 ; 4,995 (Q1) (Q1) 7,995 (Q1)	disk subsystem for S-100 includes power supply, controller, interface/cable and cabinet
<b>QUENTIN RESEARCH</b>									
505/10/15	5.25	5.0, 10.0, 15.0	80	5.0	2, 4, 6		Apple	2,195 ; 2,395 (Q1) (Q1) 2,695 (Q1)	disk subsystem compatible with Apple II, IIe

5 1/4-in disk drives

## 5¼ INCH AND SMALLER FIXED DISK DRIVES

5¼-in disk drives	Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options	
	520, 531	5.25	20.0, 31.0	40	5.0	4, 6		Apple	2,995 ; 3,195 (Q1) (Q1)	disk subsystem compatible with Apple II, IIe	
	<b>RADIO SHACK/TANDY</b>										
	8.5 Hard Disk	5.25	5.0		4.34	4		Radio Shack	3,495 (Q1)	disk subsystem compatible with Radio Shack TRS-80 II, 12, 16	
	<b>RODIME PLC</b>										
	RO200 Series	5.25	5.25, 10.5, 15.75, 21.0	90	5.0	2, 4, 6, 8		ST506		self diagnosis	
	RO200E Series	5.25	31.5, 42.0	55	5.0	6, 8		ST506		self diagnosis	
	RO350 Series	3.5	5.0, 10.0	85	5.0	2, 4		ST506		small size, low weight, low power consumption, mounting frame available to make size compatible with half height 5.25 inch drive	
	<b>SANTA CLARA SYSTEMS</b>										
	SCS 5/10/15	5.25	5.0, 10.0, 15.0	85	5.0	2, 4, 6			1,995 ; 5,056 (Q1) (Q1)	disk subsystem compatible with Apple II, III; IBM PC	
	<b>SEAGATE TECHNOLOGY</b>										
	ST212	5.25	10.0	85	5.0	2	stepper motor	ST506	790 (Q500)	half-height drive	
	ST406/12	5.25	5.0, 10.0	85	5.0	2, 4	stepper motor	ST506	610 ; 760 (Q500) (Q500)		
	ST419	5.25	15.0	85	5.0	6	stepper motor	ST506	895 (Q500)		
	ST425	5.25	20.0	60	5.0	6	stepper motor	ST506	1,090 (Q500)		
	ST506	5.25	5.0	170	5.0	4	stepper motor	ST506	610 (Q500)	first 5.25-inch Winchester announced and shipped	
	<b>SHUGART CORP.</b>										
	SA607/12	5.25	5.0, 10.1	92	5.0	2, 6	band		500 ; 620 (QOEM) (QOEM)		
	SA706/12	5.25	5.0, 10.2	99	5.0	2, 4	band		444 (QOEM)	half-height drive	
	<b>SYQUEST TECHNOLOGY</b>										
	SQ306F	3.9	5.0	70	5.0	2	stepper motor	ST506	800 (Q1)	half-height drive	
	<b>SYSGEN</b>										
	1/2	5.25	10.0, 40.0	80	4.8	8, 16		SASI	2,995 (Q1)	up to two 5.25-inch Winchesters, 20K byte streaming cartridge backup, controller	
	<b>SYSTEMS GROUP</b>										
	HD2907	5.25	16.0	72	5.0	4		S-100	2,762 (Q1)	disk subsystem compatible with S-100	
	<b>TALLGRASS TECHNOLOGIES CORP.</b>										
	1000/1200/1400	5.25	6.25, 12.5, 19.7	85	5.0	2, 4	stepper motor	IBM-PC	2,295 ; 2,895 (Q1) (Q1) 3,595 (Q1)	disk subsystems compatible with IBM-PC	
	3006/12/20	5.25	6.25, 12.5, 19.7	85	5.0	2, 4	stepper motor	IBM-PC	3,095 ; 3,795 (Q1) (Q1) 4,495 (Q1)	built-in tape backup, disk subsystem compatible with IBM-PC	
	3035	5.25	35.0	45	5.0	5	voice coil	IBM-PC		built-in tape backup, disk subsystem compatible with IBM-PC	
	<b>TANDON CORP.</b>										
	251/52	5.25	6.4, 12.8	85	5.0	2, 4	stepper motor			half-height drive	
	501/02/03	5.25	6.4, 12.8, 19.1	85		2, 4, 6			440 ; 550 (Q2,500) (Q2,500) 660 (Q2,500)		
	703/05	5.25	30.1, 50.1	39		5	rotary voice coil		945 (Q2,500)		
	<b>TARBELL ELECTRONICS</b>										
	HDS-5-16	5.25	15.0	79	5.0	6		S-100	2,375 (Q1)	disk subsystem compatible with S-100	





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Otari has excelled in the design and manufacture of magnetic tape handling equipment for over twenty years.

Now Otari redefines excellence in another magnetic medium with the introduction of extraordinarily reliable, high performance 5 1/4" Winchester disk drives.

Otari's new series of drives, with capacities of 5, 10, 15, and 20 MB (formatted), feature a fast 77 msec average access time, microprocessor controlled servo positioning, low power consumption, and low weight.

Both full and half height drives are built at Otari's sophisticated production facilities in Japan, where the commitment to quality control is absolute. Every phase of production, from base plate machining and Class 100 clean room assembly to burn-in and final testing, is accomplished under one roof.

Standing behind the excellent specs are the Otari name and Otari resources: Resources that ensure a steady supply of the drives you need, when you need them. The name that sets the standard for reliabil-

ity and quality in small Winchester drives.

Call or write for full details about Otari's excellent new line of full and half height 5 1/4" disk drives.

**Otari Electric Co. Ltd.** 4-29-18 Minami-Ogikubo, Suginami-ku, Tokyo 167. Phone: (03) 333-9631, Fax: (03) 331-5802, Telex: J26604

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CIRCLE NO. 65 ON INQUIRY CARD

**OTARI**

## 5¼ INCH AND SMALLER FIXED DISK DRIVES

5¼-in disk drives

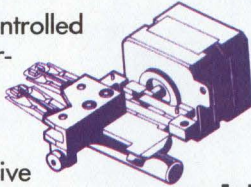
Company Model	Disk size (inches)	Capacity (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>TECMAR INC.</b>									
40200	5.25	10.0	100	6.4	4	linear stepping motor	SASI	2,795 (Q1)	expansion chassis
40300	5.25	15.0	90	6.4	6	linear stepping motor	SASI	3,195 (Q1)	expansion chassis
40400	5.25	33.0		6.4	8	voice coil	SASI	4,295 (Q1)	expansion chassis
<b>TEXAS INSTRUMENTS INC.</b>									
525/122	5.25	12.76	100	5.0	4		ST412	1,575 (Q1)	
525/61	5.25	6.38	100	5.0	2		ST506	1,225 (Q1)	
<b>THOUGHT WORKS</b>									
DF105/205, DF110/210, DF120/220	5.25	5.0, 10.0, 20.0		5.0	2, 4, 8		ST506	2,495 ; 2,995 (Q1) (Q1) 4,495 (Q1)	disk subsystem compatible with Apple II; Sanyo MBC-1000, MBC-3000; Zenith Z-100
<b>TULIN CORP.</b>									
213/26/40	5.25	10.48, 21.0, 31.46	85	5.0	2, 4, 6	rotary, embedded servo	ST506/412	650 ; 850 (Q500) (Q500) 1,055 (Q500)	half-height drive, on-board microprocessor, landing/shipping zone
<b>TRANTOR SYSTEMS</b>									
TSL-5/10/15	5.25	5.0, 10.0, 15.0		5.0	2, 4, 4			1,995 ; 2,495 (Q1) (Q1) 2,995 (Q1)	disk subsystem compatible with Osborne, Apple II, Franklin Ace
<b>UNITED PERIPHERALS</b>									
9705	5.25	6.38	85	4.0	4	stepper motor	SASI	2,995 (Q1-10)	error correction compatible with most small computers
9800	5.25	6.38	85	4.0	4	stepper motor	HPiB	2,995 (Q1-10)	error correction compatible with most HP computers
<b>VERTEX PERIPHERALS</b>									
130/50/70	5.25	24.3, 40.4, 56.6	30	5.0	3, 5, 7	rotary voice coil	ST506/412	1,850 ; 2,350 ; 2,750 (Q1)	automatic actuator lock
242, 270, 2100	5.25	34.0, 56.6, 80.0	30	8.2	3, 5, 7	rotary voice coil	ST506/412		automatic actuator lock
<b>VR DATA</b>									
Hard Disk III	5.25	5.0, 10.0, 15.0	85		2, 4, 8			995 ; 1,249 (Q1) (Q1) 1,449 (Q1)	disk subsystem compatible with TRS-80 I, II; Apple II, IIe; IBM PC
<b>WORLDWIDE DATA</b>									
Prometheus	5.25	5.0, 10.0, 15.0, 20.0	90		2, 4, 6, 8			1,595 ; 1,795 (Q1) (Q1) 1,995 ; 2,295 (Q1) (Q1)	disk subsystem compatible with IBM PC; TRS-80 I, III; Apple II
<b>XCOMP INC.</b>									
PHD-10	5.25	10.0	155	5.0	2	stepper motor	ST506	2,195 (Q1)	disk subsystem compatible with Apple II, III; NEC 8000; BMC 800
PHD-16	5.25	16.0	122	5.0	4	stepper motor	ST506	2,395 (Q1)	disk subsystem compatible with Apple II, III; NEC 8000; BMC 800
<b>XITEN SYSTEMS</b>									
Gallium-10	5.25	11.3	60	5.0	6			2,495 (Q1)	disk subsystem compatible with IBM PC, Apple II
<b>ZENITH DATA SYSTEMS</b>									
Winchester H100	5.25	12.7			4		Zenith	2,000 (Q1)	disk subsystem compatible with Zenith H-100, Z-100
<b>ZOBEX</b>									
HD-12/20	5.25	9.6, 16.7	70	5.0	2, 4			1,725 ; 1,995 (Q1) (Q1)	disk subsystem compatible with Zobex S-100, IBM PC, TI Professional

## Designed-in toughness

The Microscience HH-612 is a half-height (1.625") 5.25-inch Winchester disk drive, weighing only 3 pounds, that delivers a big 10 MB of formatted data storage.

The HH-612's long list of advanced features add up to one simple fact: this drive is tough! Using plated media, microprocessor-controlled closed loop servo-positioning, microprocessor-controlled spindle motor, four-corner shock absorber mounting, embedded guard bands, and extensive on-board diagnostics, the Microscience design team has come up with a drive rugged enough for desktop, portable and other hard-use environments.

But consider this as well: the HH-612's advanced electronics



ease the load on supplier tolerances to keep reliability high. And the HH-612 has been designed with a number of key off-the-shelf parts, so sources of supply won't run dry. Each drive goes through a Microscience-designed testing and quality assurance program that can't be matched anywhere in the industry. That's why we can offer a full-year parts and labor warranty.

Okay, the Microscience HH-612 is tough. But how about ready?

## It's ready to ship

You've probably been hearing some delivery promises the last year or so. Well, if you want more than just promises, ask Microscience for immediate delivery of evaluation units, and watch us

respond. We're ready to ship the product today. Not just one, but volume deliveries to meet your production schedule.

How can we do it, when so many other disk drives are still on the drawing board? Because we designed a tough drive that can be built in quantity.

And we've got the people, the clean-room production lines, the test equipment, the sales and support groups all in place.

We'll prove how tough and ready the HH-612 really is. Call or write Microscience. Today.

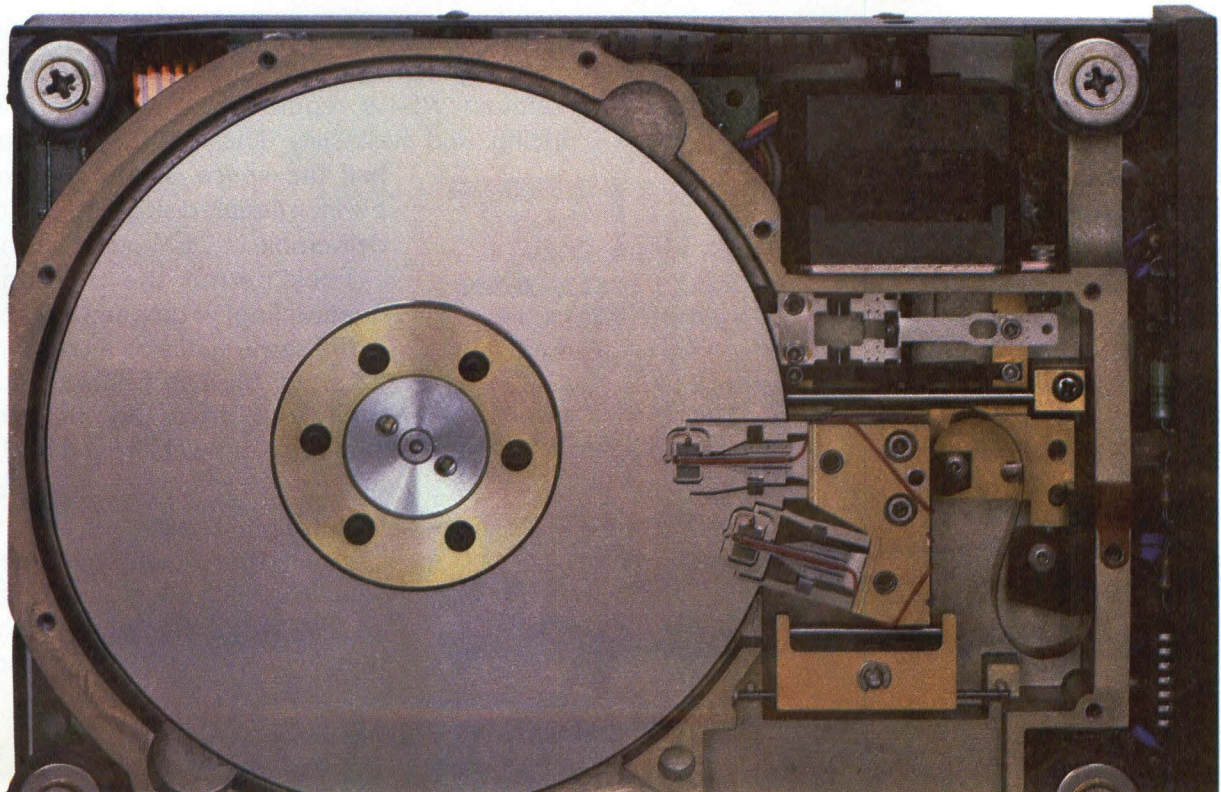


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CIRCLE NO. 66 ON INQUIRY CARD

# TOUGH AND READY



# While our family is well known, our name is not a household word... yet.



## OEM's have relied on our flexible disk drives for 10 years.

Before we changed our name, our family of products was known as Siemens Flexible Disk Drives. Now, we are WORLD STORAGE TECHNOLOGY, but our family, capabilities, reliability, and customer support activities are as strong as ever.

WST's flexible disk drives - known worldwide - span the entire breadth of capabilities. They include our first generation 8-inch flexible disk drives, our second generation 5¼-inch models, and introducing our latest product offering: the 5¼-inch, half-height models.

We pride ourselves on the fact that our family members are designed to meet and satisfy the requirements of the OEM designer marketplace.

### Newest Members

The newest additions to our family

Specification	WST Model Number (FDD)									
	100-8	200-8	100-5	200-5	111-5	121-5	211-5	221-5	112-5	212-5
Media Size (in.)	8.0	8.0	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
Heads (number)	1	2	1	2	1	1	2	2	1	2
Access:										
Track-to-Track	3	3	20	20	5	3	5	3	20	20
Average (msec)	91	91	275	275	80	110	80	110	275	275
Unformatted Capacity (Kbytes)										
(FM)	400	800	125	250	125	250	250	500	125	250
(MFM)	800	1600	250	500	250	500	500	1000	250	500
Track Density (TPI)	48	48	48	48	48	96	48	96	48	48
Drive Size (in.)										
Height	4.5	4.5	3.25	3.25	3.25	3.25	3.25	3.25	1.62	1.62
Width	8.55	8.55	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Length	14.25	14.25	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

are the half-height 5¼-inch flexible disk drives. We've identified them as FDD112-5 and FDD212-5. They maintain WST's reputation: quality, competitive pricing, and availability. These new models take up half the space of the conventional 5¼-inch flexible disk drives. And they're deliverable in OEM quantities now.

They permit the doubling (or quadrupling) of data storage capacity in the same space as a conventional, full-sized, 5¼-inch flexible disk drive. While our drives are flexible, our standards of reliability and quality are not.

### Write! Right Now!

Write to us to learn why some of the world's leading computer companies choose World Storage Technology's flexible disk drives for their products.



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- Imtech, Inc (216) 666-1185
- West Associates (214) 248-7060

CIRCLE NO. 67 ON INQUIRY CARD

## CARTRIDGE DISK DRIVES

Company Model	Disk size (inches)	Capacity Fixed/Removable (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>AMCODYNE INC.</b>									
Arapahoe 7110	8	21.3/21.3	30	9.6	4	linear voice coil	SMD	3,175 (Q1)	ramp-launched heads, 8-inch floppy dimensions
<b>AMLYN CORP.</b>									
1560	Five 5.25 diskettes	3.2	88	0.5	10		ST-506	370 (Q500)	Uses 5-diskette Mini Pac, 154 tracks per surface, 170 tracks per inch
1860	Five 5.25 diskettes	3.2	88	0.5	10		5A1000	370 (Q500)	Uses 5-diskette Mini Pac, 154 tracks per surface, 170 tracks per inch
5850/5855	Five 5.25 diskettes	8	88	0.5	5		SA1000	610 (Q500)	Uses 5-diskette Mini Pac, 154 tracks per surface, 170 tracks per inch
5860/5865	Five 5.25 diskettes	16	88	0.5	10		SA1000	750 (Q500)	Uses 5-diskette Mini Pac, 154 tracks per surface, 170 tracks per inch
<b>AMPEX CORP.</b>									
DFR 932	14	16.29/16.29	30	9.6	2	fixed rotary, cartridge linear	SMD/CMD		rack mount
DFR 964	14	48.87/16.29	30	9.6	4	fixed rotary, cartridge linear	SMD/CMD		rack mount
DFR 996	14	81.45/16.29	30	9.6	6	fixed rotary, cartridge linear	SMD/CMD		rack mount
DM 9300AQ	14	315	28	9.6	19	linear motor	SMD		CDC 9766-compatible
DM 9300Q	14	312	28	9.6	19	linear motor	SMD		
<b>ATHENAEUM TECHNOLOGY INC.</b>									
Aegis 10/10	5.25	10/10	35	5	4	linear voice coil	ST-506	1,300 (Q1,000)	soft sectoring
<b>BALL ELECTRONIC SYSTEMS DIV.</b>									
BDA 50	14	54.7	30	6.44	5	linear motor	Trident/SMD		variable length sectoring
BDA 80	14	82.9	30	9.6	5	linear motor	Trident/SMD		variable length sectoring
BDA 100	14	103.22	30	9.6	5	linear motor	SMD		variable length sectoring
<b>BRAEGEN CORP.</b>									
82		80.0	30	9.6			SMD		disk subsystem compatible with DEC PDP-11
302		300	30	9.6			SMD		disk subsystem compatible with DEC PDP-11
160W		165.9/82	30	9.6		linear voice coil	SMD		optional dual access, DEC systems, daisy-chain capability
602W		675/2	30	9.6		linear voice coil	SMD		optional dual access, DEC systems, daisy-chain capability
<b>B. T. ENTERPRISE</b>									
200715/20/25	5.25	5.0/5.0, 10.0/5.0, 15.0/5.0, 20.0/5.0		5	4, 4, 4, 8		Radio Shack	3,625 (Q1); 4,299 (Q1); 4,449 (Q1); 4,700 (Q1)	disk subsystem compatible with Radio Shack TRS-80 I, II, III, IV, 12
<b>CARDIFF TECHNOLOGY INC.</b>									
D240	5.25	16.22/16.22	25	5	4	linear voice coil	ST-506, ST-412	1,500 (Q1,000)	thin-film disks and heads
<b>CENTURY DATA SYSTEMS</b>									
C2075	8	17.0, 42/21.08	30	9.6	2, 4	voice coil	SMD	3,240 (Q200)	
T80/82	14	82.1, 82.9	30	9.6	5	linear motor	TTL/SMD	5,675 (Q200)	tabletop or rack slide mount
T200/202	14	208, 210	30	6.44	19	linear motor	TTL/SMD	8,950 (Q200)	
T300/302/306	14	312, 315	30	9.6	19	linear motor	TTL/SMD	9,750 (Q200)	CDC 9766-compatible
<b>CHARLES RIVER DATA SYSTEMS</b>									
DK-32R	8	65/60		1.64/1.97	8/2	rotary torque/linear voice coil	SASI	14,500 (Q1)	disk subsystem compatible with versabus

Cartridge disk drives

## CARTRIDGE DISK DRIVES

Cartridge disk drives

Company Model	Disk size (inches)	Capacity Fixed/Removable (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>CONTROL DATA CORP.</b>									
9448	14	16, 48, 80/16	30	9.6	2, 4, 6	linear voice coil	SMD	4,730 (Q500)	write protect, integral data recovery, integral power supply
9455	8	8.35/8.35	50	9.6	2	linear voice coil	LDI, SMD, ISI	2,345 (Q500)	32- or 64-sector format, write protect
9457	8	25.75/25.75	35	9.6	2	linear voice coil	LDI, SMD, ISI	3,070 (Q500)	32- or 64-sector format, write protect
9710	9	82.9	30	9.6	5	linear voice coil	SMD, ISI	4,370 (Q500)	rack mount, fixed/variable sectoring, dual-channel access
976X	14	40, 80, 300	30	9.6	5, 5, 19	linear voice coil	SMD	5,840 (Q500)	integral power supply
<b>CVM SYSTEMS</b>									
R-50	14	50.6	30	6.55	3	voice coil	SMD	4,850 (Q1)	
<b>CYNTHIA PERIPHERAL CORP.</b>									
D120	10.5	10	50	7.2	2	linear voice coil	proprietary	1,890 (Q100)	
D140	10.5	10/10	50	7.36	4	linear voice coil	proprietary	2,675 (Q100)	
D520	5.25	10.5/10.5	40	5	4	rotary voice coil	ST706	1,530 (Q100)	
<b>DATA GENERAL CORP.</b>									
6060	14	96	43	6.44	19		proprietary	32,250 (Q1)	
6061	14	192	43	6.44	19		proprietary	35,900 (Q1)	
6122	14	277	43	9.6	19		proprietary	43,350 (Q1)	
<b>DATAPPOINT CORP.</b>									
9310	10.5	10	75	7.35	2		Microbus	7,850 (Q1)	
9395	14	135/67	30	1.2	8		memory bus, peripheral control bus	31,950 (Q1)	
<b>DATREX INC.</b>									
Series 6000	14	6.25/6.25	35	2.49	4			2,590 (Q1)	integral power supply
WD505	5.25	6.38	55	5	2		ST-506	975 (Q1)	soft-sectored
<b>DISCTRON INC.</b>									
DP 100	8	11.6	60	7.0	2	linear voice coil	Data Peripherals	1,390 (Q1,000)	
<b>DMA SYSTEMS</b>									
5/5	5.25	5.4/5.4	40	5	2/2	voice coil	ST-706	2,200 (Q1)	
5R	5.25	5.4	40	5	2	voice coil	ST-706	2,000 (Q1)	
360	5.25	7.5		5.0		stepper motor		500 (QOEM)	half-height, ANSI standard
<b>EMULEX CORP.</b>									
9710	8	67.4	30	9.6	5	rotary voice coil	SMD	5,100 (Q1)	optional dual port
9766	14	256.2	30	9.6	19	linear motor	SMD	14,920 (Q1)	optional dual port
<b>GENIE COMPUTER CORP.</b>									
5+5	5.25	5/5	40	1.2	4			3,995 (Q1)	disk subsystem compatible with IBM PC; Apple II, III

## CARTRIDGE DISK DRIVES

Company Model	Disk size (inches)	Capacity Fixed/Removable (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>HARRIS CORP., COMPUTER SYSTEMS DIV.</b>									
5632	14	80	38	9.6	5	linear voice coil	SMD	20,900 (Q1)	includes controller
5652	14	300	38	9.6	19	linear voice coil	SMD	26,500 (Q1)	includes controller
<b>HEWLETT-PACKARD CO.</b>									
7935H	14	404/404	35	8	13		IEEE-488	27,500 (Q1)	internal diagnostics
<b>HONEYWELL INFORMATION SYSTEMS INC.</b>									
CDU 9638	14	80/13	38.3	9.6	5	servo arm	bit serial	16,000 (Q1)	disk to disk copy, EDAC recording
CDU 9641	8	40/20	43.55	9.6	4	servo arm	bit serial	9,500 (Q1)	automatic defective sector/track recognition/reallocation
MSU 9604	14	256/256	38.3	9.6	19	servo arm	bit serial	22,000 (Q1)	error detecting and correcting reads
<b>IBM CORP.</b>									
3340A2	14	140	25	7.08	12	linear radial		24,570 (Q1)	
3340B1	14	70	25	885/7.08	11	linear radial		13,510 (Q1)	
3340B2	14	140	25	7.08	22	linear radial		17,200 (Q1)	
<b>IOMEGA CORP.</b>									
Alpha-10	8	10	35	9.04	1	rotary voice coil	SCSI	1,495 (Q100)	includes controller
Alpha-10.5	8	10	35	9.04	1	rotary voice coil	SCSI	1,495 (Q100)	includes controller
Beta-5	5.25	5.2	40	5	1	rotary voice coil	ST-506	895 (Q1)	
<b>MEMOREX CORP.</b>									
OEM 410	5.25	5.24/5.24	53	5	4	linear voice coil	ST-706	1,440 (Q1,000)	
415	5.25	10.48/5.24	53	5	4	linear voice coil	ST-706	1,585 (Q1,000)	
677-70	14	206	28	6.44	19	linear voice coil	SMD	10,500 (Q100)	
<b>MICRO DESIGN</b>									
MDX7/8	5.25	5/5, 25/5		5.0	2/2, 10/2			1,795 (Q1); 2,995 (Q1)	disk subsystem compatible with IBM PC, Osborne, Compaq, Radio Shack TRS-80 III, IV
<b>MICRO DISK</b>									
PMS6-6	5.25	6/6	90	5.0	2/2			3,745 (Q1)	disk subsystem compatible with IBM PC, Compaq
<b>MICROSCIENCE INTERNATIONAL CORP.</b>									
HH-306	5.25	5/5	85	5	2	band/stepper	ST-506	300 (Q10,000)	open loop, half-height, very low power requirements
<b>MODULAR COMPUTER SYSTEMS</b>									
4178-1, 4178-2	14	67.4	30	9.6	5	linear motor		23,150 (Q1); 43,600 (Q1)	model 4178-2 features dual-port access, two computer interfaces
4178-5, 4178-6	14	256.1	30	9.6	19	linear motor		31,700 (Q1); 47,000 (Q1)	model 4178-6 features dual-port access, two computer interfaces
4179-11	14	13/13	30	9.6	2	linear motor		15,400 (Q1)	
4181-11	8	6.7/6.7	35	9.6	4	linear motor		11,775 (Q1)	

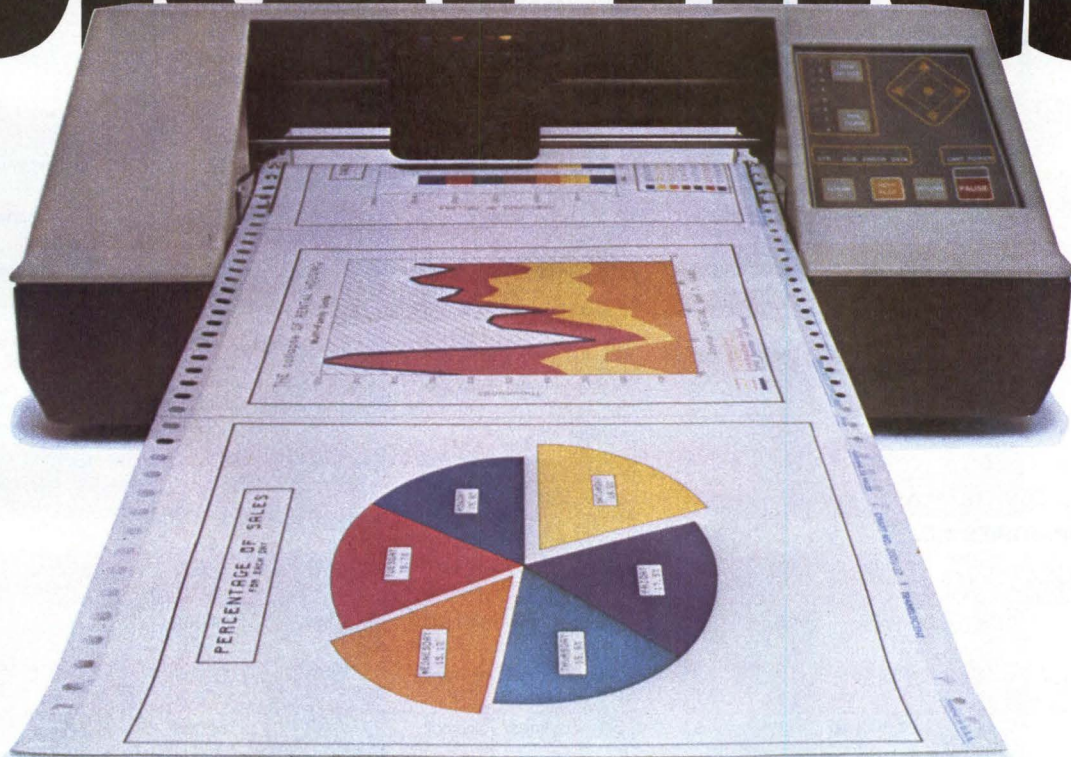
## CARTRIDGE DISK DRIVES

Cartridge disk drives

Company Model	Disk size (inches)	Capacity Filled/Removable (M bytes)	Avg access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
<b>MOHAWK DATA SCIENCES CORP.</b>									
2172	14	2.5	70	1.56	2		proprietary	7,712 (Q1)	includes drive controller
2175-1	14	13/13	30	9.6	2		proprietary	14,720 (Q1)	
2175-2	14	39/13	30	9.6	4		proprietary	21,680 (Q1)	
2175-3	14	65/13	30	9.6	6		proprietary	28,680 (Q1)	
<b>NEW WORLD COMPUTER CO. INC.</b>									
2.5/2.5	5.25	5/2.5	16.6	4	1	stepper	ST-506		half-height drive with 24 heads
5/5	5.25	10.5/5	16.6	4	2	stepper	ST-506		half-height drive with 48 heads
<b>PERTEC PERIPHERALS CORP.</b>									
D3321/22	14	3.17/3.17	60/52.5	1.56/2.5	4	voice coil		3,975 (Q100)	
D3341/42	14	3.17/3.17	60/52.5	1.56/2.5	4	voice coil		3,975 (Q100)	
D3421/22	14	6.34/6.34	60/52.5	1.56/2.5	4	voice coil		3,975 (Q100)	
D3441/42	14	6.34/6.34	60/52.5	1.56/2.5	4	voice coil		3,975 (Q100)	
D3461/62	14	19.03/6.34	60/52.5	1.56/2.5	8	voice coil		4,720 (Q100)	
D3481/82	14	19.03/6.34	60/52.5	1.56/2.5	8	voice coil		4,720 (Q100)	
<b>PLESSEY PERIPHERAL SYSTEMS</b>									
PM-DSV06F/N	14	28, 84	30	9.6	2, 6				disk subsystem compatible with DEC Q-bus, optional second drive available
<b>POLYMORPHIC SYSTEMS</b>									
HD/18+	5.25	18/5	70	5	4		ST-506	6,439 (Q1)	includes controller, power supply, cables
<b>QUADRAM</b>									
Quaddisk	5.25	6/6, 27/27	40	5.0	1, 4	stepper motor	ST506	1,995 (Q1); 6,500 (Q1)	disk subsystem compatible with IBM PC
<b>SANTA CLARA SYSTEMS INC.</b>									
SCS Series	8	10, 20, 30, 40, 80/10	55	4.34				7,310 (Q1)	includes controller, software, cables
SCS-5R Series	5.25/3.9	5, 10, 15/6.4	70					2,895 (Q1)	includes controller, software, cables
SCS 5R/10R/15R	5.25	5/5, 10/5, 15/5	85	5.0	2, 4, 6			4,474 (Q1); 4,756 (Q1); 5,056 (Q1)	disk subsystem compatible with Apple II, III; IBM PC
<b>SYQUEST TECHNOLOGY</b>									
SQ306R	3.9	5	70	5	2	stepper motor	ST-506	995 (Q1)	half-height drive
<b>SYSTEM INDUSTRIES</b>									
3100-62	14	74	38.3	9.6	5		SMD		interfaces to Data General Nova, Eclipse computers
3100-66	14	277	38.3	9.6	19		SMD		interfaces to Data General Nova, Eclipse computers
3400-62	14	74	38.3	9.6	5		SMD		interfaces to Data General Eclipse, MV computers
3400-66	14	277	38.3	9.6	19		SMD		interfaces to Data General Nova, Eclipse computers
9900-62	14	67	38.3	9.6	5		SMD		interfaces to DEC VAX, PDP-11



# FRESH EIGHT COLOR GRAPHICS



## (Now you can put an entire graphics department on your desktop.)

Getting ahead often depends upon getting your ideas across forcefully. That's what the ZETA 8 does best. By creating vivid color pictures that communicate with power. Whole ideas transmitted at a glance. Trends made clear.

Try eye-stopping graphics like these at your next presentation and watch the reaction you get.

**Introducing the ZETA 8, our new 8 color desktop plotter that never stops to change pens.**

Let's face it, most reports and presentations get done in a rush. That's why we've designed a system that goes at high speed (20 inches per second). But here's the kicker. Other plotters keep their pens off to one side so every time there's a color change the plotter grinds to a halt. Top speed drops to zero. We've put all eight pens on one carriage so the plotter never has to stop.

In fact, the ZETA 8 can be pre-programmed to create plots without operator intervention over 120 feet of paper.

Plot on acetate for overhead projection too. The ZETA 8 features a handy automatic paper load, a metric mode, and has been designed to support most computer protocols.

**Nobody's ever made so much plotter for so little money.**

That's right. A lightweight, portable plotter with eight different colors (and no time out for changing pens), a top speed of 20 i.p.s. and accuracy to within one one-thousandths of an inch.

# ZETA PLOTTERS

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ZETA  
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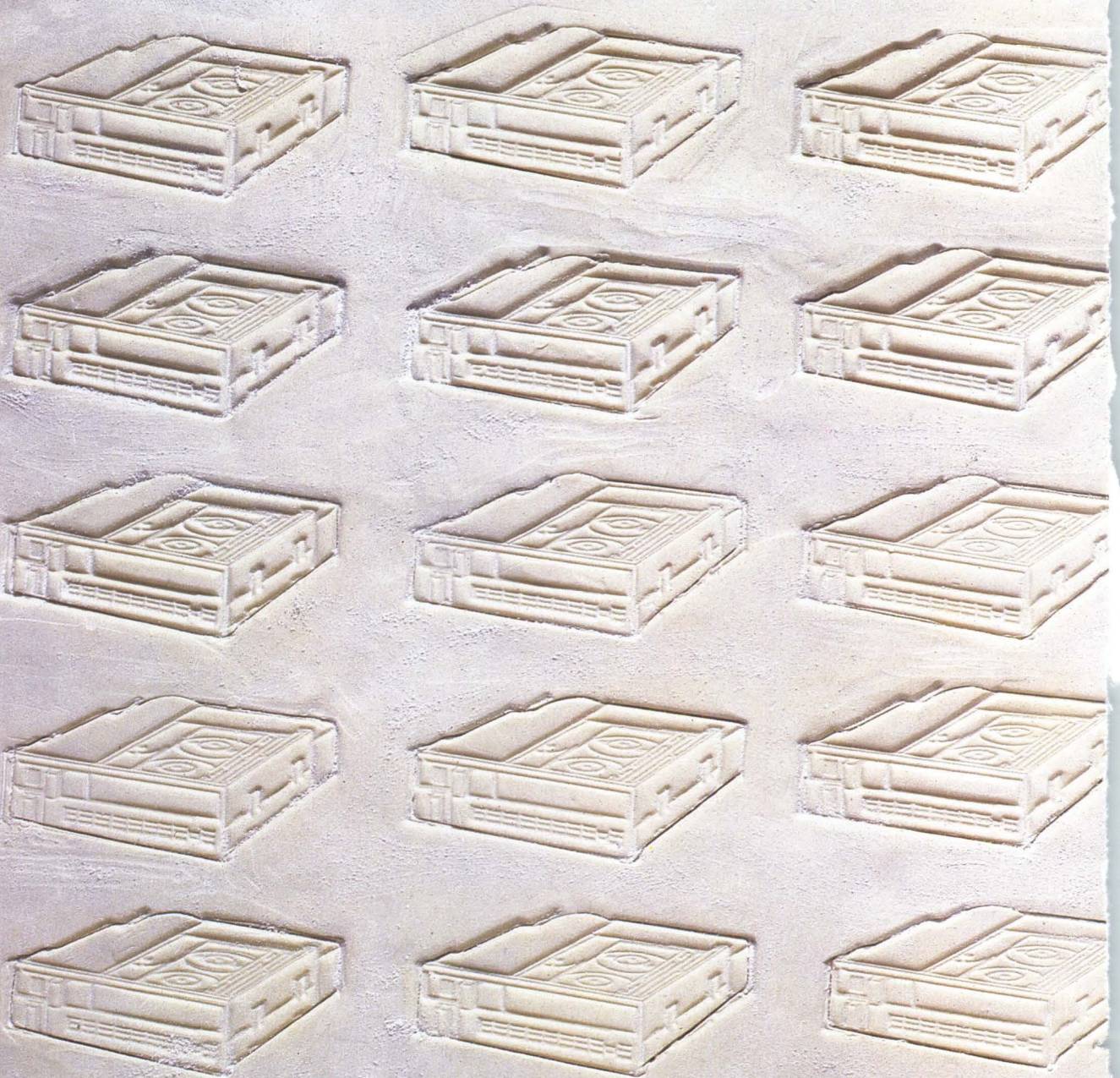
## CARTRIDGE DISK DRIVES

Cartridge disk drives

Company Model	Disk size (inches)	Capacity Fixed/Removable (M bytes)	Avg. access time (msec.)	Transfer rate (M bits/sec.)	Number of data surfaces	Actuator type	Interface type	Price (\$)	Notes, Features, Options
9900-66	14	256	38.3	9.6	19		SMD		interfaces to DEC VAX, PDP-11
9900-84	14	135	37.12	9.6	5		SMD		interfaces to DEC VAX, PDP-11
<b>TECMAR INC.</b>									
40010	5.25	5	75	5	2	linear stepping motor	ST-506	2,695 (Q1)	expansion chassis
40020	5.25	10	75	5	2	linear stepping motor	ST-506	3,595 (Q1)	expansion chassis
40210	5.25	10/5	100/75	800/625, 6.4/5	4	linear stepping motor	ST-506	3,995 (Q1)	expansion chassis
40310	5.25	15/5	90/75		6	linear stepping motor	ST-506	4,395 (Q1)	expansion chassis
40410	5.25	33.5/5			8	voice coil	ST-506	5,495 (Q1)	expansion chassis
41010	8	5/5	75	5	2	linear stepping motor	ST-506	3,495 (Q1)	expansion chassis
<b>VERMONT RESEARCH CORP.</b>									
5017	14	26.2/26.2	45	5.38	4	linear voice coil	drive level		
8010	8	10	55	5	2	linear voice coil	ANSI, SASI, or drive level		includes SASI controller, power supply, fan; wide operating temperature range (0° to 50°C)
8520	8	10/10	55	5	4	linear voice coil	ANSI, SASI, or drive level		includes SASI controller, power supply, fan; wide operating temperature range (0° to 50°C)
<b>WANG LABORATORIES INC.</b>									
2265V-1	14	80	30	9.6	5	linear voice coil	SMD	17,000 (Q1)	
2265V-2	14	300	30	9.6	19	linear voice coil	SMD	34,000 (Q1)	
2280N-1	14	13.4/13.4	30	9.6	2	linear voice coil	SMD	17,000 (Q1)	
2280N-2	14	26.8/13.46	30	9.6	4	linear voice coil	SMD	18,000 (Q1)	
2280N-3	14	67/13.4	30	9.6	6	linear voice coil	SMD	19,000 (Q1)	
2280V-1	14	15/15	30	9.6	2	linear voice coil	SMD	19,000 (Q1)	
2280V-2	14	45/15	30	9.6	4	linear voice coil	SMD	20,000 (Q1)	
2280V-3	14	75/15	30	9.6	6	linear voice coil	SMD	21,000 (Q1)	
6580-1	14	13.4/13.4	30	9.6	2	linear voice coil	SMD	17,000 (Q1)	
6580-2	14	40.2/13.4	30	9.6	2	linear voice coil	SMD	18,000 (Q1)	
6580-3	14	67/13.4	30	9.6	6	linear voice coil	SMD	19,000 (Q1)	
<b>WESTERN DYNEX CORP.</b>									
Series 6000	14	6.25/6.25	35	2.49	4			2,100 (Q1)	integral power supplies
505	5.25	6.38	55	5	2		ST-506	495 (Q1)	soft-sectored open-loop positioning, temperature compensation
<b>XACOM TECHNOLOGY</b>									
853	8	42.4/10.6	60	5.0	4			7,800 (Q1)	disk subsystem compatible with Apple II, Radio Shack TRS-80, IBM PC, Cromemco, Altos, Hewlett-Packard, Xerox 820
<b>XCOMP INC.</b>									
Toaster	5.25	10	70	5	4	stepper motor	ST-506	2,995	

**Archive cooked up  
the perfect solution  
for Winchester  
backup.**

**We started with  
philosophy for building**



# h a whole new ding 1/4" streamers.



## Mass production.

Our goal was to create a design so simple and a production line so unerringly accurate that we could turn 1/4" streamers out by the thousands with cookie-cutter consistency.

At Archive, that goal was met. In the last three years, we've shipped out more than 50,000 streamers—well over a million megabytes of storage!

Others are still learning how to build streamers in quantity. But we perfected our production process years ago.

We already have everything in place. Our equipment and test gear are on-line and working. Our people are trained and have the know-how to get the job done. And we've got solid relationships with reliable suppliers we can count on.

Today, we're shipping over 5,000 streamers each month. And everything is ready to boost our capacity to 15,000 streamers per month.



Scorpion Half-Height  
5 1/4" Streaming Tape Drive.

But we're not stopping there. We're currently in the process of increasing our operations even further.

Our goal is to always keep our production capability greater than demand. This way our customers can be sure that if anybody is going to be able to turn out a batch of streamers, it's Archive.

**Then we rejected  
of acceptable**



# the industry's idea failure rates.



A lot of suppliers seem to be perfectly satisfied to deliver a product with 90%, 80% or even 70% reliability rates.

We find that totally unacceptable! Our reliability rate is 98%—and we're still not satisfied.

We're shooting for 100% reliability. And to make sure we reach it, we're constantly improving our quality control process and manufacturing techniques.

For example, our recent advancements in LSI technology have reduced the number of parts in our drives by 40%. That means our newest streamers have fewer things that can go wrong.

We also have one of the industry's most extensive quality control programs. Out of the total time it takes to build a streamer, well over half is devoted to testing. In fact, a streamer must pass dozens of inspections before it's ready for shipping.

But in-plant inspections aren't enough. Sometimes the reason a drive fails is because it isn't being used correctly.

To prevent problems like these, over half the people in our marketing organization are qualified to provide you with technical and applications support.

We also offer a two-day training program that will teach you everything you need to know about correctly operating and integrating a streamer.

The way we see it, as long as we keep rejecting the idea of acceptable failure rates, you'll never have any reason to reject an Archive streamer.



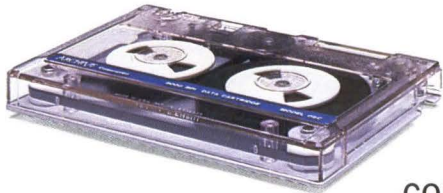
Scorpion Full-Height  
5 1/4" Streaming Tape Drive.

# The result: In techno production, nobody





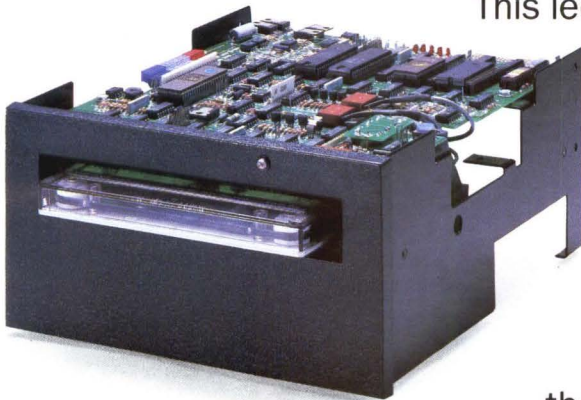
# logy, experience and stacks up to Archive.



At Archive, we ship nearly three times as many streaming tape drives as the rest of the industry combined.

That shouldn't be too surprising. We've also had more technological breakthroughs than the rest of the industry combined. For example, we were the first streamer manufacturer to successfully use LSI technology.

Going back to our early days, one of the reasons we were able to build the first  $\frac{1}{4}$ " streamer that worked is because we were the first company to fully study and understand the physics and dynamics of the  $\frac{1}{4}$ " cartridge, as used in a high-density, high-performance streaming mode.



This led to the development of our unique phase-locked-loop that follows the instantaneous speed variations that are inherent in the cartridge.

What's more, Archive's designs were the basis for the industry's standard QIC-02 interface and QIC-24 recording format.

As you can see, even the competition depends on Archive for experience. You should, too. For more information, contact the Archive office near you.

Sidewinder 8" Streaming Tape Drive.

# Where to find the freshest ideas for Winchester backup.

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**ARCHIVE**  
CORPORATION

# THE QUIET COMPANY IN 5.25" WINCHESTERS...

AIM doesn't say too much about its 5.25" Winchester. The performance speaks for itself.

Like the man with the Winchester. He had the silence of assurance. When he took aim down the barrel, he knew he had the best.

And nowadays, you too can have the best when you take AIM as your high-performance 5.25" OEM disc drive supplier.

## DART

Take the DART-130, for example: 133-megabyte capacity, in the industry-standard package, with 18-millisecond positioning time, including settling. And like its Winchester namesake, built for exceptional reliability... based on such features as sputtered metallic media, linear actuator, advanced servo design, microprocessor controlled, dedicated head-loading zone, automatic spindle and carriage locks, and low power consumption. It mates with SMD and SCSI interfaces.

## LANCE

Available soon:

- The LANCE-850, an array of four 5.25" HDA's providing an 853-megabyte capacity and 18-millisecond positioning time, including settling, in a package measuring 2.5 cubic feet including power supply. And it's compatible with SMD and SCSI interfaces.
- The LANCE-530, a 534-megabyte capacity drive array with many of the LANCE-850 features.

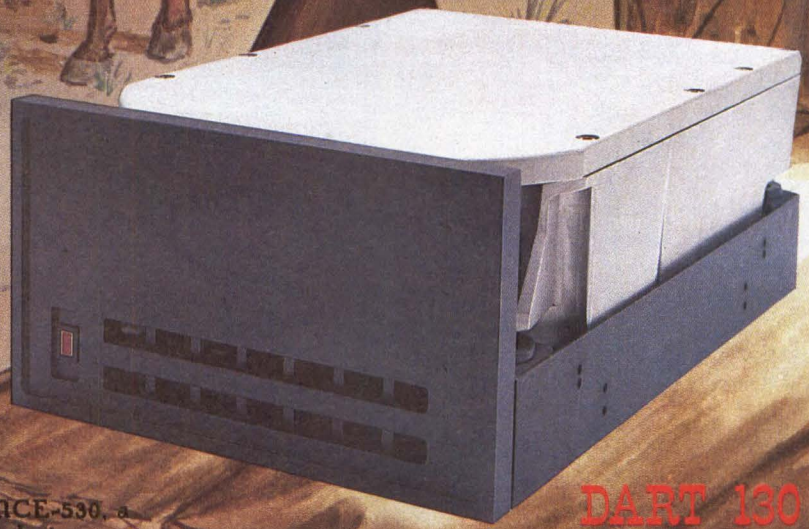
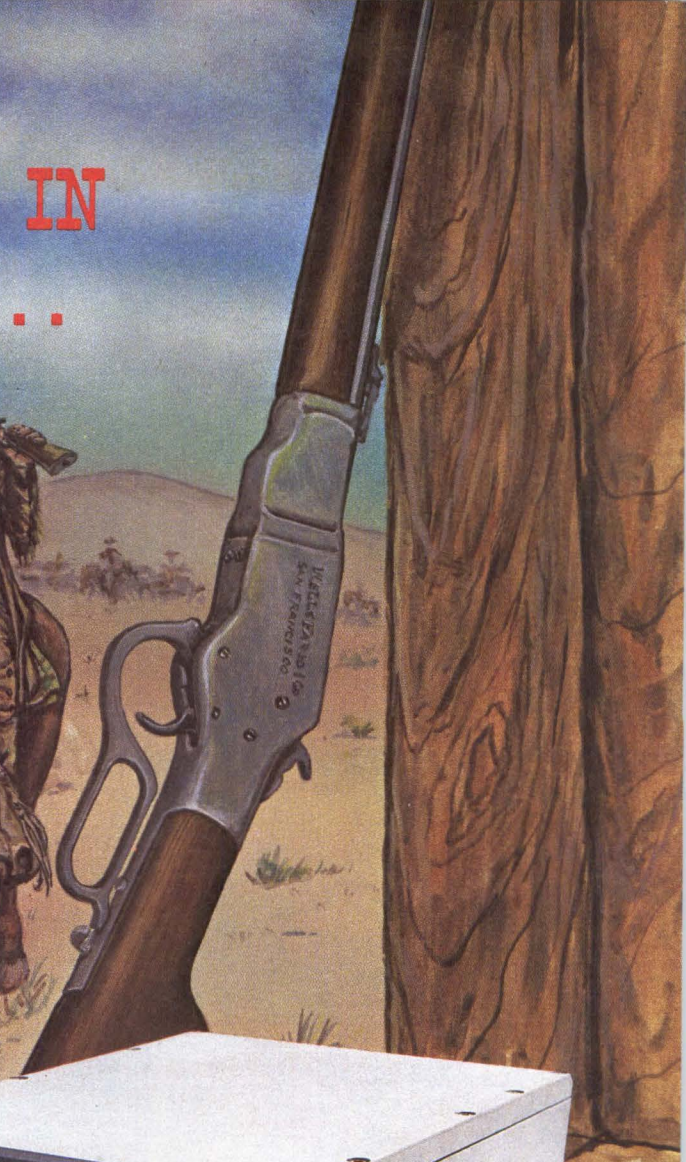
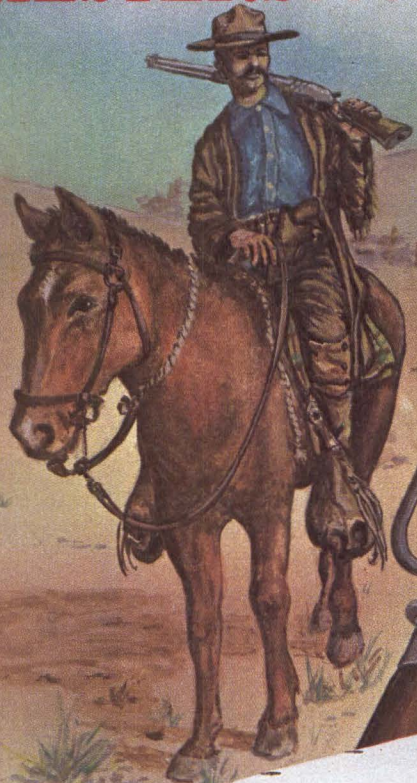
AIM. We don't have to say much about our drives. Their performance and reliability does it for us. The silence of assurance.

Circle No. 69 On Inquiry Card.

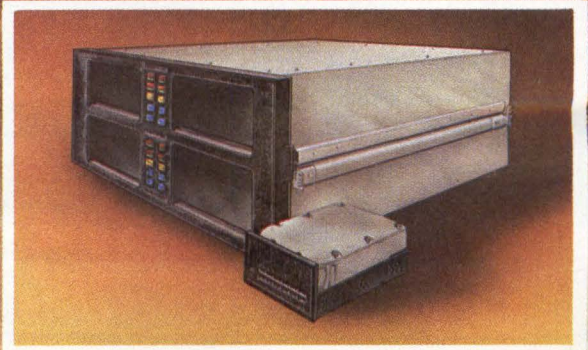


Applied Information Memories

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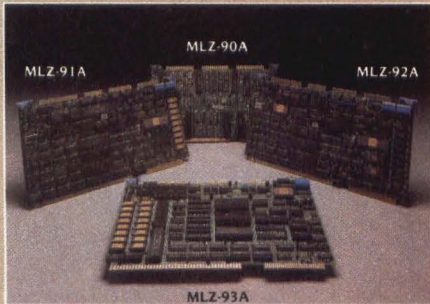
DART 130



# THERE IS MORE THAN ONE GOOD REASON TO CALL HEURIKON

**M**ake HEURIKON your source for Multibus microcomputers and system components.

Since 1972 Heurikon has been working hard to make life a little easier for those who "put it all together." Powerful Z-80™ and MC68000™ based Multibus™ microcomputers like MLZ-92A and HK68 have helped Heurikon customers find economical solutions for their problem applications.

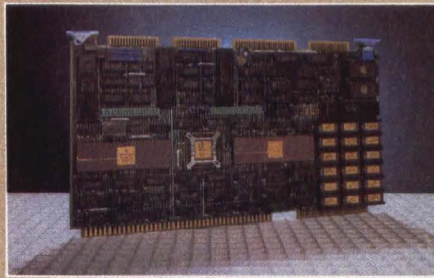


**MLZ-90A** single board microcomputer with nine byte-wide memory sockets for use with RAM or ROM (AM9511 and floppy disk drive controller optional).

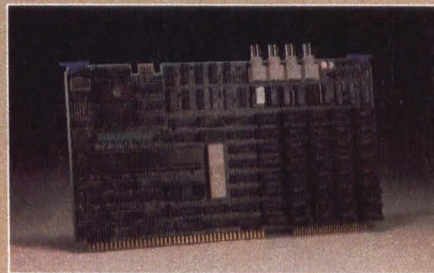
**MLZ-91A** single board CP/M™ system with on-card floppy disk drive controller, winchester interface, optional AM9511, streamer tape interface, two serial ports, one parallel port, 64K bytes RAM with parity, two EPROM sockets, and GPIB CONTROLLER.

**MLZ-92A** single board CP/M™ system with four serial ports on-card, floppy disk drive controller, winchester interface, optional AM9511, Centronics printer interface, 64K bytes of RAM with parity, and two EPROM sockets.

**MLZ-93A** single board CP/M™ system with 128K bytes of dual ported RAM, four EPROM sockets, floppy disk drive controller, optional AM9511 and powerful serial port features including SDLC and HDLC protocol support and modem controls.



**HK68™** powerful and versatile single board UNIX™ or CP/M-68K™ system with MC68000 CPU, MMU, quad channel DMA, four serial ports, 128K or 256K bytes of on-board RAM with parity (expandable to 1M byte on-board!), and two iSBX™ connectors for I/O expansion.



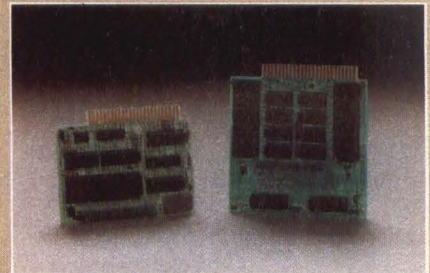
**MLZ-VDC** intelligent 640 x 480 x 4 color graphic controller based on the NEC 7220 controller chip with on-board Z-80 CPU, DMA controller, and user definable FIFO interface to Multibus™. Users may display up to 16 colors from a 4K palette. Up to 1024 x 1024 x 3 interlaced also available.

### iSBX Expansion Models

Heurikon also stocks iSBX™ modules for I/O expansion on its HK68 and MLZ-VDC. These modules may be used on any other board

complying with Intel iSBX specifications.

Presently available are the SBX-FDIO floppy disk controller module and the SBX-SIO serial port expansion module.



The SBX-FDIO can control up to four single or double sided, single or double density 5 1/4 inch or 8 inch floppy disk drives. A software toggle allows both 5 1/4 inch and 8 inch drives to be intermixed on the same cable!

The SBX-SIO is a quad serial port expansion module utilizing Zilog SCC controller chips with built in baud rate generators. The SBX-SIO is available in synchronous and asynchronous models.



### Systems

Heurikon also supplies completely integrated systems with your choice of CP/M-80™, MP/M-80™, CP/M-68K™, and "Berkeley enhanced" Unix operating systems.

Systems are available with four, six, and fourteen slot enclosures with 5 1/4 inch or 8 inch dual floppy or floppy winchester drive combinations.

## HEURIKON CORP

3001 Latham Dr. Madison, WI 53713 Telex 469532

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## PERIPHERALS DIGEST

ROBERT A. SEHR,  
Associate Editor

# Tape and cassette drive makers say, 'Thanks for the memories'

The manufacturers of cassette and cartridge-tape drives frequently get lost in the shadow cast by the giant disk drive industry. But the tape people don't much care, consoled by the fact that, as the disk drive makers sow, so shall the tape makers reap. The same forces that have driven the disk market—the high-volume desktop systems that require more and more storage—are pushing along the tape drive market as well.

It is generally accepted that floppy drive backup becomes uneconomical at more than 10M bytes. A practical alternative: tape. Volume shipments of high-capacity, 5¼-inch disk drives have given the tape industry its biggest push since 3M introduced the first ¼-inch tape cartridge in 1971.

The \$90.8 million OEM market for cartridge-tape drives in 1981 is expected to grow at an annual rate of 27 percent to \$377.66 million in 1987. That's according to *Computer Tape Outlook 1982*, a report by Freeman Associates, a Santa Barbara, Calif., market research company. The largest portion of this growth, according to Freeman Associates president Ray Freeman, will be in ¼-inch streaming cartridge drives. Installations of ¼-inch streamers are expected to grow from 9,500 in 1981 to 375,000 in 1987, a compound annual growth rate of 84 percent.

The ¼-inch tape cartridge industry faces some major challenges, too. Not the least of these is keeping up with packaging and pricing trends in the systems and disk drive areas. Examples include rack-mount systems, which are being sized down to desktop units and portables, and Winchester drives, which are being trimmed from 8 to 5¼ inches and ultimately to 3 inches. Cartridge manufacturers are faced with conforming the standard cartridge into an increasingly smaller form.

There is competition in the backup market not only from other cartridge manufacturers but also from increasingly higher-performing floppy disks and from disk cartridges that range from the Control Data Corp.'s 8-inch Lark to SyQuest Technology's 3.9-inch product.

Competition is cutting margins in the tape industry. When Cipher Data Products began shipping its Floppy-Tape product—bringing the OEM price for a 30M-byte,

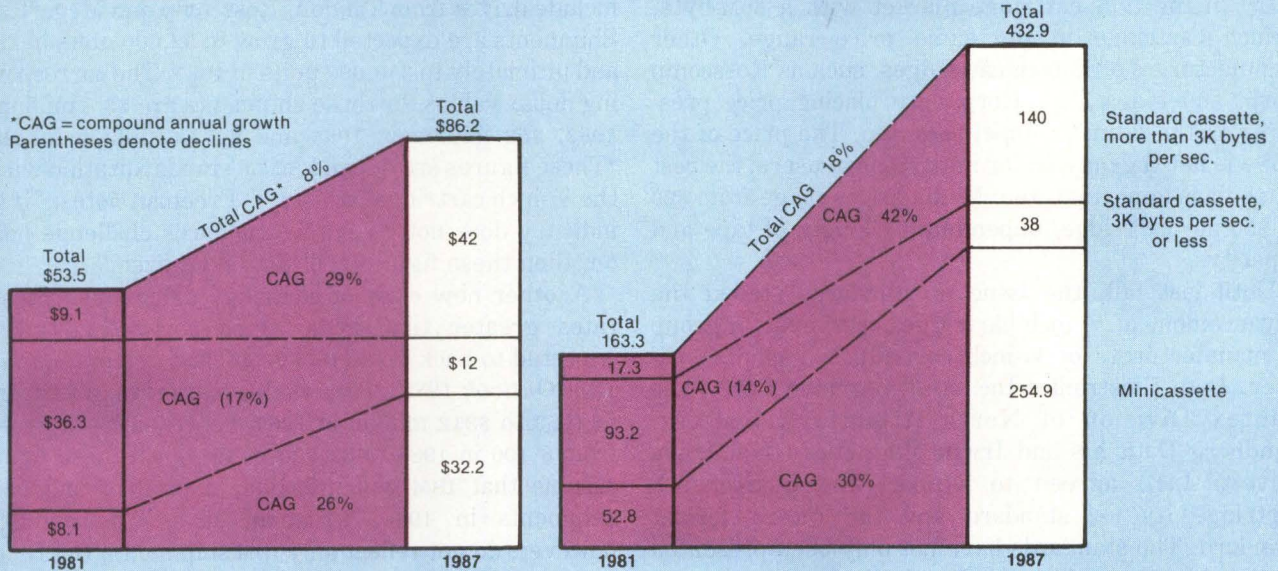
Cost of media is becoming increasingly important, as is price of drive backup. With competition such as Tandon's entry in the tape cartridge market of a 50M-byte, ½-inch cartridge, which is priced equivalent to lower-capacity ¼-inch tape drives, drive margins will erode. ▶

Hewlett-Packard may be keeping the computer cassette industry afloat because the company is still committed to cassettes for instrumentation applications. Minicassettes, however, are expected to grow at an annual rate of 30 percent, eclipsing the slower 18 percent overall cassette market growth.

### MARKET GROWTH AND PRODUCT MIX CASSETTE TAPE DRIVES

Based on revenue at OEM if-sold levels in millions

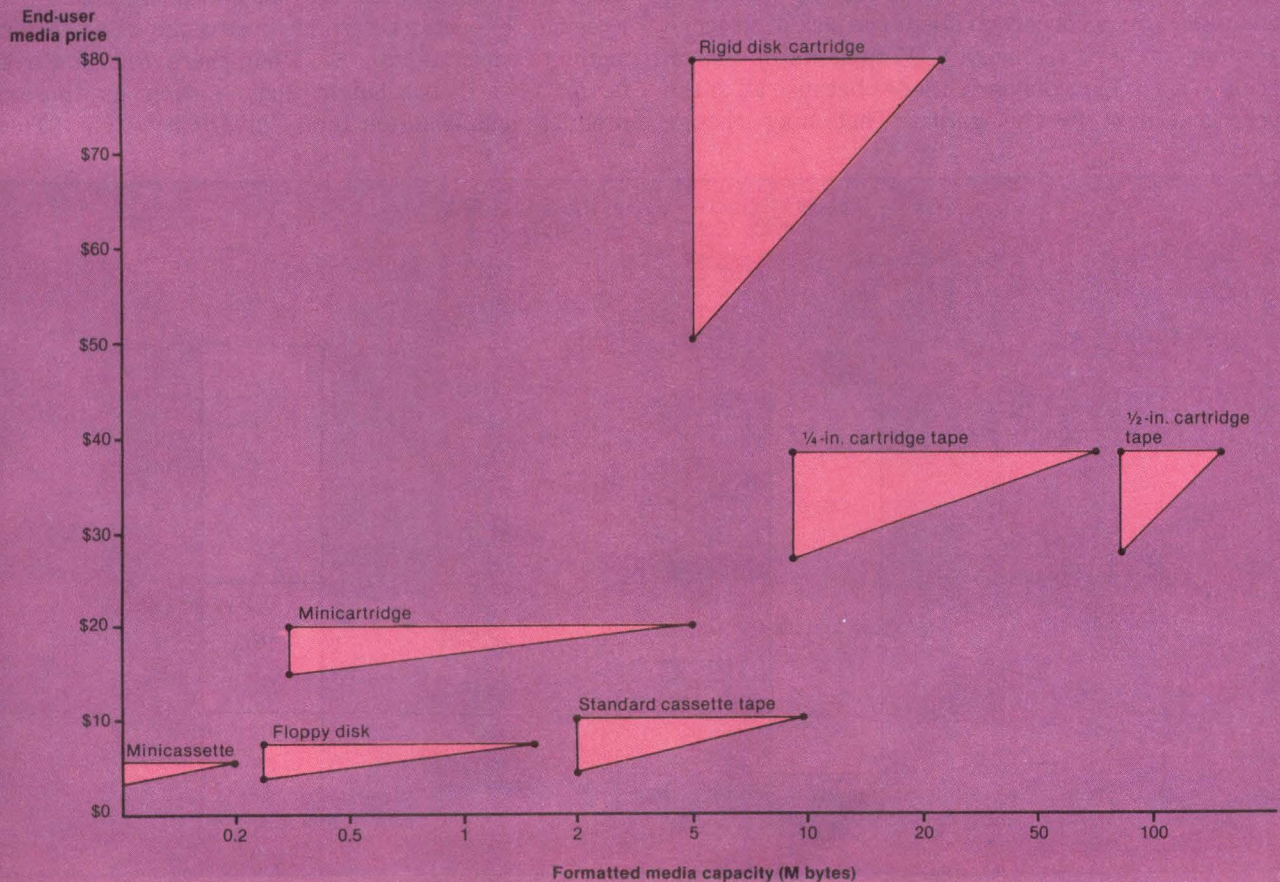
Based on unit shipments in thousands



Source: Freeman Associates

Tape drives

### PRICE/CAPACITY RELATIONSHIPS — TAPE AND DISK MEDIA



Source: Freeman Associates

¼-inch drive to \$300—Tandon Corp. announced its entry in the tape-cartridge market with a 50M-byte, ½-inch cartridge in the same price range. Other manufacturers of ½-inch cartridges, such as Rosscomp Corp. and Mega Tape Corp., are placing price pressures on the ¼-inch competitors, too. The price of the drive is not the only factor important to users; the cost of media is important, too. Media prices range from \$20 to \$50 per cartridge, depending on length of tape and capacity.

Until last fall, the issue of standards stalled the advancement of ¼-inch cartridges. However, a group of manufacturers of ¼-inch cartridges, including Cipher, Data Electronics Inc. (DEI), Archive Corp., the Qantex Division of North Atlantic Industries, Tandberg Data A/S and Irwin Magnetics (then Irwin Olivetti Inc.) agreed to support the quarter-inch cartridge (QIC)-2 standard and the QIC-24 format standard. The standards have not only been presented to the American National Standards Institute (ANSI) and the European Computer Manufacturers Association (ECMA) for official blessing but have already appeared in products shipped since last spring.

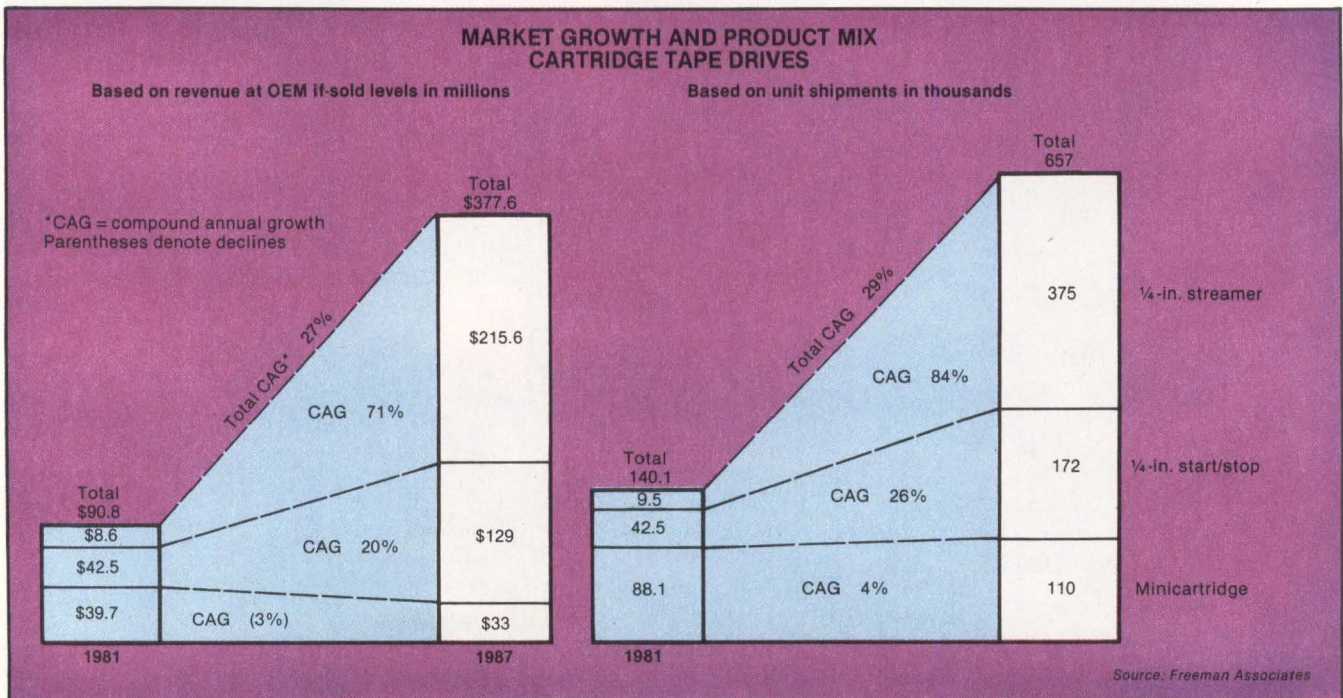
Standards have not been established in the emerging ½-inch cartridge market, however, causing hesitation among OEM buyers concerned about the lack of a second source for this new technology. Shipments of ½-inch cartridges are still in the early stages because all of the players are new to the game. That may change

somewhat, however, if a big player such as IBM Corp. or Digital Equipment Corp. legitimize the technology, as expected.

*Computer Tape Outlook 1982* forecasts that 4,900 ½-inch cartridges with transfer rates lower than 300K bytes per second will be shipped this year. These include drives from Tandon, Rosscomp and Mega Tape. Shipments are expected to grow to 52,000 units in 1984 and ultimately to 370,000 units in 1987. The corresponding dollar values for these shipments are \$5.8 million in 1983, \$52 million in 1984 and \$277.6 million in 1987. "These figures are dependent on standardization within the ½-inch cartridge industry," Freeman notes. "If the industry does not meet the standards challenge head-on, then these figures will not be realized."

Another new class of cartridge drives has transfer rates greater than 300K bytes per second and is expected to back up an IBM 3380-class drive. *Computer Tape Outlook 1982* forecasts this market to grow from 0 in 1983 to \$312 million in 1987, representing a growth from 6,100 in 1984 to 31,200 in 1987. All these figures assume that IBM will introduce a product and begin shipments in 1984, Freeman says. The numbers, however, do not reflect only IBM shipments; Big Blue is expected to have traditional competitors for its "Ocotillo" drive.

Although all of the attention in both disk and tape markets is on the 5¼-inch form factor, most tape drives shipped are in the 8-inch form factor. Tape cartridges in the 5¼-inch form factor did not appear until this year. Freeman expects the trend toward the 5¼-inch form factor to continue into '84, when there will be a trend factor toward half-height drives such as those in production at Wangtek Inc., Culver City, Calif. "There



The largest contributors to the 27 percent annual growth of the OEM cartridge tape market are expected to be ¼-inch streaming cartridges. Installations of ¼-inch streamers should boom from 9,500 in 1981 to 375,000 in 1987, an 84 percent compound annual growth rate.



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will be room for all three [5¼-inch, 8-inch and half-height form factors], however," Freeman believes, "because systems are packaged in various designs."

DEI dominated start/stop shipments in the market for ¼-inch cartridges in 1981—the latest year for which figures are available—according to *Computer Tape Outlook*. DEI held 47 percent of the market, with 3M and Kennedy Co. trailing far behind. In streaming-tape drives, however, 3M led with 53 percent of shipments, followed by Archive at 26 percent and DEI with 16 percent. Three others shared the remaining 5 percent.

3M still supplies most ¼-inch tape cartridges, but DEI has mounted an aggressive challenge to 3M's media dominance with a 550-foot cartridge introduced this year. In addition to 3M and DEI, Hewlett-Packard Co. manufactures its own cartridges for in-house use.

HP has also lent its influence and considerable dollars to the success of the minicassette, which in itself may be what remains of the computer cassette industry. Cassette drives were standard on early generations of personal computers before floppy drives became common. Now, with the exception of HP's thrust in the instrumentation field, the cassette industry appears to be going the way of eight-track technology in the audio

market. While Freeman predicts an annual compound growth rate of 18 percent for the overall cassette market, most of that is attributed to the growth of the minicassette, expected to grow at an annual rate of 30 percent, assuming HP continues to support the technology. However, a formidable challenge to the minicassette has emerged in the microfloppy, which will allow random access at the cost of a minicassette. Because of remaining confusion about a single standard for microfloppies, it may be two years before the microfloppy makes a serious challenge. With its strong commitment to Sony Corp.'s 3½-inch microfloppy, however, HP's loyalty to the minicassette—especially for instrumentation applications—remains in doubt. HP recently announced delivery of its 25,000th microfloppy drive to Westinghouse Electric Corp.'s Transportation division.

Standard cassette drives with a transfer rate lower than 3K bytes per second are expected to decline at an annual rate of 14 percent from 93,000 units in 1981 to 38,000 in 1987, Freeman states.

According to *Computer Tape Outlook*, Philips Industries and TEAC Corp. of America (TCA) dominate the minicassette and standard cassette market, respectively. Philips holds a 57 percent share in the minicassette market, while Braemar Computer Devices Inc. and Raymond Engineering Inc. share the remainder. TCA holds a 70 percent share of the standard cassette market, and 11 other contenders share the remainder. □

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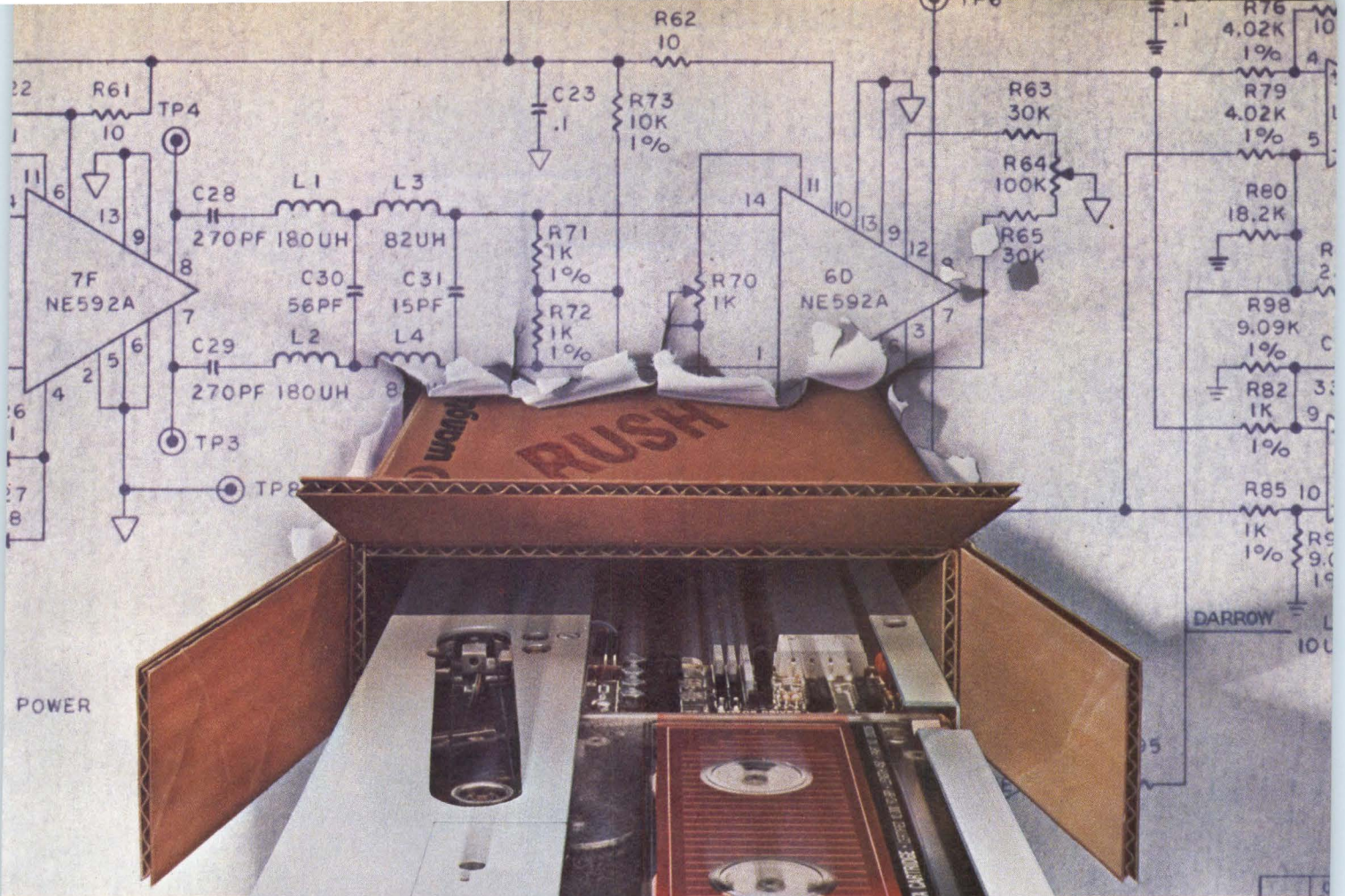
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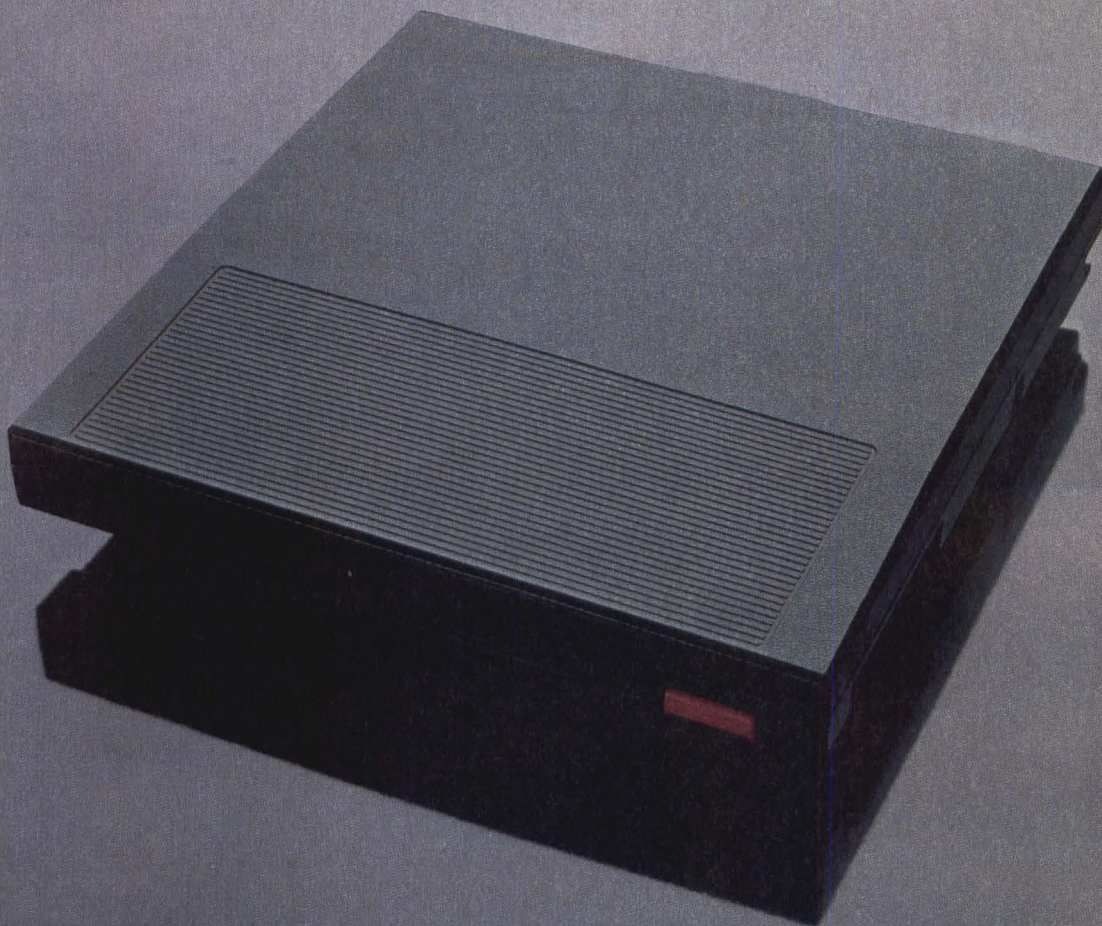
recording formats. The formatter can be housed on the bottom of the tape drive making the total height equal to a standard 5 1/4-inch Winchester drive.

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## CASSETTE/CARTRIDGE TAPE DRIVES

Company Model	Type	Tape size (in.)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (k bytes/sec)	Dimensions (l x W x D, in.)	Unit price (\$)	Interfaces
<b>ADVANCED DIGITAL INFORMATION CORP.</b>											
Data Library	cartridge	.25	start/stop	67	16	60	35.0	5x19.25x19	2,900 (Q1)	BASI, QIC-02, S-100, Multibus, IEEE-488 adaptable	
<b>ALGO INC.</b>											
1200i	cartridge	.25	start/stop	4.0	4	1600	30	19.2	5.5x7.25x14	1,996 (Q50)	IEEE-488, RS232C
1200S	cartridge	.25	start/stop	4.0	4	1600	30	19.2	5.5x7.25x14	1,796 (Q50)	RS232C
<b>ALTOS COMPUTER SYSTEMS</b>											
MTU	cartridge	.25	streaming		6400	30	19.2	16.87x18x6	2,995	RS232C, parallel	
<b>ANALOG &amp; DIGITAL PERIPHERALS INC.</b>											
Model 1	cartridge	.25	start/stop	.158	1	800	30		2.5x4x6	210 (Q100)	TTL serial
Model 2	cartridge	.25	start/stop	.5	2	1600	30		2.5x4x6	305 (Q100)	TTL serial
ADPI Byte Bucket	cassette	.25	start/stop	.5	1	800	15	1.5	6x4.5x9	780 (Q100)	RS232C, IEEE-488, NCR
ADPI Megabyte Bucket	cassette	.25	start/stop	1.0	2	1600	15	3.0	6x4.5x9	795 (Q100)	RS232C
Cassette System I	cassette	.25	start/stop	.5	2	800	5	.5	4x8.5x9.5	723 (Q100)	RS232C, 8-bit parallel
Cassette System II	cassette	.25	start/stop	1.0	2	1600	5	1.0	4x8.5x9.5	873 (Q100)	RS232C, 8-bit parallel
DC 300	cartridge	.25	start/stop	12.0	4	6400	30	6.0	8x7x8	985 (Q100)	TTL serial, CMOS
Feedback 340	cartridge	.25	start/stop	4.0	4	1600	30	6.0		2,195	RS232C, RS422
Feedback 344	cartridge	.25	start/stop	12.0	4	6400	30	24.0	8x8x13	2,250 (Q100)	RS232C, RS422
L61	cassette	.25	start/stop	.1	1		18	.75	3.5x3x6	388 (Q100)	RS232C, 8-bit parallel
L62	cassette	.25	start/stop	.2	1		18	1.2	3.5x3x6	438 (Q100)	RS232C, 8-bit parallel
MDCR1	cassette	.25	start/stop	.1	1	330-560	18	.75	3x3.5x3	156 (Q100)	TTL serial
MDCR2	cassette	.25	start/stop	.2	2	330-560	18	1.2	3x3.5x3	175 (Q100)	TTL serial
Mini DC 1	cartridge	.25	start/stop	.25	2	800	30	24.0	6x5.5x7	620 (Q100)	RS232C, 8-bit parallel
Mini DC 2	cassette	.25	start/stop	.5	2	1600	30	48.0	6x5.5x7	720 (Q100)	RS232C, 8-bit parallel
Portable Mini L6-P	cassette	.25	start/stop	.1	1		18	.75	5x7.75x9.5	640 (Q100)	RS232C
<b>ARCHIVE CORP.</b>											
Scorpion 20MB	cartridge	.25	streaming	20.0	4	8000	30, 90	30.0, 90.0		800 (Q1000)	QIC-02
Scorpion 45MB	cartridge	.25	streaming	45.0, 60.0	9	8000	90	90.0		900 (Q1000)	QIC-02
Sidewinder	cartridge	.25	streaming	20.0	4	8000	30, 90	30.0, 90.0	4.5x8.55x10	850 (Q1000)	QIC-02
Super Sidewinder	cartridge	.25	streaming	45.0	9	8000	90	90.0	4.5x8.55x10	950 (Q1000)	QIC-02
<b>AVIV CORP.</b>											
TFS 903	cartridge	.25	start/stop	21.0	4	6400	30	24.0	5.25x19x18	3,900	DEC LSI-11, Q-bus
<b>BRAEMAR COMPUTER DEVICES INC.</b>											
CD200	cassette			5.76	2	800	10, 15, 20		4.5x4.9x5.3	310 (Q100)	
CM600	cassette	.25		.09, .145	1, 2	800	3, 8, 12		3.5x3.5x2.5	134 (Q100)	
CS400	cassette			5.76	2	800	10, 15, 20		4.5x4.9x5.3	445 (Q100)	
LTD800	cassette		streaming	5.76	2, 4	800	.75		4.5x3.5x1.5	280 (Q100)	
MTL II	cassette			.136	1, 2	800			3.5x3.5x2.5	470 (Q100)	RS232C

Cassette/cartridge tape drives

## CASSETTE/CARTRIDGE TAPE DRIVES

Cassette/cartridge tape drives

Company Model	Type	Tape size (in.)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec)	Dimensions (HxWxD, in.)	Unit price (\$)	Interfaces
<b>CIPHER DATA PRODUCTS INC.</b>											
440-CT	cartridge	.25	streaming	45.0	9		90	86.7	4.5x8.55x14	800	QIC-02
525-CT Floppytape	cartridge	.25	start/stop	20	6		78	62.5	3.25x5.75x8	300	standard mini-floppy SA 400 or SA 850 type
540-CT	cartridge	.25	streaming	45.0	9		90	86.7	3.25x5.75x8	800	QIC-02
CacheStreamer	cartridge	.5	streaming	46.0, 92.0	9	1600, 3200	25	160-380	8.75x19x22	5,900	
Microstreamer	cartridge	.5	streaming	46.0, 92.0	9	1600, 3200	25	160	8.75x19x22	4,000	
Quarterback	cartridge	.25	streaming	20	4	8000	30, 90	200	4.5x8.55x14	970	QIC-02
<b>COLUMBIA DATA PRODUCTS INC.</b>											
300-C	cartridge	.25		1.5, 2.25	4	1600	30	19.2	5.2x7x14	2,695	RS232C
300-D	cartridge	.25	start/stop	2.57, 3.86	4	1600	30	19.2	5.2x7x14	2,895	RS232C
<b>COMARK CORP.</b>											
MT85 "Funnel"	cartridge	.25	start/stop, streaming	12.0	4	6400	30	192.0	4.62x8.55x14.25	2,950	Multibus
<b>CONTROL DATA CORP.</b>											
9219X Series	cartridge	.25	streaming, start/stop	26.0, 70.0	11	8000	55	55.0	4.6x8.5x14	940 (Q250)	
<b>DATA ELECTRONICS INC.</b>											
3000-S1	cartridge	.25	start/stop	5.3	4	1600	30	6.0, 24.0	4.25x6.96x5.72		DEC LSI-11, DG Nova, Interdata
3000-S2	cartridge	.25	start/stop	5.3	4	1600	30	6.0, 24.0	4.25x6.96x5.72	1,574 (Q100)	DEC LSI-11, DG Nova, Interdata, RS232C
EL-1/SL-1	cartridge	.25	streaming	13.3	2		30, 90	30.0, 90.0	3.25x5.75x8	725 (Q100)	
EL-5/SL-5	cartridge	.25	start/stop	21.3	4	6400	30	24.0	3.25x5.75x8	870 (Q100)	DG Nova; DEC PDP-11, LSI-11; Ohio Scientific, RS232C; S-100
EL-6/SL-6	cartridge	.25	start/stop	21.3	4	6400	30	24.0	3.25x5.75x8	925 (Q100)	DEC LSI-11; Q-bus
Funnel	cartridge	.25	start/stop	21.3	4	6400	30	24.0	4.2x6.9x7.7	1,140 (Q100)	DG Nova; DEC PDP-11; LSI-11; Ohio Scientific; RS232C; S-100
Serpentine Funnel	cartridge	.25	start/stop	21.3	4	6400	30	24.0	4.25x6.9x5.75	1,210 (Q100)	DEC LSI-11, Q-bus
Super Funnel	cartridge	.25	start/stop	50.0	7	6400, 8533	37.5	24.0	4.25x6.9x5.75	1,335 (Q100)	DG Nova; DEC PDP-11; LSI-11; Ohio Scientific; RS232C; S-100
QIC-Stream II	cartridge	.25	streaming	26.6	4	8000	30, 90	30.0, 90.0	4.6x8.6x14.3	1,090 (Q100)	QIC-02
Streaker	cartridge	.25	streaming	26.6	4		30, 90	30.0, 90.0	4.5x8.5x6.4	785 (Q100)	DEC LSI-11, Apple II, TRS80, Multibus, S-100
<b>DATA GENERAL CORP.</b>											
6230; 6231	cartridge		streaming		4	6400	60			5,500	DG microNova, Nova, Eclipse
<b>DAVONG SYSTEMS INC.</b>											
U-620T	cassette	.25	streaming, start/stop	18		3200, 8000	90	28.9			IBM PC, XT; Apple II, IIe, III
<b>DICOM INDUSTRIES</b>											
374	cassette	.125	start/stop	.75	2	518, 800	10, 20	2.4, 5.0	5.25x19x24	5,850	parallel, RS232C
<b>DIGI-DATA CORP.</b>											
6400	cartridge	.25	start/stop	10.0, 15.0	4	6400	30	24.0	3.25x6.9x5.75	1,190	
8300	cartridge		start/stop	20.0, 26.0	4	8333	37.5	30.0	3.25x6.9x5.75	1,390	
<b>DIGITAL LABORATORIES INC.</b>											
ACT 1200C	cassette		start/stop				1.87	1.2	6.8x10x2.3	995	RS232C
<b>ELECTRONIC PROCESSORS INC.</b>											
STR-610	cartridge	.125	start/stop	.305	2	800	18, 60	1.8	3.1x5.05x3.8	419	parallel
STR-812	cartridge	.25	start/stop	3.4	4	1600	30, 90	6.0	4x7x12	1,328	RS422

The background of the advertisement is a surreal landscape of rolling sand dunes in shades of orange and yellow. A long, winding road, composed of numerous computer circuit boards and components, stretches from the bottom left towards the horizon. A large, solid red circle representing the sun is positioned in the upper right quadrant of the sky.

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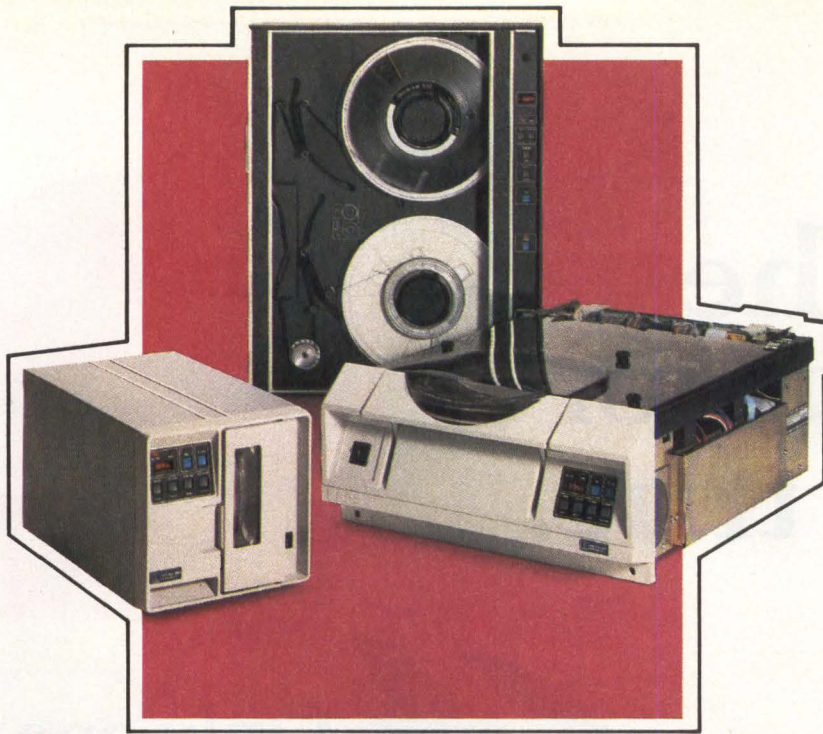
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## CASSETTE/CARTRIDGE TAPE DRIVES

Company Model	Type	Tape size (in.)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (fps)	Data transfer rate (K bytes/sec)	Dimensions (HxWxD, in.)	Unit price (\$)	Interfaces
STR-LINK III	cartridge	.125	start/stop	.305	2	800	18, 60	1.8	6x14x18	1,760	RS232C
STR-STREAM	cartridge	.25	start/stop	15.0	4	6400	30, 90	24.0	4.15x7x13.25	1,585	ST506, SA1000
<b>GENISCO MEMORY PRODUCTS</b>											
ECR-40	cartridge	.5	streaming		9	1600	45, 125			22,000	Norden, Rolm, DG, DEC, Pertec
<b>INNOVATIVE DATA TECHNOLOGY</b>											
TC-3000	cartridge	.25	start/stop	4.0	4	1600	30	6.0	5.25x8.25x15.75	2,150	RS232C, IEEE-488, HP 21MX, IBM-PC
TC-3116	cartridge	.25	start/stop	5.0	4	1600	30	6.0	6.5x7.75x10	1,295	
<b>KENNEDY CO.</b>											
6455	cartridge	.25	start/stop	21.6	4	6400	30	24.0	4.5x8.5x14	1,700	
6470	cartridge	.25	start/stop	54.0	10	6400	37.5	30.0		2,000	
<b>MEGALOGIC CORP.</b>											
QIM-I/RM	cartridge	.25	start/stop	3.0	4	1600	30	2		4,195	Multibus
TIM-I/RM	cartridge	.25	start/stop	3.0	4	1600	30	2		3,795	Multibus
<b>MEGATAPE CORP.</b>											
MT 300	cartridge	.5	streaming, start/stop	330.0	24	9600	50, 200	240.0	8.75x19x17.5	3,200 (Q100)	Pertec
HCS-1220	cartridge	.5	streaming, start/stop	330.0	24	9600	50, 200	240	10.2x8.5x30.2		Pertec
<b>MEMODYNE CORP.</b>											
M-80	cassette	.1	start/stop	.5	2	800	20	1.2	5x5x8.5	1,845	RS232C
<b>MEMTEC CORP.</b>											
420	cassette	.015	streaming	19.5	4		30, 90	37.5, 112.5	1.625x5.75x7.6	400 (OEM)	QIC-02
440	cassette	.015	streaming	43.9	4		30, 90	37.5, 112.5	1.625x5.75x7.6	500 (OEM)	QIC-02
510	cassette	.015	streaming	12.4	4		30, 90	24.0, 72.0	3.25x5.75x7.6	375 (OEM)	QIC-02
520	cassette	.015	streaming	19.5	4		30, 90	37.5, 112.5	3.25x5.75x7.6	400 (OEM)	QIC-02
<b>MILTOPE CORP.</b>											
CR 300	cartridge	.25	start/stop	2.875	4	1600	30	24.0	4.87x7.63x12.63	9,500	TTL parallel, RS232C, Rolm, Norden, PDP-11
CR 600	cartridge	.5	start/stop	6.0	7, 9	800	25	20.0	6.3x17.5x15	12,500	TTL parallel, IBM, Rolm, Norden, PDP-11
<b>NORTHERN TELECOM INC.</b>											
6109	cartridge	.25	streaming	45.0, 75.0	9		30, 90	30.0, 90.0	3.34x7.75x5.75	696 (Q500)	QIC-02
6112	cartridge	.25	streaming	60, 100	12		30, 90	30.0, 90.0	3.34x7.75x5.75	785 (Q500)	QIC-02
<b>PEREX LTD.</b>											
8051	cartridge	.25	start/stop	2.7	4	1600	30	2.0		(Q250)	RS232C, IEEE-488, 8-bit parallel
9651	cartridge	.25	start/stop	15.0	4	6400	30	19.2		2000 (Q250)	RS232C
HD6400	cartridge	.25	start/stop	15.0	4	6400	30	24.0		800 (Q250)	Apple III, S-100, Multibus
<b>PLESSEY PERIPHERAL SYSTEMS</b>											
650	cartridge	.25	streaming	20.0	4	800	90				DEC
<b>PRIME COMPUTER INC.</b>											
4581 (master)	cartridge				4	6400	30			9,000	Prime 50 series
4582 (slave)	cartridge				4	6400	30			4,500	Prime 50 series
4651-2250	cartridge				4	6400	30			4,500	Prime 2250
<b>RAYMOND ENGINEERING</b>											
6406	cassette	.15	start/stop	.9	2	800	3, 20	4.0	5.5x6x4	900 (Q1,000)	8-bit parallel
6409	cassette	.10	start/stop	.1	2	800	3	.3	3x3x1.8	365 (Q1000)	8-bit parallel

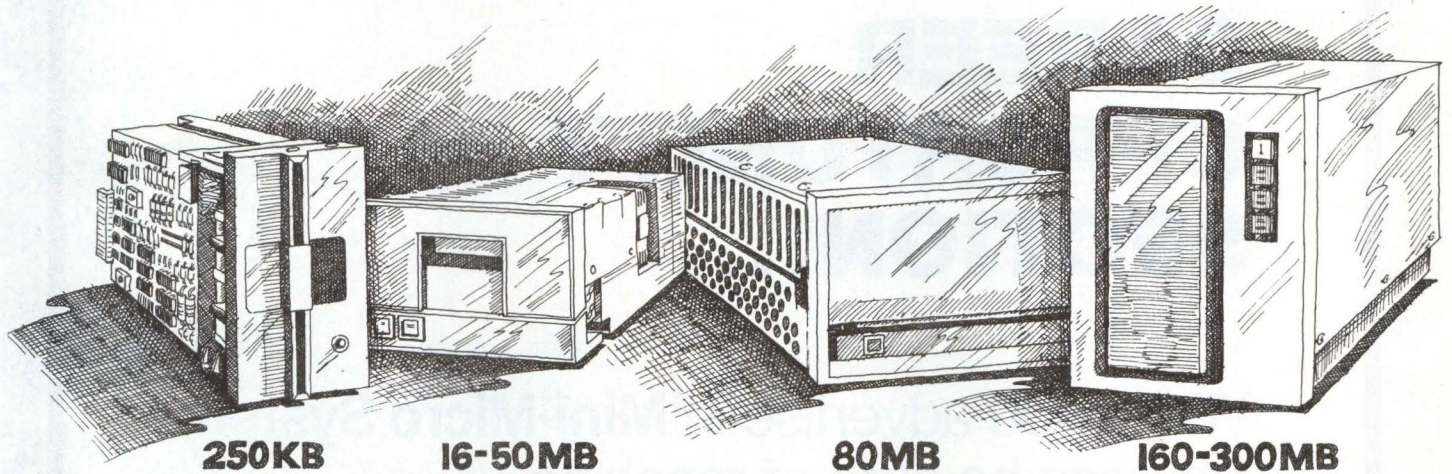
Cassette/cartridge tape drives

## CASSETTE/CARTRIDGE TAPE DRIVES

Company Model	Type	Tape size (in.)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec)	Dimensions (HxWxD, in.)	Unit price (\$)	Interfaces
6440	cassette	.15	start/stop	1.8	2	800, 1600	30	3.0, 6.0	4.5x5.5x3.75	495 (Q1000)	RS232C, IEEE-488
6449	cartridge	.25	start/stop	3.6	4	1600	30	6.0	4.5x7.25x10	795 (Q1000)	RS232C, IEEE-488, 8-bit parallel
6412-01, 6412-02, 6415-02	cassette	.25	start/stop		4	1600	30	6.0	8.4x4.1x10.6		serial I/O, ANSI standard or RS232C
WR-100	cassette	.15	streaming	20.0	4			30.0	5.75x3.25x8	525 (Q1,000)	QIC-02
<b>SAYLOR ELECTRONICS INTERNATIONAL</b>											
4240	cassette		streaming, start/stop		4	3200	30		6x5.5x7	1,550	
<b>TALLGRASS TECHNOLOGIES</b>											
Data Save	cartridge		streaming		4	8000	90			1,395	IBM-PC, TI Professional
<b>TANDBERG DATA INC.</b>											
OIC-STOR/MARK II TDC-3229	cartridge	.25	streaming	20, 27, 45, 60	4, 9	8000	45, 90	44.0, 88.0			QIC-02
QIC-STOR/MINI MARK II TDC 3319	cartridge	.25	streaming	20, 27, 45, 60	4, 9	8000	45, 90	44.0, 88.0			QIC-02
<b>TANDON CORP.</b>											
TM 951	cartridge	.5	streaming	50.0	20	6400	40	31.25	3.38x5.87x8	500 (OEM)	
<b>TECHTRAN INDUSTRIES</b>											
Series 800	cassette	.25	start/stop	.145	2	960	25	.0139, 1.2	5.0x7.25x11	1,095	RS232C
9600	cassette				2	960	10	.0139, 1.2	6.5x12x18	1,525	RS232C, CCITT
<b>TEKTRONIX INC.</b>											
4923	cartridge	.25	start/stop	.4	2	1600	30	1.2	6.0x8.7x17.2	2,600	RS232C
4924	cartridge	.25	start/stop	.6	2	1600	30	1.2	6.0x8.7x17.2	2,990	IEEE-488
<b>3M DATA RECORDING PRODUCTS</b>											
DCD-1	cartridge	.015	streaming, start/stop	.2	1	800	30	2.4	3.9x5.7x3.8	534 (Q100)	TTL compatible
DCD-2	cartridge	.015	streaming, start/stop	.7	2	1600	30	4.8	4.2x5.7x4.8	426 (Q100)	TTL compatible
DCD-3	cartridge	.25	streaming, start/stop	4.3	4	1600	30	6.0	6.9x8.7x9.4	1,061 (Q100)	TTL compatible
HCD-75/30	cartridge	.25	streaming, start/stop	67.0	16		30	17.5	4.6x6.8x17.6	1,976 (Q100)	parallel 16-bit, 8-bit bi-directional or unidirectional
HCD-75/60	cartridge	.25	streaming, start/stop	67.0	16		60	35.0	4.6x6.8x17.6	1,976 (Q100)	parallel 16-bit, 8-bit bi-directional or unidirectional
<b>UNITRONIX CORP.</b>											
DMT 730	cassette	.25	streaming, start/stop	38.0	8	700	30, 90	28.0, 86.0	4.5x5x3.5	1,900	DEC PDP 11/23, 11/24, 11/44, VAX
DMT 2000	cartridge	.5	streaming, start/stop	80.0	9	1600	25, 100	36.0, 72.0	9.5x19x24	4,800	DEC PDP 11/23, 11/24, 11/44, VAX
<b>WILLIAM-PALMER INDUSTRIES INC.</b>											
dcr/10	cassette	.25	start/stop	1.0	2	800	10	1.2, 9.6	6.44x8.5x9.25	2,475	RS232C, RS449

Cassette/cartridge tape drives

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space as conventional 5¼-inch floppies. A choice of two interfaces makes the Wren easy to integrate into your system with off-the-shelf controllers.

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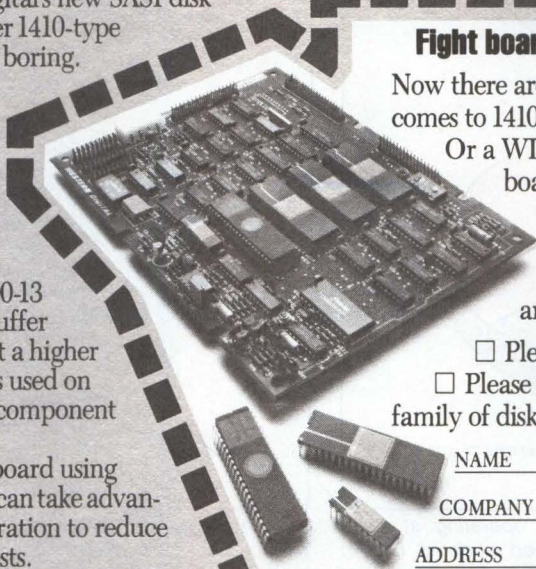
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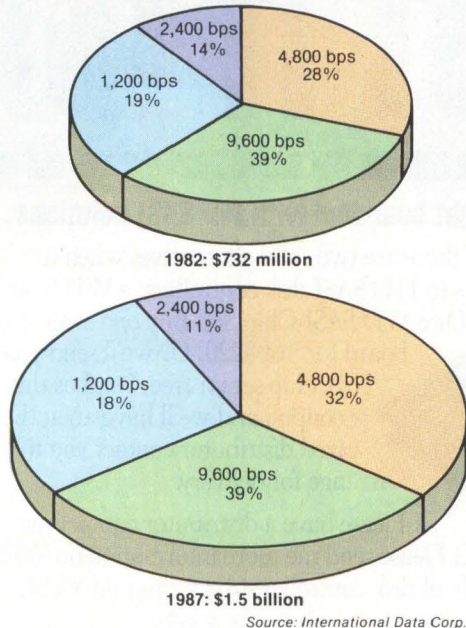
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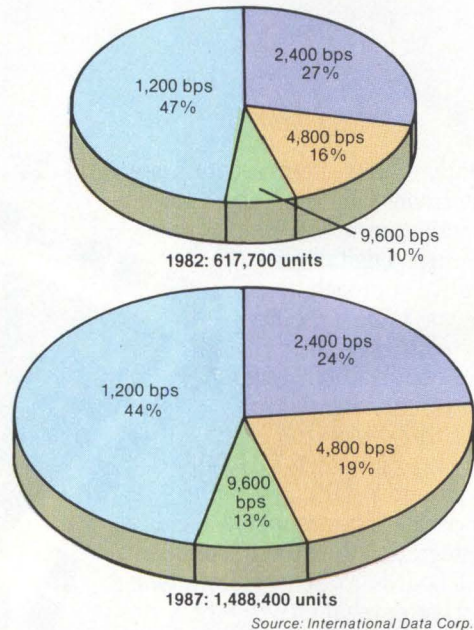
# Growing emphasis on communication

SARAH GLAZER, Associate Editor

**DOLLAR VALUE OF MODEM MARKET IN 1982 AND 1987**



**MODEM SHIPMENTS IN 1982 AND 1987**



**Revenues from high-speed modems**—those operating at 4,800 and 9,600 bps—far outweigh those for lower speed modems, both in 1982 and in the projected market for 1987. Although shipments of high-speed modems were much smaller than shipments of lower speed units, high-speed modems are much more expensive. International Data Corp. makes its estimates on "if sold" values, based on average prices for each model shipped.

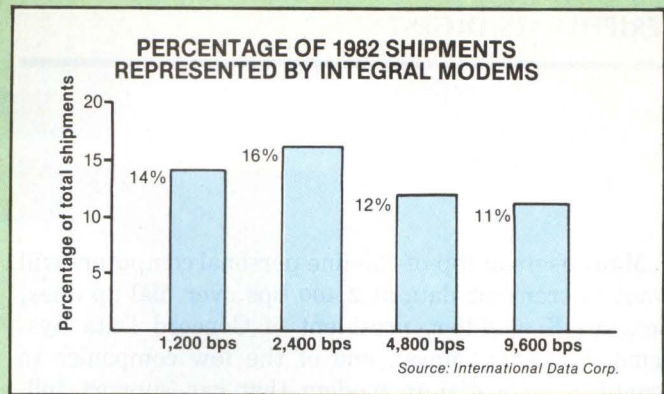
**Even though the shipments of 1,200- and 2,400-bps modems projected for 1987 will continue to outnumber those for higher speed modems, the fastest growth is taking place at the 4,800- and 9,600-bps market segments. There is a trend toward transmitting data at higher speeds for almost all types of computer equipment, says analyst Kim Myhre of International Data Corp.**

Modems continue to cost less and do more because of technical advances and stiff competition in the market. Falling prices fuel a trend toward building modems into devices that communicate—even inexpensive terminals and microcomputers. As a result, standalone modems operating at transmission speeds of 1,200 to 9,600 bits

per second (bps) often do more than simply convert signals from digital to analog and back again. Many standalone modems, particularly those that handle high-speed data transmission, include such features as diagnostics and network-control functions.

Revenues from sales of modems in the 1,200- to

Although integral modems represent less than 20 percent of overall shipments in each market segment, manufacturers expect that figure to grow, especially at the two lower speeds shown. The low prices of new single-chip modems should boost the market for integral modems most dramatically at 1,200 bps, the speed most often used by personal computers.



# spurs modem sales

9,600-bps range were \$732 million in 1982, estimates International Data Corp. (IDC), a research concern in Framingham, Mass. IDC expects revenues to reach \$1.5 billion in 1987, even though it predicts lower prices in every market segment.

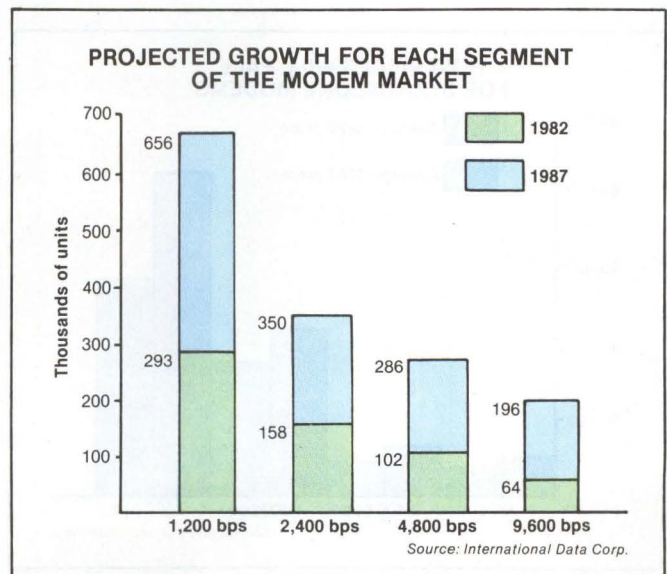
Modem prices are falling because of competition among producers and because modems are smaller and cost less to manufacture, says IDC communication analyst Kim Myhre. Smaller scale circuitry has produced a single-chip modem that Myhre predicts will be produced in large quantities in 1984. The modem on a chip should eventually stabilize the downward price spiral, maintains Dave Peters, vice president of sales for Racal-Vadic Inc., Sunnyvale, Calif., a leading manufacturer of 1,200-bps modems. He says Racal-Vadic plans to unveil its own modem on a chip in December. "You can't get a modem much smaller," Peters quips, "so it would be hard to get it much lower in price."

Low-cost, single-chip modems will make it economical for manufacturers to build modems into personal computers and inexpensive terminals—products with particularly price-competitive markets. However, Peters claims these manufacturers aren't producing modems in house because "there's quite a bit that goes around the modem chip itself: line transformers, relays for output condition, a microprocessor for dialing, tone chips and so forth."

Low-cost integral modems rarely include features such as diagnostics, though. Even if extra circuitry could go onto a chip, indicators must be displayed on a panel where the user can see them. Such a change in the terminal's package is costly, points out Courtney Klinck, product manager for modem manufacturer Anderson-Jacobson Inc., San Jose, Calif. For users who want capabilities beyond simple analog-to-digital (A/D) conversion, "the standalone modem is still going to be around," he emphasizes.

## Personal computers boost market

The single biggest force driving the market for medium-speed modems—those operating at speeds of 1,200 and 2,400 bps—is the acceptance of personal computers. The market for medium-speed dial-up modems is increasing dramatically, says communication analyst John Borden of the Yankee Group, Boston, because of "the explosion of personal computers," especially those used in business. With microcomputers plugging into both corporate and public networks to gain access to databases, more and more users rely on modems. Although modem manufacturers target 1,200 bps as the transmission speed most personal computers will use in the next few years, many acknowledge that speeds are creeping higher.



The market for modems that operate at all speeds is growing. These five-year projections show that shipments should at least double in each segment of the market, with higher speed products showing the most dramatic gains.

Many users of top-of-the-line personal computers will want to transmit data at 2,400 bps over dial-up lines, believes Ken Miller, president of Concord Data Systems, Waltham, Mass., one of the few companies to manufacture a dial-up modem that can support full-duplex transmission at 2,400 bps. Miller also notes that, with more personal computers able to emulate IBM terminals, transmission at 2,400 bps "also gives the flexibility of synchronous transmission."

Less certain about how far personal computers will push the modem market is John Pugh, vice president of marketing at Codex Corp., Mansfield, Mass., a leading manufacturer of high-speed modems. Especially in medium- and large-sized companies, users may eventually stop connecting personal computers to analog telephone lines, choosing "other possible ways to communicate, such as local-area networks," he predicts. Since most local-area networks use digital transmission, they eliminate the need for modems at each node.

**Added features characterize high-speed modems**

High-speed modems, those operating at 4,800 and 9,600 bps, are more sophisticated and more expensive than their slower cousins for several reasons. Transmitting at higher speeds over analog lines raises error rates so high that error-detecting features are standard. And, although speeds are creeping up for many kinds of communication, most high-speed modems

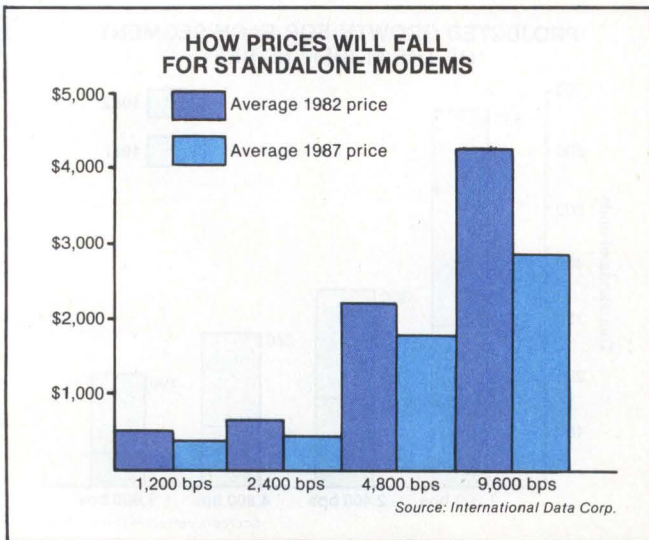
handle batch transmission: data stored in terminals and transmitted to a central processor in large enough quantities to justify the high speeds. Because this method of transmission is often used in private, leased-line networks, many high-speed modems include features for network control.

Such diagnostic and control features make a modem a remote sensor so a network controller can monitor performance, detect degradation and even reconfigure a network from a central location. "The main thing we see in high-end modems is the need for network diagnostic systems," says Dennis McKenna, a marketing director for Paradyne Corp., Largo, Fla., a leading manufacturer of 4,800- and 9,600-bps modems. In agreement is John Fairweather of Intertel Inc., Andover, Mass., another high-speed modem maker. He believes that adding intelligence to the modem is key in this segment of the market. "Our whole thrust is network control," he declares.

Although most high-speed modems are standalone units, primarily because they're so expensive, some are built into terminal devices. High-speed integral modems have been part of facsimile machines for some time, Codex's Pugh points out. They're also used in other devices, such as automatic tellers, credit-card verifiers and debit-card machines, when these are part of "big and sophisticated networks," he says.

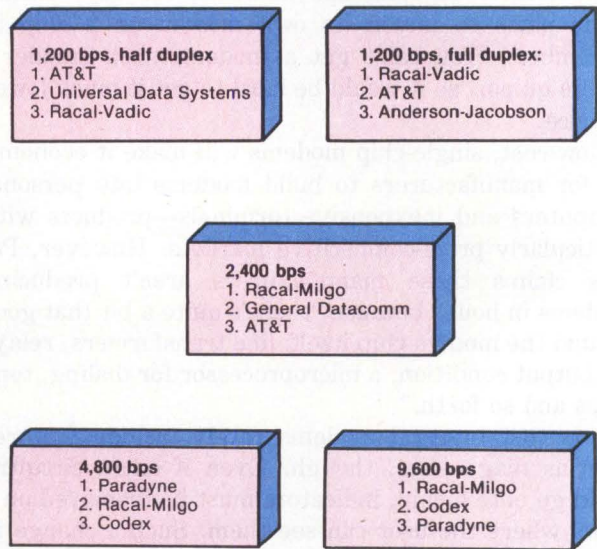
High-speed modems may have a variety of features, but competition is just as fierce in this end of the

Modems



Prices are falling for standalone modems because of two main factors: a very competitive market and technical advances that are lowering manufacturing costs. The most significant technical advance is the increased use of LSI and VLSI circuitry, which will make new modems smaller and less power hungry.

**TOP SUPPLIERS IN EACH SEGMENT OF THE MODEM MARKET**



As shown, the leading suppliers of modems are different in each speed segment of the market. The traditional market leader is AT&T, but its share has decreased because competitors offer products with more features for the same price, says analyst John Borden of the Yankee Group.





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A modem that's compatible with all these and more.

## Now you can get even more power from your personal computer or terminal.

How? It's simple. Just connect Cermetek's INFO-MATE™ 212A, intelligent auto-dialing modem to your PC or data terminal and then to the phone line and you're ready to communicate to the outside world.

Access data bases... send and receive electronic mail... make simple user-to-user connections... all at 1200, 300, or 110 bps. full duplex.

Modem Features: **SEE US AT COMDEX BOOTH #4840**

▲ Auto-dial, auto-answer

- ▲ Recognizes dial, busy, ring back, modem answer tone and the human voice
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Just call us at (408) 734-8150 for your nearest dealer location. Dealer and distributor inquiries invited.

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CIRCLE NO. 79 ON INQUIRY CARD

market as in other segments. Although manufacturers must offer advanced features to compete, they can't afford to let these extras raise prices. Large-scale integration (LSI) and very-large-scale-integration (VLSI) technology help keep manufacturing costs down, allowing producers to offer more functions without raising prices, says Anderson-Jacobson's Klinck. To keep up with their competitors, "it's incumbent on all modem manufacturers to stay in lockstep with the technology," he concludes.

Also offering competition at the high-speed end of the market is digital transmission, operating over terrestrial, microwave and satellite facilities. Although these alternatives are still more expensive than analog lines, they eliminate one cost completely: that of modems.

Paradyne is planning for the increase in digital transmission by preparing to offer digital products that will integrate with existing analog products, says marketing director McKenna. "Users will have to contend with hybrid networks for some time," he

predicts, and adds that the need for network control and diagnostics will not decrease.

Codex's Pugh believes the transition from analog lines will be slow, citing AT&T's own prediction that only 30 percent of the long-haul networks in the United States will be digital by 1990. "Within a 10-year period, we'll see an impact," he concedes. "And any company that is purely in modems had better get into other areas." □

**NEXT MONTH IN MMS**

The December issue of Mini-Micro Systems, the annual technology review, is MMS's encyclopedic resource for its unique readership of value-added OEMs and users, and resellers. It consists of feature articles about various technologies, with market and product data in graphs, charts and tables.

Topics covered will include:

- **Databases:** models, interfaces between program and user, distributed databases and applications
- **Office automation:** integrated OA systems, dedicated function systems and software
- **Microprocessors:** architecture, fabrication, simulation and packaging
- **Artificial intelligence:** natural language translation, expert systems and vision systems
- **Co-processors:** communications, local area networks and floating point arithmetic

# ANNOUNCING THE Mini-Micro Computer Digest

Second Issue  
in June



Mini-Micro Systems' Mini-Micro Computer Digest is an indispensable selection guide to minicomputers and microcomputers for value-added OEMs, resellers and users. The Mini-Micro Computer Digest categorizes each offering with extensive data and comprehensive text, yet provides the regularity, currency and editorial content of a trade journal. Mini-Micro Computer Digest combines staff-written product/market overview articles with Mini-Micro Systems well-regarded product tables.

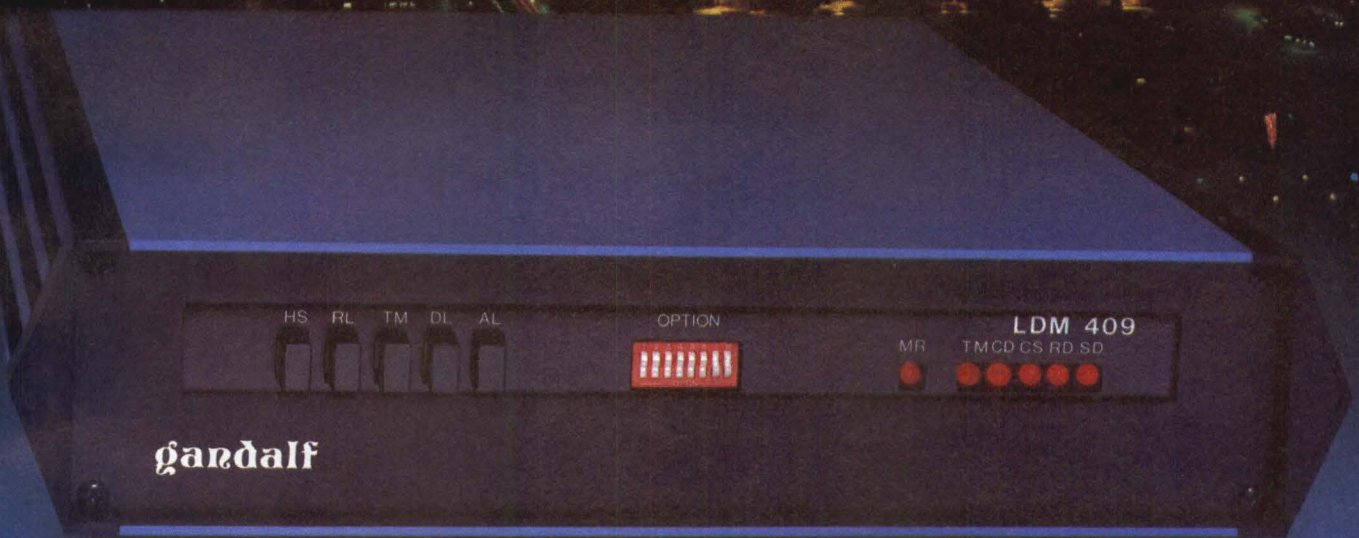
**MINI-MICRO SYSTEMS in 1984:**

- 12 monthly issues
- 2 Peripherals Digest issues . . . Spring and Fall
- And now—Mini-Micro Computer Digest in June

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# Announcing a Breakthrough in Metropolitan Data Transfer



## Gandalf's New LDM 409 makes 9600 bps Modems Very Affordable

Now there's a low cost 9600 bps synchronous modem optimized for metropolitan range applications! The Gandalf LDM 409 bridges the gap between long-haul and short-haul modem capabilities and costs.

Based on innovative digital signal processing technology, the LDM 409 is auto-equalized, microprocessor controll-

ed, and includes digital loopbacks, a test pattern generator, an error detector, plus more. The modem operates on voice grade, 4-wire leased lines in constant carrier mode.

All of this puts the LDM 409 in a class of its own.

The LDM 409 handles full duplex, point-to-point applications involving data

transfers through multiple telephone exchanges where short-hauls are not satisfactory but distances do not warrant the cost and complexity of long-hauls.

Call today to get two 9600 bps LDM 409s for the price of one 9600 bps long-haul modem. Complete details are available from your local Gandalf representative.

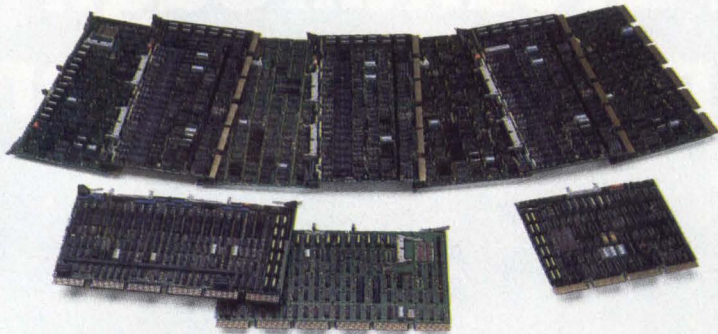
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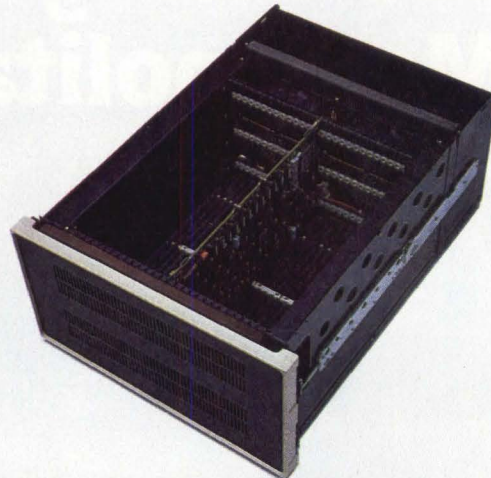
CIRCLE NO. 81 ON INQUIRY CARD

# Five reasons why DEC users should buy Emulex communications controllers.



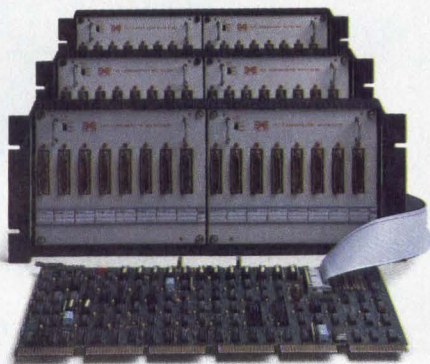
## Broad product line featuring our new DMF-32 emulation.

Nobody covers LSI-11, PDP-11, and VAX-11 users' needs like Emulex. More than 15 software-transparent controllers emulating DH11, DZ11, DV11 and DMF-32. All deliver improved line-handling capabilities, in a smaller package, at lower costs.



## Fewer backplane slots.

Emulex communications controllers pack so much capability onto each board that fewer boards are needed. Take a 64-line DH11 emulation. Emulex does on one board what it takes DEC to do on 36. Think of the savings in rack space, to say nothing of price.



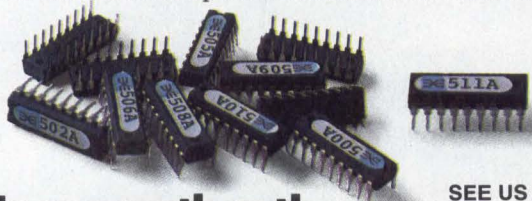
## More channels.

Emulex's new DMF-32 emulation is typical. One controller board handles up to 64 lines, vs. only eight per DEC module. And Emulex offers *all* lines with modem control, not just two. For even more lines, Emulex's Statcon Series is the answer. We simply add a low-cost port concentrator, so that with one controller board you can connect up to 256 remote *and* local terminals.



## Lower prices.

For instance, a DEC DH11 controller lists at \$8,950 per 16 lines, with expansion chassis costing \$3,000 or more. Compare that to Emulex's CS11/H at \$4,500 for the first 16 lines and \$3,000 for each additional 16 lines. At 64 lines, you suddenly have savings of about \$23,000 and a lot of extra slots to boot.



## Easy growth path.

As your system grows, upgrading is simple with Emulex controllers. Just change PROM sets. Example: DH to DMF for \$350. In addition, Emulex's advanced microprocessor architecture is consistent throughout the product line. Think of the inventory savings.

SEE US AT COMDEX BOOTH #2030.

Don't speculate with your communications controller dollars. Invest in Emulex. Phone toll free: (800) 854-7112. In California: (714) 662-5600. Or write: Emulex Corporation, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, CA 92626.



**The genuine alternative.**

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## VOICE GRADE DDD MODEMS

Company Model	Data rate (bps)	Modulation method	Synchronization	Transmission mode	Calling mode	Diagnostic features	Unit price (\$)	Features/Options
<b>ADMINET INC.</b>								
Simultaneous Voice & Data Modem	0-9600	FSK	Async	Half, full duplex		digital loopback	499 (pair)	simultaneous voice and data
<b>ANDERSON JACOBSON INC.</b>								
1211	0-300, 1200	PSK, FSK	Async/sync	Half and full duplex	orig./auto. answer	analog, digital loopback		Bell 212A, 103 compatible
1211AD/1259AD	0-300, 1200	PSK, FSK	Async/sync	Half duplex	orig./auto. answer	analog, digital loopback		
1233	0-300, 1200	PSK, FSK	Async/sync	Half duplex	orig./answer	digital loopback		Bell 212, 103, VA 3400 compatible
1234A	0-600, 1200	QAM	Async/sync	Half duplex	originate only			
1235	0-450, 1200	QAM	Async	Full duplex	originate only			
1245	0-450, 1200	FSK	Async	Full, half duplex	orig./answer			Bell 103, 202C, 202S compatible
1256	1200	QAM	Async/sync	Full duplex	orig./auto. answer	analog, digital loopback		RJ11C interface
1259	0-300, 1200	PSK, FSK	Async/sync	Half, full duplex	orig./auto. answer	analog, digital loopback		Bell 212, 103, VA 3400 compatible (rack version 1259RM)
4048	4800	QAM	Async/sync	Full duplex	orig./auto. answer	remote self test; analog, digital loopback		echo cancellation
<b>AVANTI COMMUNICATIONS CORP.</b>								
600A	0-9600		Async	Half, full duplex	originate only	local analog loopback, remote digital loopback	285	rack mount, multipoint capability
2400	1200, 2400	QAM	Async/sync	Half, full duplex	originate only	local analog loopback, remote digital loopback	1,100	multipoint capability
4800	2400, 4800	QAM	Async/sync	Half, full duplex	originate only	remote digital loopback, local analog loopback, line quality control display	1,950	multipoint capability
<b>BIZCOMP CORP.</b>								
1012	300, 1200	FSK, PSK	Async sync	Half, full duplex	auto. dial/ auto. answer	analog and digital loopbacks; self test	649 (Q1)	Bell 212A compatible
2120	110, 300, 1200	FSK, PSK	Async	Half, full duplex	auto. dial/ auto. answer	self test; analog loopback	499 (Q1)	Bell 212A compatible, integrated voice and data, designed for IBM PC, XT, auto log-on sequence
<b>BLACK BOX CORP.</b>								
212	300, 1200	FSK, PSK	Async/sync	Half, full duplex	auto. dial/ auto. answer	auto. loopback	595	stores 5 numbers in non-volatile memory, menu driven
<b>BO-SHERREL CO. INC.</b>								
M-1A	9600		Async	Half, full duplex	originate only		138	
<b>CERMETEK MICROELECTRONICS INC.</b>								
CH1760E	110, 300, 1200	FSK, PSK	Async/sync	Full duplex	auto. dial/ auto. answer	self test, analog loopback, remote digital loopback	495	stores 52 telephone numbers or log-on messages
INFO-MATE 212A	110, 300, 1200	FSK, PSK	Async/sync	Full duplex	auto. dial/ auto. answer	self test, analog loopback, remote digital loopback	595	stores 52 telephone numbers or log-on messages
INFO-MATE 212PC	110, 300, 1200	FSK, PSK	Async	Full duplex	auto. dial/ auto. answer	self test, analog loopback, remote digital loopback	495	
<b>CODEX CORP.</b>								
5208R	4800	DPSK	Sync	Half, full duplex	orig./auto. answer	local analog loopback, remote digital loopback, self test	1,750	
5201R	2400	PSK	Sync	Half, full duplex	orig./auto. answer	local analog loopback, remote digital loopback, self test	775	
5212R	300, 1200	PSK	Async/sync	Full duplex	orig./auto. answer	local analog loopback, remote digital loopback, self test	595	

DDD modems

## VOICE GRADE DDD MODEMS

Company Model	Data rate (bps)	Modulation method	Synchronization	Transmission mode	Calling mode	Diagnostic features	Unit price (\$)	Features/Options
5202R	0-1200	FSK	Async	Half, full duplex	auto. orig./ auto. answer	local analog loopback, remote digital loopback, self test	475	
MX2400	1200, 2400	DPSK	Async/sync	Half, full duplex	auto. orig./ auto. answer	local analog loopback, remote digital loopback, self test	1,600	
LSI 48/V.27 bis/ter	2400, 4800	DPSK, QAM	Sync	Half, full duplex	orig./answer	local analog loopback, remote digital loopback	3,500	
LSI 24/24	2400	QAM	Sync	Full duplex	auto. orig./ auto. answer	self test	2,650	
<b>COMPUTER COMMUNICATIONS SPECIALISTS</b>								
Audiomodem	1200	FSK	Async	Half, full duplex	orig./answer		2,895	uses audio speech processor to provide verbal response
<b>CONCORD DATA SYSTEMS</b>								
212	1200	DPSK	Async/sync	Full duplex	orig./auto. answer	local, remote loopback	770	
224	1200, 2400	QAM	Async/sync	Full duplex	auto. dial/ answer	local, remote loopback	1,195	
224 AD	1200, 2400	QAM	Async/sync	Full duplex	auto. dial/ auto. answer	local, remote loopback	1,195	
V.22	1200	DPSK	Async/sync	Full duplex	orig./auto. answer	local, remote loopback	965	
V.22 bis	1200, 2400	QAM	Async/sync	Full duplex	orig./auto. answer	local, remote loopback	995	
V.22 bis AD	1200, 2400	QAM	Async/sync	Full duplex	auto. dial/ auto. answer	local, remote loopback	1,195	
<b>CTS CORP.</b>								
CTS 212AT	300, 1200	PSK	Async sync	Full duplex	auto. dial/ auto. answer	local analog, remote and digital loopbacks; self test	130-170 (Q1,000)	TTL compatible interface, Bell 212A compatible board- level modem
CTS 212 AH	300, 1200	PSK	Async sync	Full duplex	auto. dial/ auto. answer	local analog, remote and digital loopbacks; self test	200-275 (Q OEM)	stand-alone, includes housing, power supply, plugs into a/c
CTS 212 AR	300, 1200	PSK	Async sync	Full duplex	auto. dial/ auto. answer	local analog, remote and digital loopbacks; self test	140-180 (Q1,000)	RS232C interface, Bell 212A compatible board-level modem
<b>DATAPoint CORP.</b>								
9478	1200	FSK	Async	Full duplex	answer only		995	
9479	1200	FSK	Async	Full duplex	originate only		995	
<b>DATEC INC.</b>								
212	0-300, 1200	FSK, DPSK	Async/sync	Half, full duplex	auto. orig./ auto. answer	analog loopback, remote digital loopback, self test	595	optional automatic dialer
<b>GANDALF DATA INC.</b>								
SAM 201	1200, 2400	DPSK	Async/sync	Half, full duplex	orig./auto. answer	analog, digital loopback	725	Bell 201C & CCITT V.26 compatible
SAM 212	300, 1200	DPSK, FSK	Async/sync	Full duplex	auto. dial/ auto. answer	analog loopback, remote digital loopback	618	
<b>GENERAL DATACOMM INDUSTRIES, INC.</b>								
DataComm 201-CK	2400		Sync	Half duplex	auto. dial/ auto. answer	digital loopback; self test	795	Bell 201B/C compatible, async converter
DataComm 201C	2400		Sync	Half, full duplex	auto. answer	analog, digital loopbacks; test pattern/message generator	935	Bell 201C/LIC/LID compatible
DataComm 202S/T	1200, 1800		Async	Half, full duplex		analog, digital loopbacks; self test; test pattern/ message generator	450	Bell 202S/T compatible; can be used on private line
DataComm 208B/A	4800		Sync	Half, full duplex		analog, digital loopbacks; self test, test pattern/ message generator	1,695	Bell 208A/B compatible
DataComm 212A	300, 1200		Async sync	Full duplex	auto. answer only	analog, digital loopbacks; self test	880	Bell 212A compatible
DataComm 212M	300, 1200		Async sync	Full duplex	auto. answer only	analog, digital loopbacks; self test	731	Bell 212A compatible

DDD modems

## VOICE GRADE DDD MODEMS

Company Model	Data rate (bps)	Modulation method	Synchronization	Transmission mode	Calling mode	Diagnostic features	Unit price (\$)	Features/Options
<b>HAYES MICROCOMPUTER PRODUCTS INC.</b>								
Smartmodem 1200, 1200B	300, 1200	PSK	Async	Full duplex	auto. dial/ auto. answer	local analog loopback	699, 599	Bell 103, 212A compatible; audio monitor; board-level version is 1200 B; IBM PC compatible with Hayes authored communications software
<b>INCOMM</b>								
212A	300, 1200	FSK, PSK	Async	Half, full duplex	orig./auto. answer	analog loopback, self test	549	Autodial A212A (\$599)
300/1200	300, 1200	FSK, PSK	Async/sync	Half, full duplex	orig./auto. answer	analog loopback, remote digital loopback, self test	595	auto. orig./auto. answer 300/1200 MULTIDIAL (\$795)
A1200	1200	PSK	Async	Half, full duplex	orig./auto. answer	self test, analog loopback	499	
STARCOM	300, 1200	FSK, PSK	Async	Half, full duplex	auto. orig./ auto. answer	self test	450	
OSCOM	300, 1200	FSK, PSK	Async	Half, full duplex	auto. orig./ auto. answer	self test	520	Built-in communications software for Osborne computers
<b>INFOTRON SYSTEMS CORP.</b>								
DL 212B	300, 1200	FSK, PSK	Async/sync	Full duplex	auto. answer	remote & local analog and digital loopback		rack mount
DSM/Triple	300, 1200	PSK, FSK	Async sync	Half, full duplex	answer only	remote & local, analog and digital loopbacks		automatically responds to Bell 212A, 103; Vadic VA3400 originating modems, rackmount
<b>INTEGRATED DESIGN ENGINEERING INC.</b>								
IDE-1200	1200	FSK	Async	Half, full duplex	orig./answer		500	NCR compatible
<b>INTERTEL INC.</b>								
CM2020	1200	FSK	Async	Half duplex	auto. dial/ auto. answer	analog loopback, self test	180 (Q100)	5x6-inch card, Bell 202S compatible
M2400	2400	PSK	Sync	Half, full duplex	orig./auto. answer	analog, digital loopback; self test	645	Bell 201C compatible
NCM 1200	1200	FSK	Async/sync	Full duplex		self test, CCITT V.54 loopback testing		optional DDD
NCM 2400	1200, 2400	DPSK	Sync	Half, full duplex		self test, CCITT V.54 loopback testing		optional DDD
NCM 4800	4800	QAM	Sync	Half, full duplex		analog, digital loopback		optional DDD
<b>KINEX CORP.</b>								
4800/27	2400, 4800	DPSK	Sync	Half, full duplex	orig./answer	analog, digital loopback	2,225	dial-up, leased line selection by front-panel switch
4800/M	2400, 4800	DPSK	Sync	Half, full duplex		analog, digital loopback	2,395	2x2400 multiplexer
9600/29	4800, 7200, 9600	QAM	Sync	Half, full duplex		analog, digital loopback	2,750	
<b>LEXICON CORP. OF MIAMI</b>								
LEX-15	1200	FSK	Async	Half duplex	originate only		325	Bell 202 compatible
LEX-15B	1200	FSK	Async	Half duplex	originate only		395	Bell 202 compatible, includes battery option
<b>MICROCOM</b>								
PCS/2000	1200	FSK	Async	Half, full duplex	auto. dial/ auto. answer	loopback test	995	
RX/1000	1200	FSK	Async	Half, full duplex	auto. dial/ auto. answer	loopback test	895	
<b>MICRO-BAUD SYSTEMS, INC.</b>								
MB 80514	300, 1200	PSK	Async/sync	Full duplex	auto. orig./ auto. answer		430	
<b>MULTI-TECH SYSTEMS INC.</b>								
212AD	300, 1200	FSK, PSK	Async/sync	Half, full duplex	auto. dial/ auto. answer	analog loopback, remote digital loopback	695	
212AH	300, 1200	FSK, PSK	Async/sync	Half, full duplex	auto. dial/ auto. answer	analog loopback	549	
212C	1200	PSK	Async	Half, full duplex	auto. dial/ auto. answer	analog loopback	550	
212PC	300, 1200	FSK, PSK	Async	Half, full duplex	auto. dial/ auto. answer	analog loopback	549	

## VOICE GRADE DDD MODEMS

Company Model	Data rate (bps)	Modulation method	Synchronization	Transmission mode	Calling mode	Diagnostic features	Unit price (\$)	Features/Options
<b>NCR</b>								
7120	1800		Async	Half, full duplex		local loopback		
<b>NEC AMERICA INC.</b>								
N201CR	2400	PSK	Sync	Half duplex	orig./auto. answer	self test	895	Bell N201C compatible
N212AR	1200	PSK	Async/sync	Full duplex	orig./auto. answer	self test, analog loopback	695	Bell N212A compatible
N212BR	1200	PSK	Async/sync	Full duplex	auto. orig./auto. answer	self test, analog loopback	795	Bell N212A compatible
<b>NOVATION INC.</b>								
103/212 SMART-CAT	300, 1200	FSK, PSK	Async	Half, full duplex	auto. orig./answer	local analog, remote digital loopback	595	
212 APPLE-CAT II	0-1200	PSK	Async	Half, full duplex	auto. dial/ auto. answer	self test	725	
212 AUTO-CAT	0-300, 1200	FSK, PSK	Async/sync	Half, full duplex	auto. orig./answer	local analog loopback, remote digital loopback	695	
<b>OMNITEC DATA</b>								
2x212	300, 1200	FSK, PSK	Async	Full duplex	auto. dial/ auto. answer	analog loopback, remote digital loopback, self test	995	includes 2-channel statistical multiplexer
6212	1200	PSK	Async/sync	Full duplex	auto. dial/ auto. answer	analog loopback	495	
7212	300, 1200	FSK, PSK	Async/sync	Full duplex	auto. orig./answer	analog loopback, remote digital loopback, self test	575	
8212	300, 1200	FSK, PSK	Async/sync	Full duplex	auto. dial/ auto. answer	analog loopback, remote digital loopback, self test	650	
9212	300, 1200	FSK, PSK	Async/sync	Full duplex	orig./auto. answer	analog loopback, remote digital loopback, self test	785	
<b>PARADYNE</b>								
LSI-24C	1200, 2400	DPSK	Sync	Half, full duplex	dual call-auto. ans.	local analog loopback, remote digital loopback	1,200	
<b>PENRIL CORP.</b>								
300/1200	0-300, 1200	FSK, PSK	Async/sync	Full duplex	orig./auto. answer	self test, analog loopback, remote digital loopback	795	Bell 212A compatible
8201-DN	1200, 2400	PSK	Sync	Half duplex	orig./auto. answer	self test, analog loopback	795	Bell 201C compatible
AD300/1200	0-300, 1200	FSK, PSK	Async/sync	Full duplex	auto. dial/ auto. answer	self test, analog loopback, remote digital loopback	895	Bell 212A compatible
<b>PRENTICE CORP.</b>								
P-208 A/B	4800		Sync	Half, full duplex	auto. answer only	remote and local, analog and digital loopbacks; self test	1750 (Q1)	Bell 208A/B compatible
P-212	0-300, 1200	PSK	Async/sync	Half, full duplex	orig./auto. answer	local analog loopback, remote digital loopback	495	Bell 212 compatible
TRIMODEM	0-300, 1200	PSK	Async/sync	Half, full duplex	auto. answer	local analog, digital loopback	850	Bell 212, Vadic 3400 compatible
<b>RACAL-MILGO</b>								
24 LSI MARK II DIAL	2400	FSK	Sync	Half duplex	orig./auto. answer	analog, digital loopbacks; self test		
MPS 48 DIAL	1600	DPSK	Sync	Half duplex	orig./auto. answer	analog, digital loopbacks; self test; line level/ signal quality		
<b>RACAL-VADIC</b>								
VA 212PA	1200	FSK, PSK	Async/sync	Full duplex	auto. dial/ auto. answer	analog loopback; remote, local digital loopbacks; self test		Bell 212A/103 compatible, auto dialer stores 15 numbers
VA 345/PA	1200	QAM, PSK, FSK	Async/sync	Full duplex	auto. dial/ manual answer	self test; analog, digital loopbacks		
VA 1240/41	600, 1200	FSK	Async/sync	Half, full duplex		analog, digital loopback		rack-mount

DDD modems



# For your IBM S/34, S/36 and S/38

Plug compatible with IBM S/34, S/36 and S/38, the Ericsson SRA 11 display terminal offers total ergonomic design.

Mounted on a pedestal, the amber display screen can easily be raised, lowered, tilted and swiveled. The separate low profile keyboard with wrist support features palm rests and reflection free keys with adjustable audible feedback.

A low cost Hard Copy Printer is also available to the Ericsson SRA 11 display station, which allows the printing of the screen image from the display.



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CIRCLE NO. 83 ON INQUIRY CARD

## VOICE GRADE DDD MODEMS

Company Model	Data rate (bps)	Modulation method	Synchronization	Transmission mode	Calling mode	Diagnostic features	Unit price (\$)	Features/Options
VA 1244/45	1200	FSK	Async	Half duplex		analog, digital loopback; self test		rack-mount
VA 1250/55	0-1200	FSK	Async	Half duplex	orig./auto. answer	analog loopback		Bell 202 C/S compatible
VA 1251/52	0-1800	FSK	Async	Half, full duplex		analog, digital loopbacks		Bell 202D/R/T compatible
VA 2430G/K	2400	DPSK	Sync	Half, full duplex		analog, digital loopbacks		Bell 201 B/C compatible, rack-mount
VA 2440/45	2400, 1200	DPSK	Sync	Half duplex	orig./auto. answer	analog loopback		Bell 201 B/C compatible, rack-mount
VA 3455	1200	QAM, DPSK	Async/sync	Full duplex	orig./auto. answer	analog, digital loopbacks		
VA 3467	1200	DPSK, FSK	Async/sync	Full duplex	auto. answer only	self test; analog, digital loopbacks		rack-mount
VA 3481	1200	DPSK, FSK	Async/sync	Full duplex	orig./auto. answer	analog, digital loopbacks		rack-mount, Bell 103/113, 212A compatible
VA 4840	4800	DPSK	Sync	Half, full duplex	auto. orig./auto. answer	analog, digital loopbacks; self test		rack-mount
VI 1222	1200	QAM	Async/sync	Full duplex	orig./auto. answer	digital, analog loopbacks; self test		
VI 1223L	1200	FSK	Async/sync	Half, full duplex				
VI 1223S	1200	FSK	Async/sync	Half duplex				
VI 3400	1200	DPSK	Async/sync	Full duplex		self test; analog, digital loopbacks		
VS 212P	1200	DPSK, QAM, FSK	Async	Full duplex	auto. dial/ auto. answer	analog loopback		board-level modem
VS 1200P	0-1200	FSK	Async	Half duplex	auto. orig./ auto. answer			board-level modem
<b>RADIO SHACK</b>								
DC-1200 76-1005	300, 1200		Async/sync	Half, full duplex	orig./answer		699	
<b>RIXON INC.</b>								
PC 212A	300, 1200	PSK, FSK	Async	Full duplex	auto. dial/ auto. answer	analog loopback through the IBM PC	499	fits into the card slot on the IBM PC
R212A Intelligent	300, 1200	PSK, FSK	Async	Full duplex	auto. dial/ auto. answer	analog, remote digital loopback	499	stores 10 numbers, auto. log-on
R2424	1200, 2400	QAM, PSK	Sync	Full duplex	orig./auto. answer	analog, digital loopback; self test		Bell 212A compatible
<b>ROCKWELL INTERNATIONAL</b>								
R24DC	1200, 2400	DPSK	Sync	Half duplex	orig./auto. answer	local analog loopback	450	CCITT V.26 bis, Bell 201 B/C compatible
R96DP	2400, 4800, 7200, 9600	QAM, DPSK	Sync	Half, full duplex		remote digital, local and remote analog loopbacks	495	CCITT V.29, V.27 bis/ter compatible
R48DP	2400, 4800	DPSK	Sync	Half, full duplex		remote digital, local and remote analog loopbacks	310	CCITT V.27 bis/ter, Bell 208 A/B compatible
R96 FAX	300, 2400, 4800, 7200, 9600	QAM, FSK, DPSK, AM	Sync	Half duplex			310	CCITT V.29, V.27 ter compatible
R2424 DC	300, 600, 1200, 2400	QAM, DPSK, FSK	Async sync	Full duplex	auto. dial/ auto. answer	local analog, remote digital loopbacks; self test	325	CCITT V.22 bis, V.22 A/B, Bell 212/103 compatible
R2424 M	300, 600, 1200, 2400	QAM, DPSK, FSK	Async sync	Full duplex	auto. dial/ auto. answer	local analog, remote digital loopbacks	295	CCITT V.22 bis, V.22 A/B; Bell 212/103 compatible
R1212 DC	300, 1200	DPSK, FSK	Async sync	full duplex	auto. dial/ auto. answer	local analog, remote digital loopbacks	250	CCITT V.22 A/B, Bell 202/103 compatible
R1212 M	300, 1200	DPSK, FSK	Async sync	Full duplex	auto. dial/ auto. answer	local analog, remote digital loopbacks	220	CCITT V.22 A/B, Bell 212/103 compatible
<b>SCIENTIFIC LABS.</b>								
Versacom 1200	0-1200	FSK	Async	Half, full duplex	orig./answer	analog, digital loopbacks	187	2-oz. modem, measuring 2x2x.6 in.
Versacom 212	1200	DPSK	Async/sync	Half, full duplex	orig./answer		305	Bell 212 compatible
<b>SPERRY COMPUTER SYSTEMS</b>								
8610 DCM	9600	FSK	Async/sync	Half, full duplex			852	
<b>SSM MICROCOMPUTER PRODUCTS INC.</b>								
PC Modem Card 1200	300, 1200	FSK, PSK	Async	Full duplex	auto. dial/ auto. answer	local analog, remote loopbacks	549	plugs into IBM PC, Bell 103/212A compatible

DDD modems

# THE FASTEST POLLING 9600 BPS MODEM IN THE WORLD!

The Rixon R96FP Fast Polling Modem is living up to its name by being the fastest polling modem in the industry with a 12 ms turnaround time.

These 9600 bps modems are V.29-compatible and operate synchronously over four-wire unconditioned 3002-type private lines. Designed for point-to-point and multipoint (multidrop) polling networks, the R96FP's advanced technology provides rapid equalization and retraining to obtain the 12 ms RTS/CTS delay for greater data throughput in polling networks.

The following example shows what the R96FP can do for you. In a typical polling network comparing a competitor's fast polling modem at 30 ms with Rixon's R96FP, you will have 78% more polls and an 85% increase in data throughput with the R96FP. If you change your network, you can decrease the number of computer ports by 40%, decrease your backbone lines, or

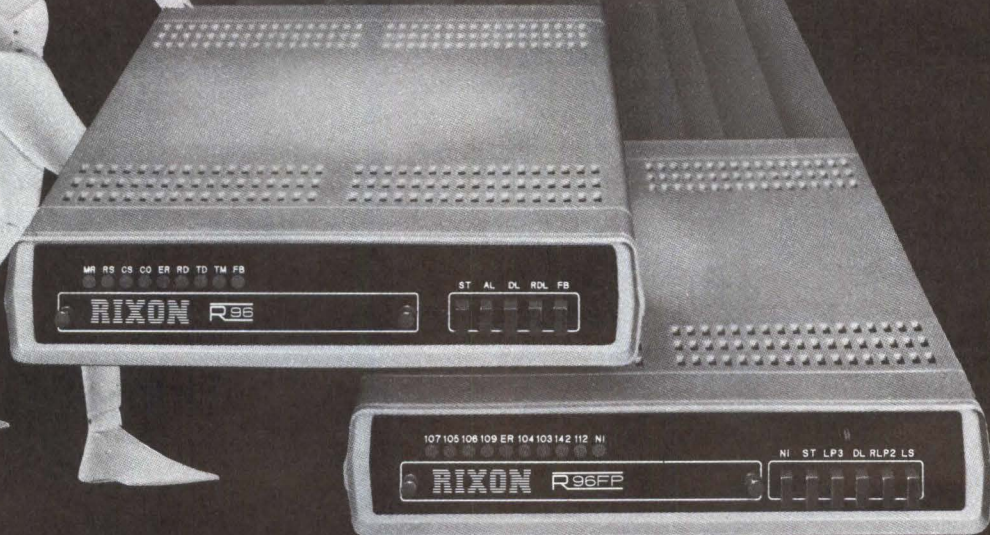
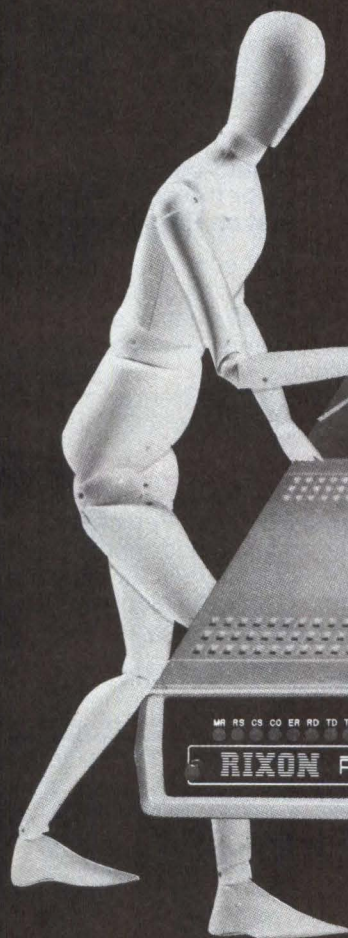
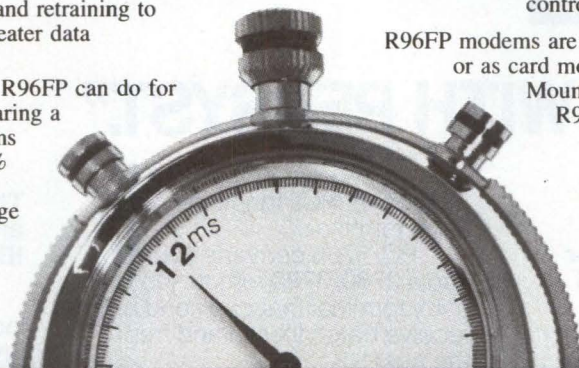
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increase the number of drops by 80%. In the test mode, the hub modem can poll, address and perform tests on up to 100 tributary modems. In using the master/tributary configuration in high-speed, point-to-point applications, the modem operates at 9600 bps with fallback speeds of 7200 or 4800 bps. Fallback speed is enabled by a modem front-panel pushbutton. Tests of the modem, line and terminal are controlled by other front-panel pushbuttons.

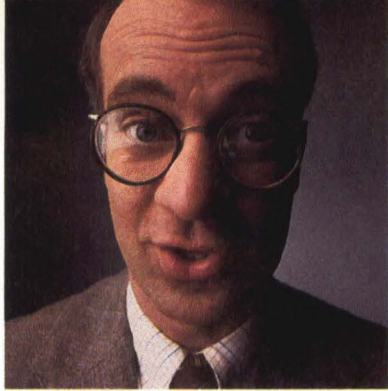
R96FP modems are available as compact standalone units or as card models for mounting in the RM90 Rack Mountable Card Cage. The list price of the R96FP is \$2995, and \$2595 for the R96 point-to-point modem. For more information call Bob Sagolla at 301-622-2121 extension 327, or write to RIXON INC. at 2120 Industrial Parkway, Silver Spring, Maryland 20904.

CIRCLE NO. 84 ON INQUIRY CARD

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# RIXON INC.



# “GET IBM 3270, 3780 AND HASP COMMUNICATIONS—ADDING A ONE-BOARD PROCESSOR TO MY PC?”

## “YOU CAN WITH PERSYST.”

**The Persyst DCP/88. The only compatible front end communications processor that can support a range of IBM communications.**

It's a Persyst exclusive.

The DCP/88 distributed communications processor. A one-board computer that can be configured by software to handle communications between a PC and another computer system.

In fact, the DCP/88 enables the IBM or TI PC to support a range of sophisticated IBM communications—all with just one processor.

So it gives corporate users unprecedented, low-cost flexibility to incorporate the PC into virtually any environment.

**Convert any PC into an IBM 3270 terminal. An IBM 2780/3780 RJE workstation. Or a HASP/RJE workstation—instantly.**

Just combine the DCP/88 with Persyst software—and you can connect your PC to any compatible host mainframe or minicomputer.

PC/3270 enables your PC to emulate an IBM 3274 Cluster control unit and 3278 terminal, supporting up to four additional devices. Including a printer and

three other PCs functioning as 3278 terminals.

PC/3780 converts your PC into a 2780/3780 remote job entry terminal that can send and receive batch files to and from the host.

And with PC/HASP, your PC instantly becomes a full-function HASP/RJE workstation that can support up to seven input and seven output multi-leaved job streams concurrently.

**Capability to support your communications needs now. And in the future.**

Because the DCP/88 supports bisync, SDLC, HDLC and async protocols, it is the only communications processor you'll ever have to buy.

Use it to connect your PC to an expanding network of IBM communications. Configure your system to meet virtually any communications need—without adding another piece of hardware. Or expense.

All of which makes the DCP/88 as practical as it is powerful.

**The Persyst Coax/3278. Still another way to expand your IBM communications.**

Here's another fast way to incorporate the PC into existing SNA or bisync data processing installations.

The Coax/3278. A single-slot expansion board that converts your PC into an IBM 3278 display terminal. And with its high-speed coaxial port, you can connect the PC directly to IBM 3274 or 3276 cluster controllers.

**Sophisticated communications products for the corporate user. Insist on Persyst.**

Persyst communications products are designed to make corporate information systems more powerful. And more efficient.

Write or call Persyst today for complete information.

# PERSYST

Persyst Products, Personal Systems Technology, Inc., 15801 Rockfield Blvd., Suite A, Irvine, CA 92714. Telephone (714) 859-8871. Telex: 467864.

PC/HASP Dynamic design lets you assign incoming I/O streams to different devices—disk files, printers and RS-232 ports.

PC/3270 and PC/3780 transmit data at speeds up to 9600 baud.

Dedicated 8088 micro-processor gives the DCP/88 processing power equivalent to the IBM PC itself. You can execute two programs simultaneously.

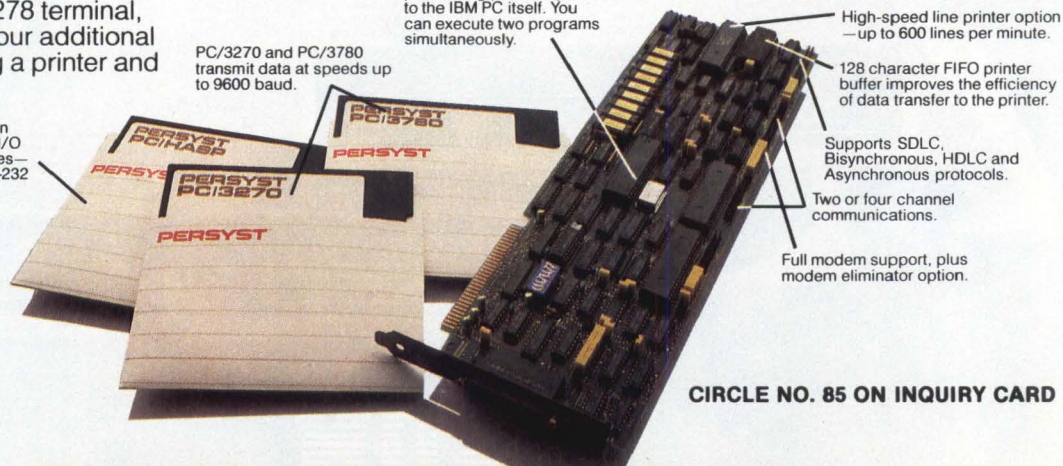
High-speed line printer option—up to 600 lines per minute.

128 character FIFO printer buffer improves the efficiency of data transfer to the printer.

Supports SDLC, Bisynchronous, HDLC and Asynchronous protocols.

Two or four channel communications.

Full modem support, plus modem eliminator option.



CIRCLE NO. 85 ON INQUIRY CARD

## THE DCP/88™ BY PERSYST.

## VOICE GRADE DDD MODEMS

Company Model	Data rate (bps)	Modulation method	Synchronization	Transmission mode	Calling mode	Diagnostic features	Unit price (\$)	Features/Options
<b>UNIVERSAL DATA SYSTEMS, INC.</b>								
201C	2400	DPSK	Sync	Half duplex	auto. answer	analog loopback; self test	775	Bell 201 and CCITT V.24 compatible; alternate voice/data
202LP	1200	FSK	Async	Half duplex	orig./answer		195	Bell 202 and CCITT V.24 compatible; alternate voice/data
202S	1200	FSK	Async	Half duplex	orig./auto. answer	analog loopback; self test; remote self test	475	Bell 202 and CCITT V.24 compatible; alternate voice/data
202S LP	1200	FSK	Async	Half duplex	orig./auto. answer		245	Bell 202 and CCITT V.24 compatible
202S/SS	1200	FSK	Async sync	Half duplex	orig./answer	analog, digital loopbacks; self test	550	Bell 202 and CCITT V.24 compatible; alternate voice/data
202S/150	1200	FSK	Async	Half duplex	orig./answer	digital loopback; self test	620	Bell 202 and CCITT V.24 compatible
202S/5	1200	FSK	Async	Half duplex	orig./answer	digital loopback; self test	550	Bell 202 and CCITT V.24 compatible
208A/B	4800	QAM	Sync	Half, full duplex	orig./auto. answer	analog, digital loopbacks; self test	1,750	Bell 208 and CCITT V.24 compatible; alternate voice/data
212LP	300, 1200	DPSK	Async sync	Full duplex	orig./auto. answer		445	Bell 212A and CCITT V.24 compatible; alternate voice/data
212A	300, 1200	DPSK	Async sync	Full duplex	orig./auto. answer	analog, digital loopbacks; self test	595	Bell 212A and CCITT V.24 compatible; alternate voice/data
212A/D	300, 1200	DPSK	Async sync	Full duplex	auto. dial/ auto. answer	analog, digital loopbacks; self test	645	Bell 212A and CCITT V.24 compatible; alternate voice/data
9600A/B	9600	QAM	Sync	Half, full duplex	orig./auto. answer	analog, digital loopbacks; self test	2,650	
<b>US ROBOTICS</b>								
AD212A	1200	QPSK	Async	Half, full duplex	auto. orig./ auto. answer	analog loopback	599	
AL212A	300-1200	QPSK	Async	Half duplex	auto. answer only	analog loopback	549	
AUTOLINK 1200	300, 1200	QPSK	Async	Full duplex	orig./auto. answer	analog loopback	499	
COURIER	300, 1200	QPSK	Async	Full duplex	auto. dial		519	
MICRO LINE 1200	300, 1200	QPSK	Async	Full duplex	orig./answer	analog loopback	449	
PASSWORD	300, 1200	QPSK	Async	Full duplex	auto. dial		449	
<b>VEN-TEL INC.</b>								
MD201-1	0-2400	PSK	Sync	Half duplex	orig./auto. answer		730	rack-mount modem card
MD202-1	0-1200	FSK	Async	Half duplex	orig./auto. answer		310	rack-mount modem card only
MD202-2	0-1200	FSK	Async	Half duplex	orig./auto. answer		380	standalone modem with power supply
MD212-1E	300, 1200	PSK	Async/sync	Full duplex	orig./auto. answer		445	
MD202-6E	0-1800	FSK	Async	Half, full duplex			350	
MD202-5	0-1800	FSK	Async	Half, full duplex			280	rack-mount card only
MD212-2	300, 1200	PSK	Async/sync	Full duplex	orig./auto. answer		480	board-level modem
MD212-3E	300, 1200	PSK	Async/sync	Full duplex	orig./auto. answer		495	
MD212-4	300, 1200	PSK	Async/sync	Full duplex	orig./auto. answer		725	
MD212-5E	300, 1200	PSK	Async/sync	Full duplex	orig./auto. answer		625	
MD212-6E	300, 1200	PSK	Async/sync	Full duplex	auto. dial/ auto. answer		925	board-level modem
<b>VISIONARY ELECTRONICS</b>								
1200	300, 1200		Async	Half, full duplex	orig./answer		950	clock/calendar, 48K bytes RAM
<b>WOLFDATA INC.</b>								
WD 212	300, 1200	PSK, FSK	Async	Full duplex	orig./answer	analog loopback	125	

DDD modems

# NOW THERE ARE TWO WAYS TO

(THE OLD WAY)



1. Call three WP vendors.

2. Call three spreadsheet vendors.

3. Call three menus/forms vendors.

4. Call three multi-user O.S. vendors.

5. Now call 20 vendors to find three who offer a relational DBMS.

6. Then call back half the vendors to ask if they share common files.

7. Call the other half back to see if they share common files.

8. Call Personnel to hire programmers. ASAP.

9. Call three board vendors.

10. Call secretary to order oatmeal and milktoast for lunch. Again.

11. Call back the three board vendors to see if they offer upgrade paths.

12. Call five more board vendors.

13. Call three CRT vendors.

14. Call three disk drive vendors.

15. Nature calls.

16. Call Personnel to check when programmers are starting.

17. Place classified ad for programmers and Personnel Director.

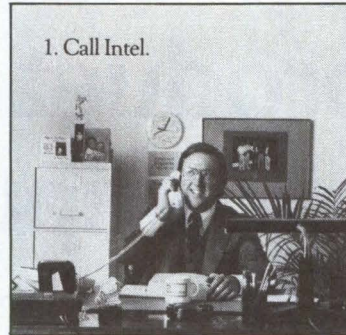
18. Call wife to say you're going to be late for dinner. Again.

19. Call customers to say their systems are going to be late.

20. Call Dial-A-Prayer.

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(THE NEW WAY)



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tions software possible, in the shortest amount of time possible, so you can serve your users as quickly as possible.

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# Terminal manufacturers broaden product lines, add microcomputers

GEOFF LEWIS, Associate Editor

Despite the much-vaunted proliferation of single-user microcomputers and a general slowing in growth in traditional multiuser minicomputer markets, shipments of ASCII CRT terminals continue to grow at rates surpassing 20 percent annually. Dataquest Inc., a San Jose, Calif., market research company, estimates that, by year-end, the U.S. market will have purchased 1.8 million terminals and predicts that market will account for 2.2 million units in 1984.

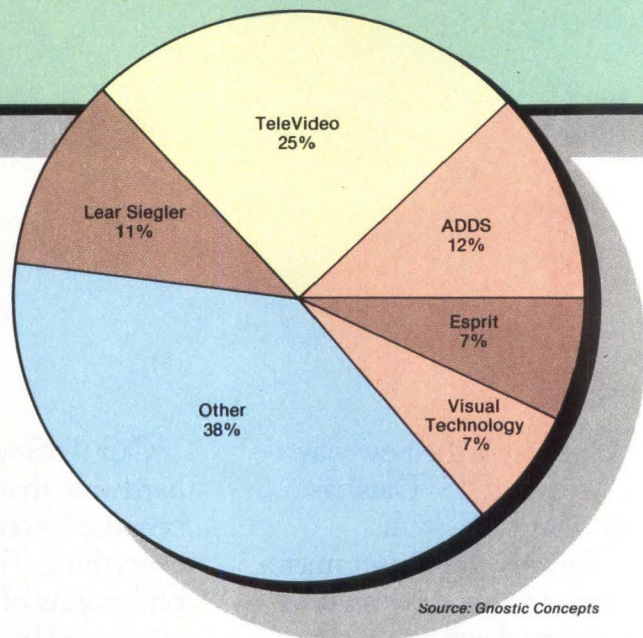
However, the healthy growth rates are accompanied by developments that have put existing suppliers to the test and have created some new opportunities for latecomers to the terminals market. Use of denser circuitry and less expensive manufacturing methods—both in the United States and abroad—are helping to reduce costs and end-user prices to the point at which high-volume OEMs are procuring CRT terminals for less than \$400 per unit. At the same time, demand for ergonomic amenities, such as detached, low-profile keyboards and tilting displays, are producing more fully-featured terminals. These come in at the \$600 to \$700 list-price levels established for low-end conversational terminals two years ago with the advent of products such as Applied Digital Data Systems (ADDS) Inc.'s Viewpoint and TeleVideo Systems Inc.'s 910.

Bob Sanekoff, Dataquest director of display terminals industry service, says the fastest-growing market segment now is smart editing terminals, characterized by full editing functions, multiple pages of memory and an array of function keys. That segment, which totaled 460,000 units last year, is expected to jump to 600,000 units next year, a 30 percent gain compared to about a

22 percent gain for the market as a whole. At the same time, the low-end conversational terminal market will lag behind the overall market with an 18.5 percent rise in shipments, Sanekoff predicts.

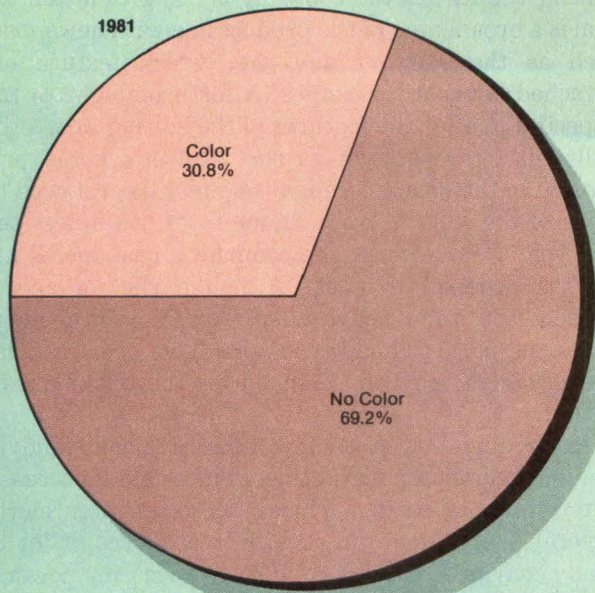
But Sanekoff and other analysts also predict that the halcyon days of the high-end editing terminals such as TeleVideo's 925/950/970 and Lear Siegler Inc.'s ADM 32/42 may be rapidly drawing to a close. "The high end of the terminals market will be displaced by personal computers in the next year-and-a-half," predicts Bob Katzive, vice president of market consulting company Gnostic Concepts. Katzive points out that personal computers such as Apple Computer Inc.'s Apple IIe are now retailing for around \$1,500 and are expected to come down to \$1,000 in the next several months as products such as IBM Corp.'s "Peanut" home computer enter the market. At those levels, he observes, smart editing terminals will not be seen as price competitive.

ASCII TERMINAL MARKET  
1983 unit shipments



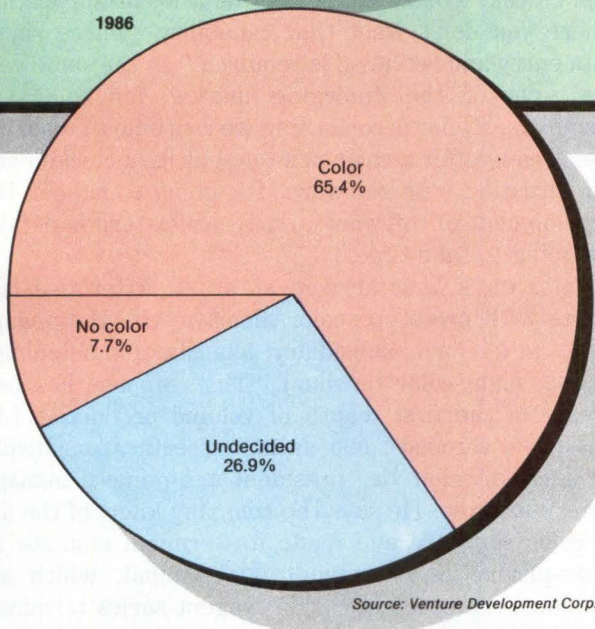


**NUMBER OF ALPHANUMERIC CRT TERMINAL MANUFACTURERS OFFERING COLOR CAPABILITIES**  
(% of respondents)



(Chart, opposite page) Shipments of ASCII CRT terminals by independent suppliers in 1983 totaled 600,000 units, excluding products such as the DEC VT100 series, which accounted for an estimated 200,000 units. TeleVideo led the market with 150,000 shipments and was followed by ADDS at 70,000, Lear Siegler at 65,000 and Esprit and Visual Technology with approximately 45,000 each.

(Charts, left) In 1981, 30 percent of U.S. manufacturers offered color terminals. They include Data General Corp., Datamedia Corp. and IBM Corp., as well as plug-compatible manufacturers. More than 50 percent of alphanumeric terminals shipped in 1981 were used for data-entry and inquiry/response applications, but VDC says this is changing as more color terminals enter the market.



Source: Venture Development Corp.

As a result, both Katzive and Sanekoff expect the CRT terminal manufacturers to begin offering PC-equivalent products. Such products have already begun to appear at Beehive International and Visual Technology Inc., Katzive points out, adding that TeleVideo, with its burgeoning systems division, is "superbly positioned" to offer a bridge product between the terminal and desktop computers.

Mark Siegel, executive vice president and general manager of TeleVideo's terminals division, acknowledges that the company is preparing to attack the overlapping market between personal computers and CRT terminals. "I've got to believe the competition is also homing in on the desktop information terminal, where data inquiry, personal computing and networking are all converging," Siegel comments. However, TeleVideo's first attempt at a hybrid terminal product will be closer to an intelligent telephone than to

a personal computer, he says. That product, set for introduction at this month's Comdex show, will be called an Information Station and will combine a limited-function CRT terminal for data inquiry with an advanced telephone. "We don't believe that the vast majority of users need a personal computer," he says. "They do need some data-retrieval capability and a small desktop package." He predicts that the market for such products—though largely untested—will amount to hundreds of thousands of units annually in the mid- to late-1980s. Siegel adds that personal computing capabilities—to the degree the market demands them—can be incorporated in the Information Station.

In the near term, however, TeleVideo is looking at about a better than 20 percent growth rate in its terminal business, which should keep the company in the lead among domestic independent terminal suppliers. However, TeleVideo, which zoomed to more than \$60 million in terminal sales last year from less than \$2 million in 1978, has had some painful lessons in how mercurial the CRT-buying public can be. For example, late last year, the company introduced a high-end model 970, terminal that was aimed at both the Digital Equipment Corp. VT100-replacement market and the American National Standards Institute's (ANSI) X.364 market—only to meet with disappointing results. "We thought a lot more users were a lot more familiar with the ANSI standard. We were wrong and bounced up against less-than-magical response," Siegel recalls. In mid-1983, the company introduced a separate product for the VT100 and 970 markets. The 960 aimed at VT100

Alphanumeric terminals

users, was packaged in TeleVideo's older, boxy cabinet. It has a 12-inch display and was priced at \$995. In comparison, the \$1,495 970 comes in a distinctive ergonomic package and has a 14-inch monitor. Siegel expects the 960 to fulfill TeleVideo's expectations for the VT100 market while the company continues to educate the market about the benefits of the ANSI-standard product.

In another example of how even a leading marketer can misjudge consumers, TeleVideo recently replaced the low-end 915 editing terminal with the 914. (MMS, August, Page 9), a model with fewer features than the 915. The 914 model is packaged in the older cabinet instead of the 970 package. The 915, it turned out, was too close to the previously introduced \$899 model 924, Siegel explains. Overall, Siegel says, TeleVideo is less preoccupied with being the price leader than it was when the company was gaining market share in its early years. "Yes, price is an important issue, but we are not in the era of disposable terminals yet. Customers still expect service, support and reliability. If we are \$10 or \$20 more expensive, the user will still buy TeleVideo because we have established a reputation for quality," Siegel asserts. Nevertheless, the company recently cut the price of its entry-level 910 terminal to \$645, putting it at the same level as the ADDS Viewpoint and the Lear Siegler ADM 5.

TeleVideo was able to enter the U.S. market so aggressively in the late 1970s because of lower-cost production using Korean subassemblies. The move to offshore manufacturing of both subassemblies and finished goods continued throughout the industry this year. But some manufacturers claim the cost differential between Far East manufacturing havens and automated U.S. plants has shrunk as more advanced circuitry has simplified electronic assembly and reduced the labor content. Lear Siegler marketing director Cathy Raftery says the company will bring offshore manufacturing of printed-circuit boards back to the company's Anaheim, Calif., facilities from a Hong Kong subcontractor. "We can now buy components for the same price overseas manufacturers can," she explains, adding that the efficiencies of the company's plant and the cost of transportation from overseas combine to give the domestic product a competitive footing. "We're now able to resurrect the Great American Dream Machine name with which we introduced the original ADM series in the early 1970s," she points out. However, the company will still import the ADM 20 series from Teco, Taiwan, she notes.

For Lear Siegler, once the undisputed leader among independent terminal suppliers, 1983 has been a year of rebuilding with new products. Raftery maintains that the company is second only to TeleVideo and is "within

striking distance" of regaining the number-one slot. Among the tactics the company is using to attain that goal is a broadening of the product line with new models such as the ADM 11 and 24e, which feature new detached keyboard packages. A forthcoming ADM 12 is expected to offer the features of the editing ADM 31 but will sell for less than \$1,000. Raftery notes price erosion in the smart terminal segment has reduced the price of the ADM 31 from \$1,400 to \$1,095 in less than five years. Meanwhile, the company's base model ADM 3A has dropped to \$595. Although the 3A and its predecessor, the 3, have been in production for eight years and more than 200,000 units have been installed, Raftery says, a strong demand for the terminals still exists.

At the high end of its line, Lear Siegler is studying the microcomputer market again after an unsuccessful entry into the small business microcomputer market several years ago. But, Raftery observes, "I'm not really convinced that there will be processing power on every desk. There will always be a lot of applications where you don't want that capability—where simple data entry and retrieval is required." In the same vein, she says of the emerging market for color CRT terminals, "Color is something we continue to research. We already offer a color printer, but it's a chicken-and-egg situation with software. It's going to happen [the development of software to drive color terminals], but it's going to take time."

Color CRTs *have* arrived at ADDS. After two false starts with prototype color displays, the Hauppauge, N.Y., NCR Corp. subsidiary has started shipping a \$1,295, eight-color terminal. "The response has been great. In the first month of volume production [August], we shipped 1,000 units," asserts ADDS display products division vice president and general manager John Witherow. He says the company knew of the lack of color software and made its terminal emulate the mass-production Viewpoint 60 terminal, which also emulates the codes in earlier Regent series terminals. In addition, the company has slated fourth-quarter production for a four-color terminal that can be used with a protocol converter to emulate IBM Corp.'s 3279 color display.

However, ADDS main line of business remains in the low-end market, Witherow says. At the low end, Witherow claims, the company has the leading market share among independent suppliers with the Viewpoint series. "Our product mix is still predominantly low end, but, in 1983, we saw some very pleasant surprises in the Viewpoint 60 buffered terminal line," Witherow says. The \$895 mid-range terminal surpassed the company's projections, he adds.

Witherow points to the increasing use of offshore manufacturing as a dominant force in the low-end market. ADDS has closed a Draper, Utah, plant opened in the late 1970s in an effort to vertically integrate its manufacturing operations. "In time, the plant would have come into its own, but, for now, it was not

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\*Including models from TeleVideo, Lear Siegler, ADDS, Hazeltine, DEC, and SOROC.



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CIRCLE NO. 87 ON INQUIRY CARD

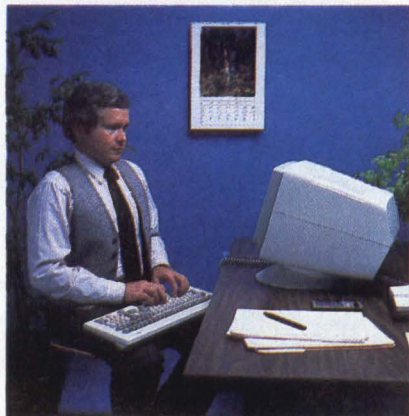
# PRESENTING LEAR SIEGLER'S AMERICAN DREAM MACHINES: THREE NEW HIGH TOUCH™ TERMINALS.



Have you noticed that the more high technology we put into the workplace, the more human touches the workers put in? There's a real need to soften the interface between people and high technology.

That's why we designed our new High Touch™ terminals to work together with biology, not just with technology.

Our new generation of High Touch terminals brings an elegant new touch to our American



*6' coiled cable lets you put the keyboard anywhere.*

Dream Machine (ADM™) tradition. The family features three new ergonomic terminals designed to meet the needs of OEMs and end users alike: The ADM 11, ADM 12 and ADM 24E.

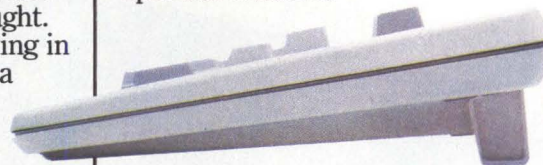
There is more to ergonomics than simply tacking on a few faddish features as an afterthought. That's why we put our thinking in up front. And came up with a whole new way for terminals to relate to humans.

No aspect of terminal design escaped our deepest consideration. Or reconsideration. Dozens of little touches add up to the convenience and comfort of High Touch. For example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

The monitor not only tilts and swivels, it stops positively in almost any position.

The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen—made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

Our uncluttered keyboard, with its logical separations between key groupings, improves your efficiency. The low-profile, DIN-standard keyboard is not only tapered, its angle of tilt is easily adjusted for maximum operator comfort.



*Low profile DIN-standard keyboard with adjustable tilt.*

The Selectric® layout with its sculptured keys makes data entry easy and efficient. And we placed the *control* and *escape* keys close to the alphanumeric keys, where people just naturally expect to find them.

The ADM 11 is a High Touch conversational terminal that accepts data continuously at 19.2 kilobauds. It features separate cursor control keys logically arranged in a cross for ease of use. Four modes are provided for the printer interface: page print,

**Distributor Sales & Service:** Boston (617) 456-8228 • Chicago (312) 279-7710 • Houston (713) 780-9440 • Los Angeles (714) 774-1010, Ext. 219 • Philadelphia (215) 245-4080 • San Francisco (415) 828-6941 • England (04867) 80666 • From the states of CT, DE, MA, MD, NJ, NY, RI, VA and WV (800) 523-5253. **OEM Sales:** Chicago (312) 279-5250 • Houston (713) 780-2585 • Los Angeles (714) 774-1010, Ext. 582 • New York (516) 549-6941 • San Francisco (415) 828-6941 • England (04867) 80666. Selectric® is a trademark of IBM. ADM,™ High Touch™ and Express Depot™ are trademarks of Lear Siegler, Inc.

	ADM 11	ADM 12	ADM 24E
Programmable Function Keys	4 (Shiftable to 8)	16 (Shiftable to 32)	16 (Shiftable to 32)
Non-Volatile Function Keys	Optional	Standard	Standard
Function Key Legends on 25th Line	From Host	From Host	Standard Non-Volatile
No. of Pages of Display Memory	1	2	2 or 4
Display Memory Configurations (Plus 25th message/status line)	24 lines by 80 characters	(2) 24x80 or (1) 48x80 or (1) 24x158	User-Definable up to 96x80
Scrolling	Standard Scrolling	Smooth, Jump or Horizontal Scrolling	Smooth or Jump Split Screen
Transmission Mode	Conversation Mode	Conversation or Block Mode	Conversation or Block Mode
Editing	Limited	Full Editing & Protected Fields	Full Editing & Protected Fields
Visual Attributes: Reduced Intensity, Blink Blank and Reverse Video. Underline also on ADM 12 and ADM 24E	3 Embedded 1 Non-Embedded	5 Embedded or Non-Embedded, plus Full Screen Reverse Video	6 Embedded or Non-Embedded, plus Full Screen Reverse Video and Highlight
OEM Flexibility	Modifiable Set-Up Characteristics	Modifiable Set-Up Characteristics & Personality	Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (56K ROM or RAM. Plus up to 22K Display Available) Room for add'l Logic Boards.

line print, transparent print, and display and print. There are four programmable function keys (shiftable to eight). And two levels of setup mode to reduce errors while still giving the operator maximum flexibility.

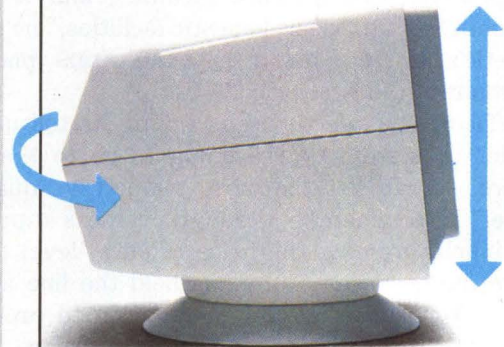
For a High Touch terminal with editing and more, choose the ADM 12. It features five non-embedded attributes. Embedded mode can also be selected for existing applications. And 16 programmable non-volatile function keys (shiftable to 32). The display memory can be configured as two 24 x 80 character pages, or one 48 x 80 page, or one 24 x 158 page. The terminal runs in either conversational or block mode.

Or choose our top-of-the-line ADM 24E which features a moveable 24-line window you can use to look at 48 (or 96) lines of memory. The ADM 24E also offers plenty of additional space for OEMs, with up to 56K ROM or RAM available for add-on programs. Plus up to 22k display RAM.

When it comes to terminal technology, we're the historic leader with the largest installed base. Our terminals are used in

more computer-based systems than any other.

When you buy Lear Siegler, you're buying proven quality and reliability, backed by the broadest network of full service centers anywhere. That means you can get walk-in Express Depot™

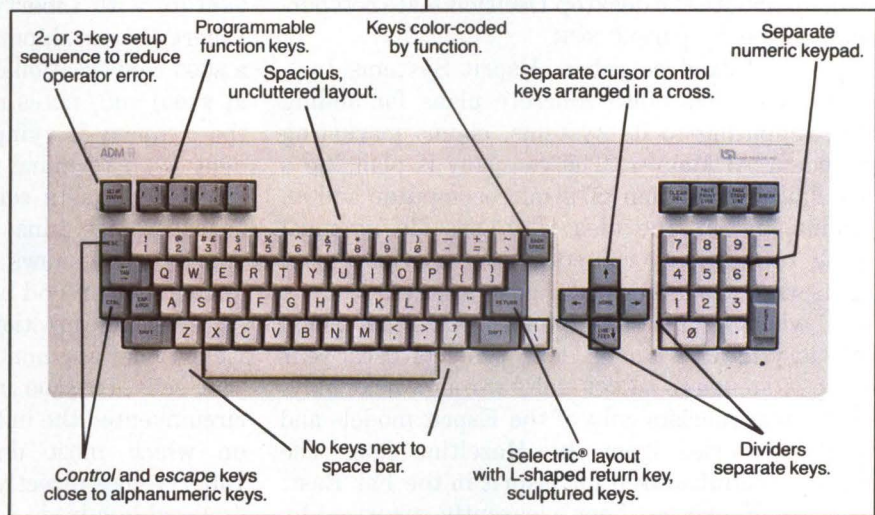


Monitor tilts and swivels to almost any position. Available with 12 or 14 inch screen.

service, on-site service and extended warranty service in 3,000 cities nationwide.

Lear Siegler High Touch terminals are made in America—designed, engineered, manufactured and shipped from Anaheim, California to provide you with the best local support.

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ADM 11 keyboard.

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competitive with offshore facilities, and it was not competitive with other domestic facilities," he explains. Gnostic's Katzive adds that the ADDS plant "was overbuilt in the first place."

Offshore manufacturing is taking its toll on prices, Witherow states. "We're going to go to the sources where we can get the most competitive quality and price," he comments. Although overseas suppliers are continually pushing the price of entry-level terminals down, he observes, ADDS has held the line at around \$650. "We have the ADDS reputation to protect," he explains. To remain competitive, therefore, ADDS is trying to add features.

ADDS' microcomputer systems operation has been struggling for significant market share in the small business systems arena. Now, the company is considering entering the low-end microcomputer market. Witherow states, "There is no question that the personal computer/home CPU/small business computer is going to be a commodity and that our distributors will want to handle them. You can extrapolate from the pricing curves and see that these products come down to the level of our Viewpoint 90 by the end of next year." However, he declines to specify how the company will address that market or to confirm industry reports that ADDS will distribute the desktop Decision Mate computer manufactured by parent NCR.

ADDS' Long Island neighbor, Esprit Systems Inc., Commack, N.Y., has more concrete plans for adding personal computing to its systems, claims marketing vice president Al Maurer. The company is planning a Comdex Fall introduction of a microcomputer add-on for terminal users. The idea is to provide personal computing to multiuser computer systems instead of making users buy another standalone system.

Esprit, which became a spin-off of Hazeltine Corp. last February in a \$5 million deal, projects fiscal-year shipments of 55,000 to 60,000 units through next May. The Esprit line consists only of the Esprit models and Executive 10 series from the Hazeltine line. The products are manufactured for Esprit in the Far East.

Like ADDS, Esprit has been pleasantly surprised by the demand for its color CRT. Maurer notes that, because most of Esprit's products flow through distributors to dealers, OEMs and end users, he does not know how the \$995 terminal is being used. He contends the downward pressure on prices is continuing at a 15 percent annual rate, but, he adds, that pace is difficult to maintain—even with offshore manufacturing. "I think there will be a rash of products with a \$500 list price in the coming year. Esprit is trying to be there, but it is not easy," he observes.

Strategically, Esprit is concentrating on filling in the holes in its line. "You have to have a broad line to succeed," Maurer comments. "What is happening is that distributors are starting to shake out what lines they will carry. They would prefer to have one source for a full solution instead of using different suppliers for each type of terminal they need," he says. In the near term, Esprit will address the high-end market with an ANSI-standard terminal and will follow with a mid-range addition as well. Esprit officials hope the broadened line will protect the company against new—particularly foreign—competitors.

CRT TERMINALS ESTIMATED UNIT SHIPMENTS		
	1983	1984
Segment I	350,000	415,000
Segment II	225,000	270,000
Segment III	600,000	750,000
Segment IV	460,000	600,000
Segment V	125,000	140,000

Source: Dataquest Inc.

Dataquest divides the terminal market into five segments: Segment I is low-end, character-mode/limited-editing CRTs, Segment II is captive products manufactured by computer manufacturers for sale with their systems, Segment III is the IBM 3270- and 3270-emulating terminal market, Segment IV is block-mode transmission, full-editing, "smart" terminals, and Segment V is clustered, distributed-processing systems.

One such competitor that has emerged aggressively in the low end is Liberty Electronics USA, a joint venture with Liberty Electronics Corp. Ltd., Taiwan. Liberty began shipments a year ago of its first product, a \$595 conversational/block-mode terminal (now priced at \$495) and, notes marketing director Tim Meadows, the company is vying for fourth place among independent ASCII terminal manufacturers. Liberty Electronics, which was a consumer electronics manufacturing concern, maintains a cost advantage over domestic suppliers, Meadows contends. He points out that the advantages extend beyond direct labor costs to include engineering functions, also performed in Taiwan. Liberty has augmented its line with an OEM-only model that sells for \$400 in quantities of 1,000. Liberty has circumvented the industrial and peripheral distributors on which most domestic suppliers rely. Instead, Liberty goes directly to what Meadows estimates to be "several hundred" dealers.

On the OEM side, the company supplies terminals to Morrow Designs Inc., which accounts for some 7,000 terminals annually. Lear Siegler's Raftery claims that Lear Siegler supplies similar volumes to Morrow.

Although Meadows declines to specify Liberty's plans, he confirms the company is ready to broaden its line with higher-performance products. "We don't plan to be a terminal house for time immemorial, but we are not diving into the personal computer market with both feet either," he comments. □

# The terminal that's a perfect fit anywhere in your company.

Qume's new QVT 108™ terminal has the power and flexibility to handle everything from routine order entry to the most demanding management-level applications. It outperforms competitive terminals, with sophisticated features like 22 user-programmable functions, 12 editing functions, a user-defeatable 25th status line, a menu set-up mode, and two full pages of screen memory.

The QVT 108 is easy to use, with complete emulation of Televideo's 925\*, 920\*, or 912\* terminals at the stroke of a key. And your staff will love its superior ergonomics. The QVT 108 has a detached,

low-profile keyboard, height-adjustable to different handrest positions. A tilt-swivel screen in green or amber, with an optional 14-inch display for even better readability. Plus many other features to keep people comfortable and productive.

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See us at COMDEX  
Booth No. 1636.

This chapter provides a general introduction of the terminal's operation. It describes the terminal's features, and the terminal's operation. It also describes the terminal's operation.

The office is a typical terminal, which uses a keyboard and display to communicate with a computer. The terminal can only communicate with a computer which is connected to the terminal's operation.

\* Televideo 925, 920, and 912 are registered trademarks of Televideo Corporation.



```
                S E T  U P

MAIN PORT      1200B
MODE           OFF
BAUD           OFF
PARITY         8
DATA BITS     OFF
STOP BITS     OFF
DTR           OFF
XOFF/XON      %
XON =         %
XOFF =        %
ACK =         %

AUX PORT      BIDIR
MODE          300
BAUD          OFF
PARITY        8
DATA BITS    OFF
STOP BITS    OFF
DTR          OFF
XOFF/XON     OFF

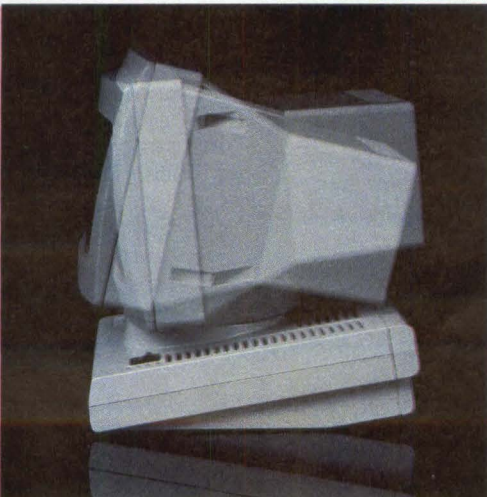
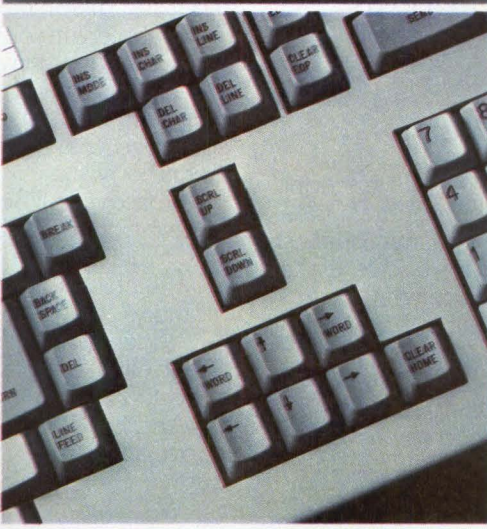
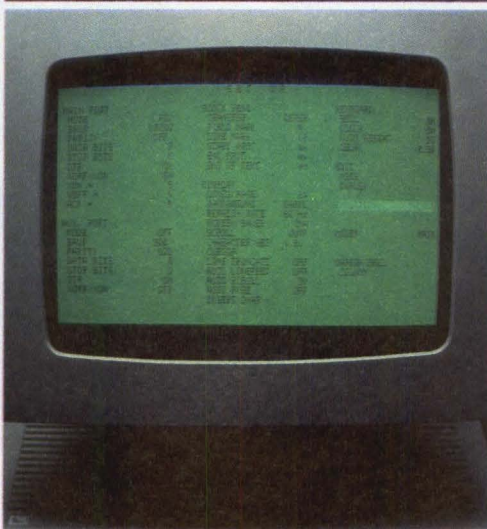
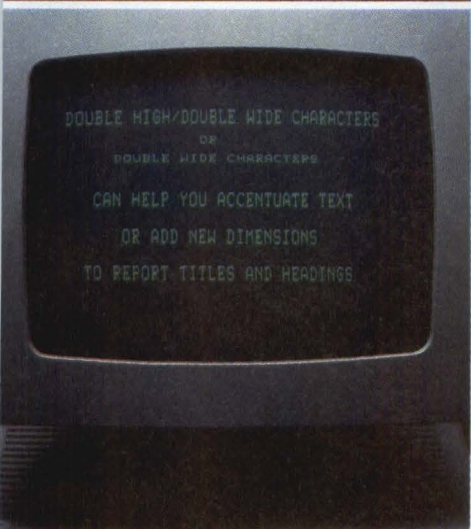
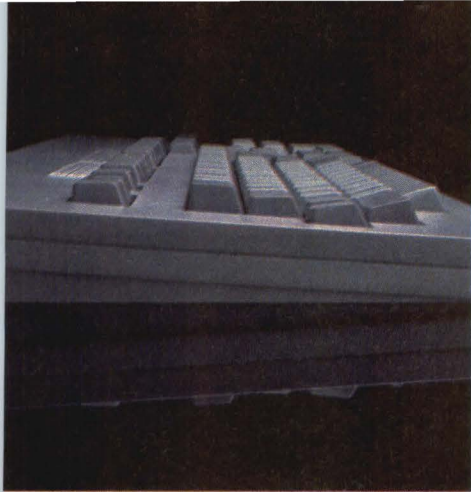
BLOCK SEND    IMMED %
TRANSFER      %
FIELD MARK   1f
LINE MARK    st
START PROT.  st
END PROT.    st
END OF TEXT  st

DISPLAY      24
LINES/PAGE   DARK
BACKGROUND   60 Hz
REFRESH RATE OFF
SCREEN SAVER  SLOW 2
SCROLL
CHARACTER SET
CURSOR
LINE TRUNCATE ON
AUTO LINEFEED OFF
AUTO SCROLL   ON
AUTO PAGE    ON
INSERT CHAR *

KEYBOARD     OFF
BELL         OFF
CLICK        OFF
AUTO REPEAT  25
DELAY        8.66

EDIT         TUI958
MODE        MAIN
DUPLEX
EMULATION
MODEM
MARGIN BELL
COLUMNS
```





## Introducing the Freedom 200. No other VDT gives you more, for less.

For only \$745, the Freedom 200 gives you more user-relevant functions and optimized ergonomic features than any other standard VDT.

You get 106 keys, clustered for maximum user efficiency.

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Plus 11 cursor control keys, including tab by word for easy editing.

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Plus user-definable smooth scrolling regions, with selectable scroll rates.

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Plus 128 ASCII characters, with 86 extended graphic characters for forms creation.

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Plus TeleVideo 950 and Lear Siegler ADM 31 emulation.

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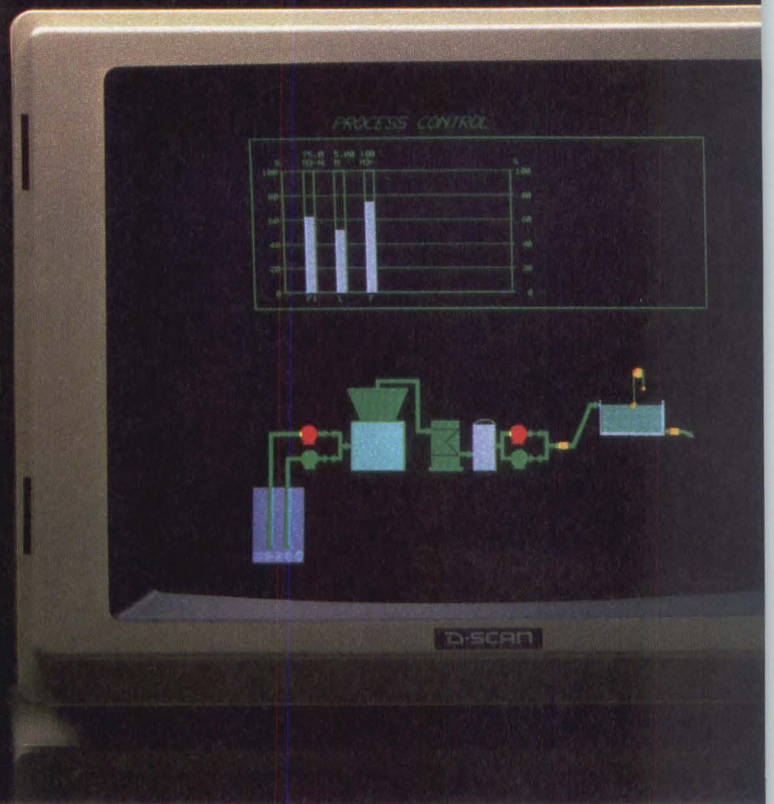
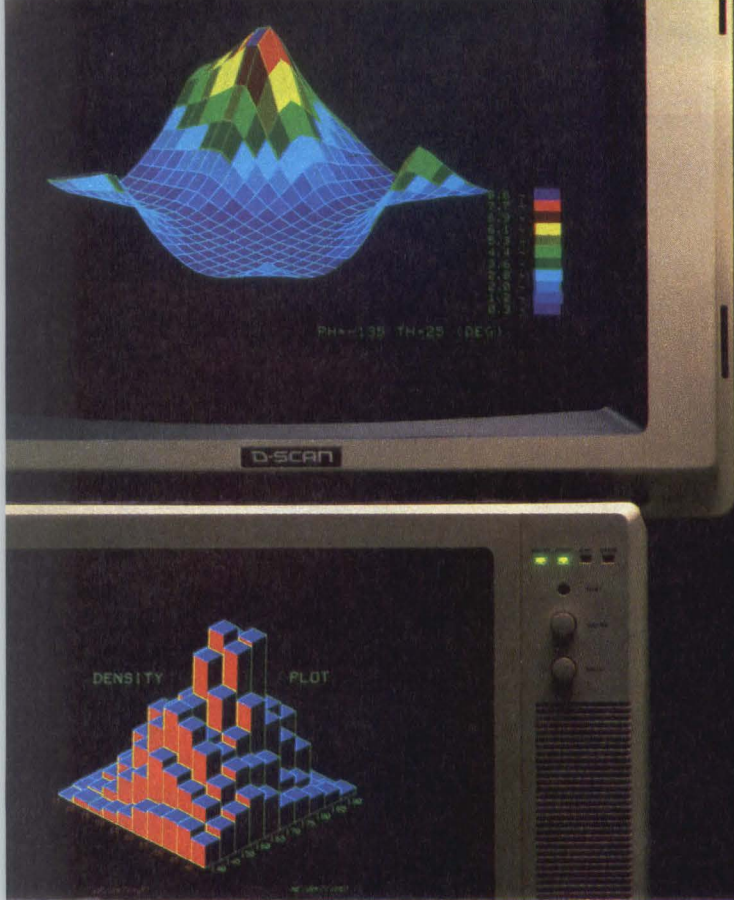
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**See us at COMDEX.  
Booth W940.**

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## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (opt. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>ADVANCED ELECTRONICS DESIGN, INC.</b>							
512	Intelligent/ Graphics	13-inch, color	85 x 53	5 x 7, 7 x 12, matrix chars.	RS232C, current loop, DMA (DEC)	9,500	Tektronix emulation, 19-inch CRT available
767	Intelligent/ Graphics	13-inch, color	127 x 63	5 x 7, 7 x 12 matrix chars.	RS232C, current loop, DMA (DEC)	14,000	Tektronix emulation, anti-aliased, vector drawings, 19-inch CRT available
<b>AMALGAMATED WIRELESS LTD.</b>							
8602	Editing/Graphics	14-inch, 7-color	80 x 25	256 chars.	dual RS232C ports	2,300 (Q200)	daisy-chain clustering
VTE-6	Editing	12-inch, green, white	80 x 25	96 chars.	dual RS232C ports	2,400 (Q200)	daisy-chain clustering
<b>AMPEX CORP.</b>							
D125	Editing	12-inch	80 x 25		RS232C, current loop	679	12 function keys, emulates 16 terminal types, supports 50 to 19200 baud X-on X-off protocol
D150	Editing	12-inch	80 x 25		RS232C, current loop	849	20 programmable function keys, emulates 16 terminal types, supports 50 to 19200 baud X-on X-off protocol
D175	Editing	12-inch	80 x 25		RS232C, current loop	869	20 programmable function keys, emulates 16 terminal types, supports 50 to 19200 baud X-on X-off protocol
<b>ANDERSON JACOBSON INC.</b>							
510	Editing/Graphics	15-inch, green	80 x 24	ASCII, graphics	CCITT	1,995	
520	Intelligent/ Graphics	15-inch; green, amber	80, 132 x 24	ASCII	CCITT	2,395	21K memory, 24 programmable keys
<b>ANDROMEDA SYSTEMS</b>							
EDT II	Editing/Graphics	12-inch, b&w	80 x 24		DEC LSI-11, Q-BUS	1,700	Tektronix 4010 graphics capabilities
<b>ANN ARBOR TERMINALS INC.</b>							
Ambassador	Intelligent/ Graphics	15-inch, green	80 x 60	95ASCII, business graphics optional	RS232C; RS442, current loop optional	1,595	DEC mode, printer output
Genie	Intelligent/ Graphics	15-inch, white	80 x 30	95ASCII, business graphics optional	RS232C; RS442, current loop optional	1,195	printer output
Genie Plus	Intelligent/ Graphics	15-inch; white, green	80 x 30	95ASCII, business graphics optional	RS232C; RS442, current loop optional	1,395	block mode printer output, DEC mode
Guru	Intelligent/ Graphics	15-inch, green	170 x 66	95 ASCII, business graphics optional	RS232C; RS442, current loop optional	2,395	printer output, DEC mode
<b>APPLIED DIGITAL DATA SYSTEMS</b>							
Viewpoint, A-1, A-2	Dumb/Graphics	12-inch; b&w, green	80 x 24	5 x 7, 7 x 9 matrix chars.	RS232C, CCITT 2.24	650	
Viewpoint Color	Editing/Graphics	13-inch, color	80 x 25	business graphics	RS422, current loop optional	1,295	
Viewpoint 3A Plus	Dumb	12-inch; b&w, green	80 x 24		RS232C, CCITT 2.24		compatible with ADM 3A, 5; TVI 912/920
Viewpoint 60	Editing/Graphics	12-inch; b&w, green	80 x 25	5 x 7, matrix chars.	RS232C, current loop	895	
Viewpoint 60G	Editing/Graphics	12-inch; b&w, green	80 x 25		RS232C, current loop	1,950	Tektronix 4010 commands
Viewpoint 78	Dumb/Graphics	12-inch; green, white	80 x 25		RS232C, RS422, current loop optional	1,095	3278-2 compatible keyboard, IBM graphics symbols
Viewpoint 79	Dumb/Graphics	13-inch, 4-color	80 x 25		RS232C, RS422, current loop optional	1,995	IBM graphics symbols
Viewpoint 90	Editing/Graphics	12-inch; b&w, green	80 x 25	5 x 7, matrix chars.	RS232C, current loop	1,095	
<b>ARTS COMPUTER PRODUCTS INC.</b>							
combination unit	Dumb	12-inch, color	40 x 22	several fonts available	RS232C, asynchronous ASCII	10,649	synthetic speech, buffer review system, 25-inch CRT available

Alphanumeric terminals

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
LPVT	Dumb	12-inch, color	49 x 22	several fonts available	RS232C, asynchronous ASCII	6,999	buffer review system, 25-inch CRT available
Orator	Dumb		80 x 24	Helvetica	RS232C, asynchronous ASCII	4,649	synthetic speech, buffer review system
<b>ASH ROW LTD.</b>							
721	Dumb/Graphics	12-inch, green	80 x 25	128ASCII	RS232C	1,900	19-inch rack panel mounting with remote keyboard
809	Intelligent/Graphics	9-inch, green	80 x 12	128ASCII	RS232C	2,100	19-inch rack panel mounting with remote keyboard
913	Intelligent	12-inch, green	80 x 24	96ASCII	RS232C, current loop	1,300	19-inch rack panel mounting with remote keyboard
<b>AYDIN CONTROLS</b>							
5219	Editing/Graphics	19-inch, 16-color	80 x 48		RS232C	3,795	4 page picture memory
AYCON/15	Editing/Graphics	13-25-inch, color	72 x 34, 80 x 48	process control font	bisync	10,000	OEM packaging, optional light pen, track ball, joystick, touch panel, additional function keys
AYCON/17	Editing/Graphics	13-inch, color	80 x 48		RS232C, bisync	2,400	OEM packaging, optional light pen, 45 additional function keys
<b>BEEHIVE INTERNATIONAL</b>							
ATL-004	Editing	14-inch	132 x 27			995	VT100 compatible
ATL-008	Editing/Graphics	14-inch, green	132 x 24		RS232C, RS422, current loop	1,395	multiple windows
DM83	Editing	12-inch, green	80 x 24		Burroughs TD1, dual RS232C ports	1,995	Burroughs TD830 and MT983 compatible
TOPPER	Editing/Portable	12-inch, green	80 x 24	ASCII, EBCDIC	dual RS232C ports	2,995	IBM 3270 compatible with CC76 cluster controller (BSC, SNA)
<b>BURROUGHS CORP.</b>							
DE700	Intelligent	12-inch, green	80 x 26	7 x 9 matrix chars.	RS232C	3,995	
MT785	Intelligent	12-inch, green	80 x 26	7 x 9 matrix chars.	RS232C	3,072	
MT985	Editing	12-inch, green	80 x 26	7 x 9 matrix chars.	RS232C	2,010	
<b>CALLAN DATA SYSTEMS</b>							
100L	Intelligent/Graphics	12-inch, green	80 x 25	ASCII	RS232C	2,995	configurable Multibus or LSI-11 based integrated work station, OEM adds processor boards, optional disk drives
CD100M	Intelligent/Graphics	12-inch, green	80 x 25	ASCII	RS232C	3,450	configurable Multibus-based integrated work station, OEM adds processor boards including optional 68000 CPU with UNIX operating system
<b>CARTERFONE COMMUNICATIONS CORP.</b>							
7276	Intelligent	12-inch, white	80 x 25	ASCII, EBCDIC	RS232C	2,995	3276-equivalent, bisync controller/workstation
7276SNA	Intelligent	12-inch, white	80 x 25	ASCII, EBCDIC	RS232C	2,995	3276-equivalent, SNA controller/workstation
7700	Intelligent	12-inch, green	64 x 25		RJ45, RS232C	4,800 - 6,000	operates concurrently over TWX, TLX, DDD, and IRC-PTL networks
7800	Editing	12-inch, white	80 x 24		RS232C	3,780 - 5,020	communicates over DDD networks
<b>CHROMATICS INC.</b>							
CT 4100	Intelligent/Graphics	13-inch, 8-color	80 x 48	raster char. fonts	RS232C, parallel	2,995	enhanced ISC 8001G or VT100 emulator, non-volatile RAM
CT 4200	Intelligent/Graphics	13-inch, 16-color	85 x 48	raster, vector, bold vector char. fonts	RS232C, parallel, accessory RGB	3,995	ADM3A emulator, non-volatile RAM
CT 4300	Intelligent/Graphics	13-inch, 16-color	190 x 96	raster vector, bold vector char. fonts	RS232C, parallel, accessory RGB	6,995	ADM3A emulator, non-volatile RAM

# WHICH TWIN HAS THE TANDBERG?

## The big screen terminal that's soooooo easy on the eyes

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The TDV 2200 features a 15-inch screen with big, flicker-free, green-on-green characters; a patented Equalite™ Video system that displays both vertical and horizontal lines with equal intensity; and true character definition across the entire 15-inch screen. The TDV 2200 also tilts, swivels, raises and lowers for easy readability in any room light, at any angle.

But there's a lot more to the TDV 2200 than meets the eye. There are sixteen soft switches called PUSH keys that recall previously stored words, phrases, or code sequences. A single keystroke can recall up to 48

characters. This not only saves time, but also eliminates the possibility of error when entering this data. Up to 416 characters can be stored and recalled from the terminal or host computer.

There's also a simplified menu protocol that cuts set-up time in half; full editing capability; up to eight screens of memory; semi-graphic display; character, page, block or line/field transmission and a host of other features.

The Tandberg Data TDV 2200 family is available in a number of models that will emulate virtually any popular terminal including the DEC VT100 and VT52, Data-point 3600 and 8200, IBM 3101,

Data General 6053 and D200, H-P 2622, Basic Four and others. An advanced performance model is also available for the development of application-tailored OEM terminals.

To truly appreciate this outstanding combination of graceful ergonomic design, functional capabilities and performance features, you should really try one for yourself. Just call or write for a demonstration. You'll see that there's a lot more to the TDV 2200 than meets the eye. Tandberg Data, Inc., P.O. Box 99, Labriola Court, Armonk, N.Y. 10504. Phone: (914) 273-6400. Telex: 137357 Tanberg Arnk.

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CIRCLE NO. 91 ON INQUIRY CARD



## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>CIE TERMINALS</b>							
CIT-80	Dumb	12-inch; white, green, amber	80 x 24	128ASCII	RS232C, current loop	1,195	VT52 and ANSI mode, printer port
CIT-101	Dumb/Graphics	12-inch; white, green, amber	132 x 24	128ASCII, OCR	RS232C, current loop	1,495	DEC VT100 compatible, bidirectional printer port
CIT-101e	Editing/Graphics	14-inch; white, green, amber	132 x 24	128ASCII, OCR	RS232C, current loop	1,495	DEC VT102 compatible, 3 screen pages, bidirectional printer port
CIT-161	Intelligent/Graphics	12-inch, 8-color	132 x 24	128 ASCII	RS232C, current loop	2,595	DEC VT100 compatible, bidirectional printer port, CIG-267 option provides Tektronix 4010, 4014, 4027 compatibility
CIT-414	Editing/Graphics	12-inch, green	130 x 65		RS232C, current loop	1,895	Tektronix 4010, 4014, 4016 compatible
CIT-500	Intelligent	15-inch, green	120 x 64		RS232C, current loop	2,150	DECVT100 compatible
<b>CIFER plc</b>							
2841	Dumb/Graphics	12-inch; green or orange on black	128 x 32	7 x 7, 9 x 9 matrix chars.	dual RS232C ports		reprogrammable keyboard, non-volatile memory
2605	Dumb	12-inch; green, orange, white	80 x 24	128ASCII	dual RS232C ports		
2634	Editing/Graphics	12-inch; green, orange, white	80 x 24	128ASCII	dual RS232C ports		7-page display memory, optional telex operation and Tektronix 4010 graphics
<b>COBAR INC.</b>							
3100	Dumb/Graphics	12-inch, white	132 x 24		RS232C, current loop optional		DEC VT100, VT101, VT102 compatible; optional 3-page memory, composite video
3132	Editing/Graphics	15-inch, white	132 x 24		RS232C, current loop optional		DEC VT100, VT101, VT102 compatible, optional 3-page memory, composite video
<b>CODEX CORP.</b>							
CDX268	Editing/Graphics	15-inch; green, amber	80 x 25		RS232C, RS422	1,895	detachable keyboard, 12 function keys
<b>COLORGRAPHIC COMMUNICATIONS CORP.</b>							
MVI-7	Intelligent/Graphics	13-inch, color	80 x 24	128ASCII, line drawing	RS232C, current loop, RS422	3,500	110 to 19200 Baud full or half duplex auxiliary port, rack mountable chassis, optional light pen, RGB video output
MVI-7 model 719	Intelligent/Graphics	19-inch, color	80 x 24	128ASCII, line drawing	RS232C, current loop, RS422	4,000	110 to 19200 Baud full or half duplex auxiliary port, rack mountable chassis, optional light pen, RGB video output
MVI-100	Intelligent/Graphics	13-inch, color	80 x 48	128ASCII, line drawing	RS232C	2,750	110 to 19200 Baud full or half duplex auxiliary port, optional light pen
MVI-100 model 113/119	Intelligent/Graphics	13-inch, color	80 x 48	128ASCII, line drawing	RS232C	2,750; 3,250	19-inch CRT available, 110 to 19200 Baud full or half duplex auxiliary port, rack mountable chassis, optional light pen
MVI-100 model 480/489	Intelligent/Graphics	13-inch, color	80 x 48	128ASCII, line drawing	RS232C	5,000; 5,500	19-inch CRT available, 110 to 19200 Baud full or half duplex auxiliary port, rack mountable chassis for model 489; optional light pen, RGB video output for model 480
MVI-100 model 813/819	Intelligent/Graphics	13-inch, color	80 x 48	128ASCII, line drawing, process control character set	RS232C	3,000 & 3,500	19-inch CRT available, 110 to 19200 Baud full or half duplex auxiliary port, rack mountable chassis for model 819, optional light pen, RGB video output for Model 819
<b>COMMUNICATIONS AND SPECIAL SOFTWARE</b>							
Workstation I	Intelligent	11-inch, white	80 x 24	ASCII, math, line drawing	IBM 3270 bisync and universal async	6,395	simultaneous IBM and ASYNC communications
<b>COMPUTEK INC.</b>							
8/25	Intelligent/Graphics	12-inch; white, green, amber	80 x 25		RS232C, RS422	3,500 (Q100)	up to 6 ports, optional floppy and Winchester disk drives, local area network
<b>COMPUTER TALK INC.</b>							
423	Intelligent/Graphics/Portable	11-inch, b&w	80 x 25	ASCII	RS232C	3,606	light pen
427	Intelligent/Graphics	11-inch, b&w	64 x 30	ASCII	RS232C	3,136	Z80 processor
<b>CONTROL CONCEPTS</b>							
CC-3276	Intelligent	12-inch, green	80 x 24		RS232C	3,350	separately addressed printer port, optional 2400 Baud modem, video output

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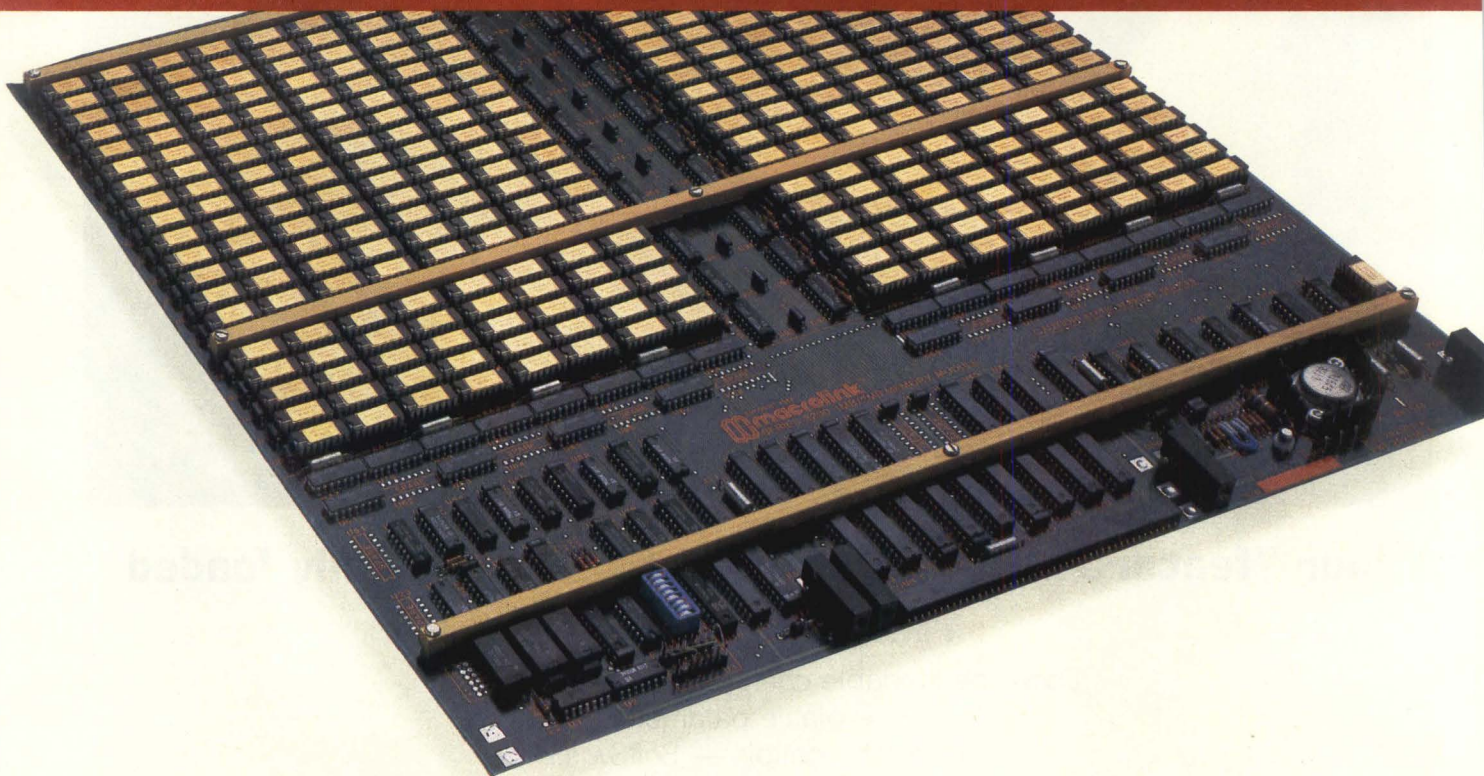
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CIRCLE NO. 93 ON INQUIRY CARD



## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/	Interfaces	Unit price (\$)	Features/ Options
EM-3275	Intelligent	12-inch, green	80 x 24		RS232C	2,500	screen copy printer port, optional 2400 Baud modem, video output
EM-3276	Intelligent	12-inch, green	80 x 24		RS232C	2,600	separately addressable printer port, optional 2400 Baud modem, video output
<b>CROMEMCO INC.</b>							
C-1	Intelligent/ Graphics	12-inch, green	80 x 25	American, American bold, scientific	serial I/O, S-100	885	includes model CTI interface board
<b>CTI DATA CORP.</b>							
CTI 1000A	Intelligent	12-inch, green	80 x 25	EBCDIC	RS232C	2,350	local format storage, IBM 2740 compatible
CTI 3078	Editing	12-inch, green	80 x 25	EBCDIC	RS232C, RS422	1,250	IBM 3278/2 compatible
<b>CYBERNEX LTD.</b>							
XL-84	Dumb/Graphics	12-inch, green	80 x 25	ASCII, French, line drawing	RS232C, current loop, auxiliary serial port	695 (Q100)	14-inch CRT available, code sets for ADM3, Hazeltine, DEC
XL-87D	Editing/Graphics	12-inch; green, amber	80 x 25	ASCII, line drawing	RS232C, current loop, auxiliary serial port	795 (Q100)	14-inch CRT available
XL-87H	Editing	12-inch; green, amber	80 x 25	ASCII, French	RS232C, current loop, bidirectional auxiliary RS232C port	895 (Q100)	14-inch CRT available
XL-87M	Intelligent/ Graphics	12-inch, green	80 x 25	128ASCII	RS232C, current loop, auxiliary serial port	795 (Q100)	14-inch CRT available
MDL Series	Intelligent	12-inch, green	80 x 24	128ASCII	dual RS232C ports, current loop, Centronics	995 (Q100)	14-inch CRT available
MDL-150 TS	Intelligent/ Graphics	12-inch, green	80 x 24	128ASCII	dual RS232C ports, current loop, Centronics	1,995 (Q100)	14-inch CRT available, touch screen input, multi-window display
MDL-B4E	Intelligent	12-inch, green	80 x 24	128ASCII	dual RS232C ports, current loop, Centronics	1,195 (Q100)	14-inch CRT available, MAI Basic Four emulation
APL-100	Intelligent	14-inch, green	80 x 48	ASCII, APL	dual RS232C ports, current loop, Centronics	1,195 (Q100)	
1109	Intelligent/ Graphics	19-inch, color	150 x 70		dual RS232C ports, Centronics		Tektronix 4109 replacement, 1024 x 780 resolution
1014	Intelligent/ Graphics	14-inch, green	150 x 70		dual RS232C ports, RS422, Centronics	1,995 (Q100)	Tektronix 4010, 4012, 4014 replacement; 1024 x 780 resolution, optional bit pad, mouse, graphic copy to Epson or Centronics
SA-830	Intelligent	14-inch, green	80 x 25	128ASCII	dual RS232C ports	1,395 (Q100)	Burroughs TD 830, MT 983, ET 1000 emulation, 64K RAM, optional TDI concatenation
SA-7800	Intelligent/ Graphics	14-inch, green	80 x 72	128ASCII	three RS232C ports	1,495 (Q100)	Honeywell VIP 7800 series emulation, printer buffer
MDL-D200	Intelligent	12-inch, green	80 x 24	ASCII	RS232C, current loop, Centronics	1,095 (Q100)	14-inch CRT available, Data General Dasher emulation including 6052, 6053, D100, D200
<b>DACOLL ENG SERVICES</b>							
M242-3/3E	Dumb/Editing	12-inch, green	132 x 25		RS232C, current loop	1200 (Q1); 1400 (Q1)	15-inch CRT available
M249-2A	Editing	12-inch, green	132 x 25		RS232C, current loop	3,400 (Q1)	15-inch CRT available
<b>DATA GENERAL CORP.</b>							
280-C	Dumb	13-inch	80 x 24	US, UK, Danish/ Norwegian, French, German	RS170, RS232C, current loop	3,750	
6110APL	Dumb	12-inch, b&w	80 x 24	APL, 96ASCII	RS232C, current loop	2,700	
D200	Dumb	12-inch, b&w	80 x 24	US, UK, Danish/ Norwegian, French, German	RS232C, current loop	1,950	
D400	Intelligent	12-inch, green	135 x 24	US, UK, Danish/ Norwegian, French, German	RS232C, current loop	2,300	24 windows

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets	Interfaces	Unit price (\$)	Features/Options
D450	Intelligent/ Graphics	12-inch, green	135 x 24	US, UK, Danish/ Norwegian, French, German	RS232C, current loop	2,800	24 windows
<b>DATA TYPE INC.</b>							
AutoGraph Color X5A	Editing/Graphics	14-inch, color	132 x 24	English		3,595	Tektronix 4014, TeleVideo 925, compatible, optional hardcopy printer
AutoGraph XK1	Editing/Graphics	15-inch, green	132 x 24	English		3,295	Tektronix 4014, TeleVideo 925, compatible, optional hardcopy printer
AutoGraph XK19	Editing/Graphics	19-inch, green	132 x 24	English		4,495	Tektronix 4014, TeleVideo 925, compatible, optional hardcopy printer
<b>DATAMEDIA CORP.</b>							
3270-6	Intelligent	14-inch; gray, green, amber	80 x 24		bisync, RS232C		12-inch CRT available
3270-8	Intelligent	14-inch; gray, green, amber	80 x 24		bisync, RS232C		12-inch CRT available
3270-S	Intelligent	14-inch; gray, green, amber	80 x 24		bisync, RS232C		12-inch CRT available
ColorScan 10	Dumb	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
ColorScan 30	Editing	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
ColorScan 60	Editing	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
ColorScan 70	Dumb	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
Excel 10	Dumb	12-inch; gray, green, amber	132 x 24	ASCII	RS232C, current loop optional		14-inch CRT available
Excel 20	Dumb	12-inch; gray, green, amber	132 x 24	ASCII	RS232C, current loop optional		14-inch CRT available, optional composite video
Excel 30	Editing	12-inch; gray, green, amber	132 x 24	ASCII	RS232C, current loop optional		14-inch CRT available, optional composite video
Excel 40	Editing	12-inch; gray, green, amber	80 x 24	ASCII	RS232C		optional composite video
Excel 60	Editing	12-inch; gray, green, amber	80 x 24	ASCII	RS232C, current loop optional		optional composite video
Excel 70	Dumb	12-inch; gray, green, amber	80 x 24	ASCII	RS232C, current loop optional		optional composite video
Retrographics Colorscan 10	Dumb/Graphics	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
Retrographics Colorscan 30	Editing/Graphics	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
Retrographics Colorscan 60	Editing/Graphics	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
Retrographics Colorscan 70	Dumb/Graphics	12-inch, color	132 x 24	ASCII	RS232C, current loop optional		optional composite video
<b>DATAPoint CORP.</b>							
8220	Editing	12-inch, amber	80 x 24		RS232C	1,895	local printer capability
<b>DATASTREAM</b>							
178 Display Station	Dumb (VT-52 emulation) Editing (IBM emulation)	12-inch, black; amber optional	80 x 25	128ASCII, EBCDIC	RS232C, printer port	975 (Q1)	emulates DEC VT52; emulates IBM 3278 model 2 and IBM 3178 via Datastream cluster controller
<b>DATAVUE CORP.</b>							
DU132-C	Intelligent/ Graphics	13-inch, green on black	132 x 24		RS232C	1,795	16 programmable keys
<b>DECISION DATA COMPUTER CORP.</b>							
3751-11	Editing	15-inch, green	80 x 24		IBM S/34, S/36, S/38	2,175	optional light pen, mag stripe reader
3791-01	Editing	12-inch, green	80 x 24		IBM S/34, S/36, S/38	1,810	
<b>DELTA DATA SYSTEMS CORP.</b>							
2830 II	Intelligent	12-inch, green	80 x 24	ASCII	RS232C	1,795	Burroughs emulation
7303	Intelligent	15-inch, green	80 x 27	ASCII	RS232C	3,795	up to 8 split screens

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>DENTRONIX SYSTEMS INC.</b>							
200	Dumb	12-inch; white, green, amber	80 x 25	German, Spanish, USASCII, UKASCII	RS232C, current loop, printer port	1,250	15-inch CRT available, DG D200 compatible
400	Editing/Graphics	12-inch; white, green, amber	135 x 25	USASCII, UKASCII, French, German, Swedish/Finnish, Spanish, Danish/Norwegian, Greek, Math, thin-line graphics, thick-line graphics	RS232C, current loop, printer port	1,450	15-inch CRT available, DG D400 compatible
<b>DIGICO COMPUTERS LTD.</b>							
Prince 3807	Intelligent/Graphics	15-inch, green	80 x 24		RS232C		disk storage facilities
<b>DIGITAL EQUIPMENT CORP.</b>							
RT-100	Dumb	12-inch, b&w	132 x 24	96ASCII	RS232C	3,900	
RT-102	Dumb	12-inch, b&w	132 x 24	96ASCII	RS232C	4,000	
RT-137	Dumb	12-inch, b&w	132 x 24	96ASCII	RS232C	5,300	bar code reader
VT-100	Dumb/Graphics	12-inch, b&w	132 x 24	96ASCII	RS232C	1,945	
VT-101	Dumb	12-inch, b&w	132 x 24	96ASCII	RS232C	1,350	
VT-102	Dumb	12-inch, b&w	132 x 24	96ASCII	RS232C, printer port	1,945	advanced video option
VT-125	Dumb/Graphics	12-inch, b&w	132 x 24	96ASCII	RS232C, printer port	3,800	bit-mapped graphics
VT-131	Editing	12-inch, b&w	132 x 24	96ASCII	RS232C	1,985	local editing with block transmission mode
<b>DIRECT INC.</b>							
820	Intelligent/Graphics	12-inch; green, white	132 x 28	96 char. ISO	RS232C	1,495	HP block mode compatible, 4K byte display memory
825	Intelligent/Graphics	12-inch; green, white	132 x 28	96 char. ISO	RS232C	1,890	HP block mode compatible, 16K byte display memory
828/1	Intelligent/Graphics	12-inch; green, white	132 x 28	96 char. ISO	RS232C	2,790	HP block mode, VT100 compatible, 32K byte display memory
831	Intelligent/Graphics	12-inch; green, white	132 x 28	96 char. ISO	RS232C	1,395	DEC block mode compatible, 16K byte display memory
<b>DTI INC.</b>							
BASIC IV	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	
Editor	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	VT100 code compatible
Genius	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	Lear Siegler code compatible
Prism	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	Microdata Prism code compatible
DTI 200	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	Data General code compatible
E52	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	DEC E52 code compatible
FALS 200	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	Lear Siegler code compatible
PT 80	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	VT100 code compatible
1510 +	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	Hazeltine code compatible

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
6053	Editing/Graphics	12-inch; b&w, green	80 x 24	ASCII	RS232C, current loop	995	Data General code compatible
<b>DY-4 SYSTEMS INC.</b>							
VGT-100	Editing/Graphics	15-inch, green	132 x 24		three RS232C ports	1,912	VT100, Tektronix 4010, PLOT10 graphics compatible, 240 x 640 pixel resolution
VGT-100H	Editing/Graphics	15-inch, green	132 x 24		three RS232C ports	2,039	VT100, Tektronix 4010, PLOT10 graphics compatible
<b>ECS MICROSYSTEMS INC.</b>							
4000	Intelligent	12-inch, green	80 x 25	8 x 7 matrix chars.	RS232C, SIO	1,995	communications protocols for Burroughs, Honeywell, IBM, NCR, Univac
4100	Intelligent	12-inch, green	80 x 25	8 x 7 matrix chars.	RS232C, SIO	2,895	communications protocols for Burroughs, Honeywell, IBM, NCR, Univac
<b>ELECTRO MECHANICAL SYSTEMS</b>							
Touch Information Display	Dumb	12-inch, amber	80 x 24	96ASCII, 32 block graphic symbols	RS232C	1,400	touch-active display, keyboard port
<b>ENVISION</b>							
210	Editing	13-inch, color	132 x 24	USASCII	RS232C	2,750	printer port, VT100 compatible; optional RS-170 video output
220	Intelligent/Graphics	13-inch, color	132 x 24	USASCII	RS232C	4,950	Polygon fill, 640 x 480 pixel resolution, user defined symbols; optional RS-170 RGB video output, mouse, graphics tablet
230	Intelligent/Graphics	13-inch, color	132 x 24	USASCII	RS232C	6,950	local 2D transformations, true zoom; optional RS-170 RGB output, mouse, graphics tablet
215	Intelligent/Graphics	13-inch, 8-color			optional RS-170	3,450 (Q1)	VT-100 compatible; opt. mouse, tablet, 640 x 409 resolution
239	Intelligent/Graphics	19-inch, 8-color		640 x 480 pixels	optional RS-170	9,450 (Q1)	designed for CAD/CAM; DEC VT-100, Tektronix 4105 compatible; opt. mouse, tablet
<b>ERICSSON RADIO SYSTEMS AB</b>							
SRA-11	Editing	15-inch, bronze	80 x 26	8 x 16 matrix chars.	TWINAX to IBM S/34, S/36, S/38	2,200	for use with IBM 34, 36, 38 computers; optional hard copy printer
<b>ESPRIT SYSTEMS INC., HAZELTINE TERMINALS DIV.</b>							
Esprit III Color	Intelligent/Graphics	12-inch, 8-color	80 x 25	ASCII	RS232C, current loop	995	printer buffer, 11 programmable function keys, as many as 4 pages of display memory
Executive 10/102	Intelligent/Graphics	14-inch, green	132 x 25	ASCII	RS232C, current loop	995	DEC VT100 emulation, 8 programmable function keys
Executive 10/25	Intelligent/Graphics	14-inch, green	132 x 25	ASCII	RS232C, current loop	1,095	16 programmable function keys
Executive 10/51	Editing/Graphics	12-inch, green	80 x 25	ASCII	RS232C, current loop	1,150	IBM 5251 compatible, supports all IBM status symbols
Executive 10/78	Editing/Graphics	12-inch, green	80 x 25	ASCII	RS232C, current loop	1,095	IBM 3278 compatible, supports all IBM status symbols
<b>FALCO DATA PRODUCTS</b>							
Falco 2	Intelligent/Graphics	12-inch; green, amber, b&w	80 x 25		RS232C, RS422, current loop	695	20 programmable function keys, ANSI 3.64 compatible
TS-1	Intelligent	12-inch; green, amber, b&w	80 x 25		RS232C, RS422, current loop	1,095	28 programmable function keys
TS-100/132	Intelligent/Graphics	12-inch; green, amber, b&w	132 x 25		RS232C; current loop, RS422 optional	1,195	DEC VT100 emulation, DEC VT52 emulation
TS-2	Intelligent	12-inch; green, amber, b&w	80 x 25		RS232C; current loop, RS422 optional	1,395	Lear Siegler ADM 2 emulation, Tandem compatible
TS-2624	Intelligent	12-inch; green, amber, b&w	80 x 26		RS232C; current loop, RS422 optional	1,995	HP 2624 emulation
TS-42	Intelligent	12-inch; green, amber, b&w	80 x 25		RS232C; RS422, current loop	1,495	Lear Siegler ADM 42 emulation, Tandem compatible
<b>FOUR PHASE SYSTEMS</b>							
CDX-268	Intelligent/Graphics	15-inch; green, amber	80 x 25		RS232C, RS422	1,895	
<b>GENERAL DIGITAL CORP.</b>							
VuePoint/Rackmount	Editing	10-inch; orange on black plasma panel	40 x 12		RS232C	3,500; 3,950	3 pages display memory; rackmount model in 19-inch rack with diagnostic self-test firmware

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## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets	Interfaces	Unit price (\$)	Features/Options
<b>GENERAL TERMINAL CORP.</b>							
SW-10	Intelligent	12-inch; white, green	80 x 25	96ASCII, 5 x 7 matrix chars., 32 special chars.	RS232C, current loop	849	ANSI X3.64 compatible; options include 11 international keyboards
SW-80	Editing/Graphics	12-inch; white, green, amber	80 x 24	96ASCII, 5 x 7 matrix chars.	RS232C	1,040	24 function keys
<b>GENISCO COMPUTERS CORP.</b>							
G-1000	Intelligent/Graphics	19-inch, b&w	146 x 66	ASCII	RS232C	9,950	PLOT10 compatible, 1024 x 792 dot resolution, hardcopy port; optional digitizing tablet
G-2200	Intelligent/Graphics	19-inch, color	146 x 66	ASCII	RS232C	12,500	VT100 and PLOT10 compatible, 1024 x 792 dot resolution, hardcopy port; optional digitizing tablet
<b>GRAPHON CORP.</b>							
GO-100	Intelligent/Graphics	12-inch, green	132 x 24	ASCII	RS232C	1,495	DEC VT100 emulation, 8 function keys
GO-140	Intelligent/Graphics	12-inch, green	132 x 24	ASCII	RS232C	1,995	emulates DEC VT100, Tektronix 4010, 4012, 4013
<b>HARRIS CORP.</b>							
8675	Editing/Graphics	12-inch, green	80 x 25	128ASCII	RS232C	1,195	block mode
8685	Intelligent/Graphics	12-inch, green	80 x 25	128ASCII	RS232C, RS422	1,950	20 programmable keys
8686	Editing/Graphics	12-inch, green	80 x 25	128ASCII	RS232C, RS422	1,950	
<b>HAZELTINE TERMINALS (SEE ESPRIT SYSTEMS INC.)</b>							
<b>HEATH DATA SYSTEMS</b>							
HS19-2	Intelligent/Graphics	12-inch, green	80 x 24	ASCII	RS232C	625	DEC VT52 software compatible, 8 programmable keys
HS19-3	Intelligent	12-inch, white	80 x 25	ASCII	RS232C	595	DEC VT100 software compatible, 8 programmable function keys
<b>HEWLETT-PACKARD CO.</b>							
2382A	Editing/Portable	9-inch, white	80 x 24	line drawing, international languages optional	RS232C	1,720	screen-labeled soft keys, two pages of memory; ANSI optional
2621B	Editing	12-inch; white, green, amber	80 x 24		RS232C	1,295	two pages of memory, 8 screen-labeled soft keys; optional built-in thermal printer
2622A	Editing	12-inch; white, green, amber	80 x 24	line drawing, international languages optional	RS232C; optional RS422, current loop, printer port	2,210	8 screen-labeled soft keys; optional built-in thermal printer
2623A	Editing/Graphics	12-inch; white, green, amber	80 x 24	line drawing, international languages optional	RS232C, RS422, current loop	3,250	options include printer port, ANSI, built-in thermal printer
2624B	Editing	12-inch; white, green, amber	80 x 24	line drawing, optional math and international languages	RS232C, printer port	3,035	8 screen-labeled soft keys, 2-4 pages of display memory; options include RS422, current loop, built-in thermal printer
2626A	Editing	12-inch; white, green, amber	80 x 24	line drawing, optional math and international languages	RS232C; optional printer port; RS422, current loop	4,400	multiwindow display, interactive forms design facility, optional built-in thermal printer
2626W	Editing	12-inch; white, green, amber	80 x 124	line drawing, optional math and international languages	RS232C, printer port	5,000	word processing terminal with specially labeled keys common to word processing functions, options include daisywheel printer, RS422, current loop
2627A	Editing/Graphics	12-inch, 8-color	80 x 24	line drawing, international languages optional	RS232C, RS422, printer port; RGB output optional	5,975	vector graphics, local polygonal area filling; optional ANSI
2647F	Intelligent/Graphics	12-inch, white	80 x 24	line drawing, math	RS232C; RS422, current loop, printer port optional	9,950	includes autoplots/47 business graphics software and BASIC graphic extensions for user designed custom graphics

## ALPHANUMERIC DISPLAY TERMINALS

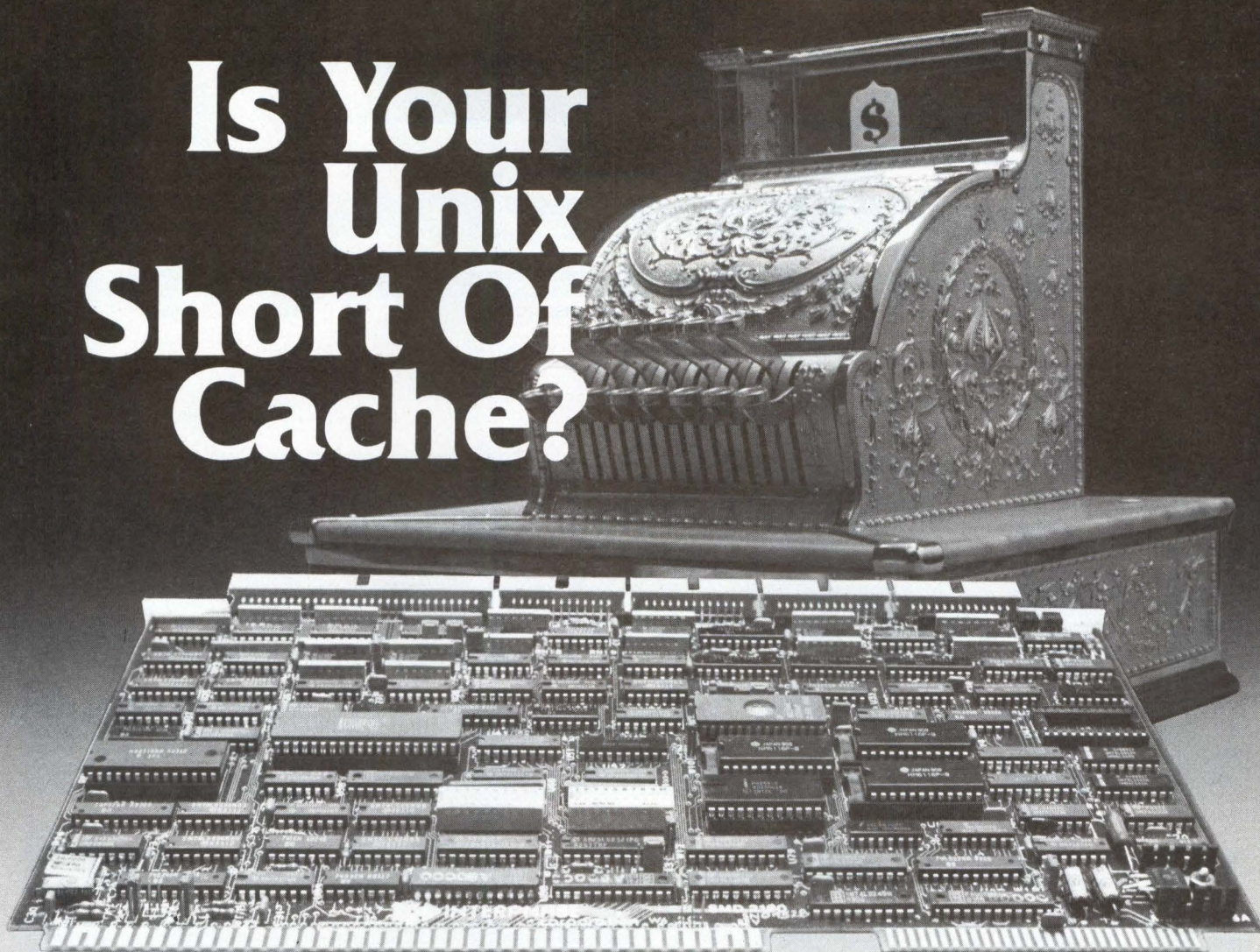
Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/ Code	Interfaces	Unit price (\$)	Features/ Options
2700	Intelligent/ Graphics	12-inch, color	80 x 24	line drawing, math, international languages optional	RS232C, RS422, printer port, RGB output port optional	19,900	color graphics workstation: displays multiple views, true zoom and pan, local graphic manipulation
<b>HMW DATA SYSTEMS GMBH</b>							
1001	Intelligent	14-inch, color	80 x 48		RS232C, Centronics	3,500	19-inch CRT available, optional floppy disk
2001	Editing	14-inch, color	80 x 48		RS232C	2,800	optional 32 function keys
40L	Intelligent/ Graphics	14-inch, color	80 x 48		RS232C, 16-bit parallel	3,500	19-inch CRT available, optional 32 function keys, floppy disk, joystick, light pen, trackball
<b>HMW ENTERPRISES INC.</b>							
9081	Intelligent/ Graphics	19-inch color	80 x 48	ISA, ISC	RS232C, current loop, 24-bit parallel	5,100	detachable keyboard, optional light pen, line and graphics printer ports
9083-S	Intelligent/ Graphics	13-inch, color	80 x 48	ISA, ISC	RS232C, current loop, 24-bit parallel	4,100	opt. RS 170 connection, and second RS232C I/O port
9204	Intelligent/ Graphics	13-inch, color	80 x 48	ISA, ISC	RS232C, current loop, 24-bit parallel	6,000	meets NEC class 1, Div. 2, Group D applications; opt. 32K byte RAM, 32K byte ROM
<b>HONEYWELL INFORMATION SYSTEMS INC.</b>							
VIP-7300 family	Editing/Graphics	12-inch, green	80 x 25		RS232C, current loop, RS422A, MIL STD 188C	1,900	conversation, word processing, data entry keyboards
VIP-7813	Editing/Graphics	12-inch, green	80 x 25		RS232C, RS422A, asynchronous	2,350	multi. function keyboard, scrolling, 16K byte buffer/printer adapter, char./text/form modes; opt. 100/400 cps bidirectional printer
VIP-7814	Editing/Graphics	12-inch, green	80 x 25		RS232C, synchronous multi-drop	2,700	transaction keyboard, 16K byte char. buffer printer adaptor; optional 100/400 cps bidirectional printer
<b>HUMAN DESIGNED SYSTEMS INC.</b>							
Concept AVT	Intelligent/ Graphics	12-inch, amber	132 x 25	ASCII	RS232C, current loop	1,295	4-page memory, windowing, 43 programmable keys, DEC VT100 compatible, 2-3 bidirectional ports
Concept AVT-APL	Intelligent/ Graphics	12-inch, amber	132 x 25	ASCII, APL	RS232C, current loop	1,495	4-page memory, windowing, 43 programmable keys, self-test, DEC VT100 compatible, 2-3 bidirectional ports
Concept GVT	Intelligent/ Graphics	12-inch, amber	132 x 25	ASCII	RS232C, current loop	1,895	4-page memory, windowing, 43 programmable keys, DEC VT100 and Tektronix 4010 compatible
Concept GVT-APL	Intelligent/ Graphics	12-inch, amber	132 x 25	ASCII, APL	RS232C, current loop	2,095	4-page memory, windowing, 43 programmable keys, DEC VT100 and Tektronix 4013 compatible
Concept APLB	Intelligent/ Graphics	12-inch; white, green, amber	132 x 25	ASCII, APL	RS232C, current loop	1,595	4-page memory, 38 programmable keys, windowing, self-test, 1-3 bidirectional ports
Concept 108	Intelligent/ Graphics	12-inch; white, green, amber	132 x 25	ASCII	RS232C, current loop	1,395	4-page memory, 38 programmable keys, windowing, self-test, 1-3 bidirectional ports
<b>ICOT CORP.</b>							
700	Dumb	12-inch, green	132 x 27		RS232C, current loop	1,095	14-inch CRT available, calculator mode, IBM/Univac host compatible with ICOT controller
701	Dumb	12-inch, green	132 x 43		RS232C, current loop	1,750	IBM/Univac host compatible with controller, calculator mode, 14-inch CRT available, supports PROS protocols
757, 767, 768	Editing	12-inch, green	132 x 43		RS232C, RS422		14-inch CRT available, business applications, supports PROS protocols
<b>ID SYSTEMS CORP.</b>							
100	Editing/Graphics	12-inch, gray	132 x 48	ASCII, line drawing	RS232C; current loop, parallel, serial, optional	3,895	12-inch color CRT available, Tektronix 4014, 4010, PLOT10, DEC VT100 compatible, optional
200	Intelligent/ Graphics	14-inch, color	132 x 48		RS232C, current loop optional	4,000	19-inch color CRT available, multiple page editing, zoom, pan, display list, Tektronix 4014, 4010, PLOT10, DEC VT100 compatible; optional light pen, mouse, trackball
<b>IMLAC CORP.</b>							
Series II	Intelligent/ Graphics	19-inch, green	80 x 50		light pen	15,750	64K bytes vector memory, 2040 x 2048 resolution, optional Tektronix 4611, 4631, Versatec V-80 hardcopy interfaces, light pen, 128K bytes vector memory

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>IMS INTERNATIONAL</b>							
Ultima	Editing/Graphics	12-inch, green	80 x 25	French, German, Spanish	RS232C, RS422	950	non-volatile memory, 19.2 baud modem interface
<b>INDUSTRIAL DATA TERMINALS</b>							
1900	Intelligent/Graphics	19-inch, 8-color	85 x 25		RS232C, parallel, current loop	7,500	rugged industrial multiprocessor architecture
2200	Intelligent/Graphics	19-inch, 16-color	85 x 51		RS232C, parallel, current loop	11,995	rugged industrial multiprocessor architecture, optional 2M bit bubble memory storage
2250	Intelligent/Graphics	19-inch, 16-color	85 x 51		RS232C, parallel, current loop	16,595	two screen image memory planes, independent image controller, optional 2M bit bubble memory storage
<b>INFORMER COMPUTER TERMINALS INC.</b>							
301	Dumb	6-inch, white	32 x 16	128ASCII	RS232C, asynchronous	1,675	
304	Editing	9-inch, white	80 x 24	128ASCII	RS232C, RS422, current loop, asynchronous	1,650	
375	Editing	9-inch, green	80 x 24	128ASCII	RS232C, BSC	2,400	12-inch CRT available, IBM 3275-2 compatible
376	Editing	9-inch, green	80 x 24		RS232C, BSC, SNA/SDLC	1,950	compatible with IBM 3276-2 or -12 in single terminal configuration, optional APL keyboard, light pen, 12-inch CRT
377	Editing	9-inch, green	80 x 24		RS232C, coaxial	1,700	12-inch CRT available, IBM 3277-2 compatible with Informer controller
378	Editing	9-inch, green	80 x 24		RS232C, coaxial	1,700	12-inch CRT available, IBM 3278-2 compatible with Informer controller, optional APL keyboard, light pen
401	Dumb	9-inch, green	80 x 24		RS232C, asynchronous	690	
<b>INTECOLOR CORP.</b>							
2405	Intelligent/Graphics	13-inch, 8-color	80 x 24		RS232C, current loop optional	1,295	12 programmable function keys, ANSI X3.64 compatible; optional 12 additional function keys, light pen
2427D	Intelligent/Graphics	13-inch, color	80 x 24		RS232C	2,695	560 x 288 resolution, bit-mapped graphics, Tektronix 4010, 4014, 4027 compatible, optional 12, 24 function keys, light pen
8001G	Intelligent/Graphics	19-inch, 8-color	80 x 48	64ASCII	RS232C, current loop optional	2,745	101-key ASCII keyboard, optional light pen
8001R	Intelligent/Graphics	19-inch, 8-color	80 x 48	64ASCII	RS232C, current loop optional	3,975	480 x 384 resolution, readable bit map, dot, arc, incremental vector generations, optional light pen
8001R/M	Intelligent/Graphics	19-inch, 8-color	80 x 48	64ASCII	RS232C	5,100	U-200 compatible, optional plotter
8301G	Intelligent/Graphics	13-inch, 8-color	80 x 48	64ASCII	RS232C, current loop optional	3,045	101-key ASCII keyboard, optional light pen
8301R	Intelligent/Graphics	13-inch, 8-color	80 x 48	64ASCII	RS232C, current loop optional	4,240	480 x 384 resolution, incremental vector generations, optional light pen
9001R/M	Intelligent/Graphics	19-inch, 8-color	80 x 48	64ASCII	RS232C	6,350	U-200 compatible, optional plotter
VHR-19	Intelligent/Graphics	13-inch, color	80 x 32		RS232C	5,875	1024 x 1024 resolution, bit-mapped graphics, Tektronix 4010, 4014, PLOT10, DEC VT52, VT100, ANSI X3.64 compatible; optional 12, 24 function keys, trackball
<b>INTEGRATED DATA SYSTEMS</b>							
212	Editing/Graphics	12-inch, 8-color	80 x 24	128ASCII	RS232C, current loop	2,425	
813	Editing/Graphics	13-inch, 8-color	80 x 32	128ASCII	RS232C, current loop	2,925	
819	Editing/Graphics	19-inch, 8-color	80 x 48	128ASCII	RS232C, current loop	3,950	
1213	Intelligent/Graphics	13-inch, 8-color	80 x 32	128ASCII	RS232C, current loop	3,145	Multibus computer chassis, high-power power supply
1219	Intelligent/Graphics	19-inch, 8-color	80 x 48	128ASCII	RS232C, current loop	4,295	Multibus computer chassis, high-power power supply
<b>INTERNATIONAL ENTRY SYSTEMS INC.</b>							
Datacorder I	Intelligent/Portable	16 x 1; optional CRT available			Centronics, RS232C	2,295	10-key alphanumeric keyboard, 80-line printer
Datacorder II	Intelligent/Portable	40 x 1, optional CRT available			Centronics, RS232C	3,995	10-key alphanumeric keyboard, 80-line printer



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CIRCLE NO. 95 ON INQUIRY CARD

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>INTERTEC DATA SYSTEMS</b>							
Intertube	Intelligent/ Graphics	12-inch, b&w	80 x 25	96ASCII, 8 x 8 matrix chars.	RS232C		video attributes, self-diagnostics
<b>ITT COURIER TERMINAL SYSTEMS INC.</b>							
1700-21, 22	Intelligent	12-inch, green	80 x 24	EBCDIC			24 programmable function keys
2700-13, 14, 15, 16	Intelligent	15-inch, green	80 x 24, 80 x 32, 80 x 43, 132 x 27	EBCDIC	RS232C		24 programmable function keys
2790-2A, 3A, 4A	Intelligent	14-inch, 7-color	80 x 24, 80 x 32, 80 x 43	EBCDIC	RS232C		24 programmable function keys
<b>KIMTRON CORP.</b>							
ABM 85	Editing/Graphics	12-inch; green, amber	80 x 25	ASCII, graphics, international chars.	RS232C	795	
ABM 85-3/5	Editing	12-inch, green	80 x 25	ASCII	RS232C	495	
ABM 85H	Intelligent/ Graphics	12-inch; green, amber	80 x 25	ASCII, graphics, Spanish, French, German	RS232C, RS422 optional	825	emulates DGD200, TeleVideo 915, 920, 924, 925, 950; 16 programmable function keys
ABM 86	Editing/Graphics	12-inch; green, amber	132 x 27	ASCII, graphics	RS232C, RS422 optional	995	
KGT-100	Editing/Graphics	12-inch; green, amber		ASCII, graphics	RS232C	1,800	
<b>LANPAR TECHNOLOGIES</b>							
Vision 830	Editing	12-inch, green	80 x 25	USASCII, Burroughs special	Burroughs TDI, multidrop synchronous/asynchronous	1,795	15-inch CRT available, Burroughs TD830 with forms storage
Vision 1000	Intelligent/ Graphics	12-inch, green	132 x 25	USASCII	RS232C	1,195	15-inch CRT available, VT100 compatible, 4 programmable function keys
Vision 2000 +	Intelligent/ Graphics	12-inch, green	132 x 25	USASCII, French	RS232C	1,595	15-inch CRT available, VT100 compatible, 4 pages memory
<b>LEAR SIEGLER INC., DATA PRODUCTS DIVISION</b>							
ADM-3A	Dumb/Graphics	12-inch, green	80 x 24	USASCII, 5 x 7 matrix chars.	RS232C, current loop	595	
ADM-5	Editing/Graphics	12-inch, green	80 x 24	USASCII, 5 x 7 matrix chars.	RS232C, current loop	645	numeric keypad
ADM-11	Editing	12-inch, green	80 x 25	USASCII, UKASCII, French, German, Swedish, Finnish, Danish, Norwegian, Spanish	RS232C, current loop, RS422	695	non-volatile setup mode and function keys, printer port
ADM-12	Intelligent/ Graphics	12-inch; green, amber	158 x 25	USASCII, UKASCII, French, German	RS232C, current loop, RS422		split screen, printer port, 16 programmable function keys, 6 optional programmable editing keys
ADM-22	Editing	12-inch, green	80 x 24	USASCII	RS232C, current loop	695	code compatible with ADM 3A/5/31, Hazeltine 1500, ADDS Regent 25
ADM-23	Editing/Graphics	12-inch; green, white	80 x 24	USASCII, optional U.K., French, German	RS232C, optional current loop	795	2 pages of memory, auxiliary port

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/ Code	Interfaces	Unit price (\$)	Features/ Options
ADM-24	Editing/Graphics	12-inch; green, amber	80 x 24	USASCII, UKASCII, French, German, Swedish, Finnish, Danish, Norwegian, Spanish, Katakana, Greek and math symbols	RS232C, optional current loop and RS422	1,195	8 function keys, 48 lines of display memory, split screen
ADM-24E	Intelligent/Graphics	12-inch; green, amber	80 x 24	USASCII, UKASCII, French, German, Swedish, Finnish, Danish, Norwegian, Spanish, Katakana, Greek and math symbols	RS232C, optional current loop and RS422	1,250	16 programmable function keys, optional 96 line display memory, split screen, optional, 4K byte printer buffer, and integral modem
ADM-31	Editing/Graphics	12-inch; green, white	80 x 24	USASCII	RS232C, RS232C extension port	1,095	2 pages of memory, serial printer port
ADM-32	Editing/Graphics	12-inch; green, white	80 x 25	USASCII	RS232C, RS232C extension port	1,295	15-inch CRT available, 2 pages of memory
ADM-36	Editing/Graphics	12-inch; green, white	132 x 24	USASCII, UKASCII, German, French, Spanish, Swedish, Finnish, Norwegian, Danish	RS232C, RS422, optional current loop	1,195	15-inch CRT available, ANSI X3.64 and DEC VT100 compatible, optional VT131 compatible
ADM-42	Editing/Graphics	15-inch; green, white	80 x 25	USASCII	RS232C, RS232C extension port	2,195	16 function keys, 4 pages of memory
<b>LEE DATA CORP.</b>							
0700	Intelligent/Graphics	15-inch, monochrome			serial, parallel, IBM 327X	2,733	15-inch color CRT available
1220	Dumb	15-inch; green, gray	132 x 43		IBM 3278		
1218	Dumb	15-inch; green, gray	80 x 24		IBM 3278		
1230	Dumb	15-inch; green, gray	80 x 32		IBM 3279		
<b>LEXICON INC.</b>							
Lexiscope 4000	Intelligent/Graphics	12-inch, green	80 x 50		Data General Nova, Eclipse	2,500	560 x 500 graphics resolution, HP 2648A compatible graphics command set, optional controller
<b>LIBERTY ELECTRONICS USA</b>							
FREEDOM 50	Editing/Graphics	12-inch, green	80 x 25	French, Japanese, Danish, Norwegian, Swedish, Finnish, Spanish, German	RS232C, current loop	395 (Q1000)	
FREEDOM-100	Editing/Graphics	12-inch, green	80 x 25	French, Japanese, Danish, Norwegian, Swedish, Finnish, Spanish, German, line graphics	RS232C, current loop	495	10 function keys

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>LYNWOOD SCIENTIFIC DEVELOPMENTS LTD.</b>							
Alpha-Colour	Intelligent/ Graphics	15-inch, color	80 x 30		dual RS232C ports, optional fiber-optic interface	6,037	optional 64K byte RAM, badge reader
Alpha-Graphic	Intelligent/ Graphics	15-inch, green	80 x 30		dual RS232C ports, optional fiber-optic interface	4,287	optional 64K-byte RAM, badge reader
<b>MATROX ELECTRONIC SYSTEMS LTD.</b>							
CTM-300	Intelligent/ Graphics	12-inch, 8-color	132 x 25	English, French, German, Spanish, Greek, Swedish	RS232C, parallel printer port, light pen	3,240	2K-bytes RAM, 18 programmable function keys
<b>MDS (MOHAWK DATA SCIENCES)</b>							
2192	Editing	15-inch, green	80 x 24			2,128	optional typewriter, data-entry, keypunch keyboards
2195	Intelligent	15-inch, green	80 x 24		RS232C, printer port	2,128	optional typewriter, data-entry, keypunch keyboards
<b>MEMOREX CORP.</b>							
1377 Display Station	Dumb	15-inch, green	80 x 24				IBM 3270 compatible, optional 5 keyboards, light pen
2051-Display Station	Dumb	15-inch; green, amber	80 x 24		IBM S/34, S/36, S/38		83-key EBCDIC typewriter keyboard
2078 Display Station	Dumb/Graphics	15-inch; green, amber	132 x 43				optional light pen
2079 Color Display	Dumb/Graphics	13-inch, 7-color	132 x 32				optional light pen
<b>MICRO PRODUCTS CO.</b>							
1100	Intelligent	14-inch; b&w, green, amber	132 x 24		RS232C	1,695	
1200	Intelligent/ Graphics	14-inch; b&w, green, amber	132 x 24	line drawing	RS232C	1,795	
1250	Intelligent/ Graphics	14-inch; b&w, green, amber			RS232C	3,495	
2100	Intelligent/ Graphics	14-inch, 8-color	80 x 48		RS232C	3,395	
2150	Intelligent/ Graphics	14-inch, 8-color	80 x 48		RS232C	4,395	
<b>MICRO-TERM INC.</b>							
ACT-5A	Editing	12-inch; b&w, green	80 x 24	7 x 9 matrix chars.	RS232C	995	
ERGO-201	Editing/Graphics	12-inch, green	80 x 25	7 x 9 matrix chars.	RS232C	695	ADM3A, TeleVideo 925, DEC VT52, ACT 5A emulations
ERGO-301	Editing/Graphics	12-inch, green	132 x 25	7 x 9 matrix chars.	RS232C	895	VT100 compatible, 2 pages of memory
ERGO-4000	Editing	15-inch, green	80 x 66	7 x 9 matrix chars.	RS232C	1,495	ANSI compatible, word-processing terminal
Mime-2A	Editing	12-inch; b&w, green	80 x 24	7 x 9 matrix chars.	RS232C	1,045	emulates DEC VT52, Soroc, Hazeltine terminals
Mime-340	Editing	12-inch, green	80 x 24	7 x 9 matrix chars.	RS232C	750	emulates DEC VT52, Hazeltine 1410, ADM 3A, ANSI X3.64
Mime-740	Editing/Graphics	12-inch, green	132 x 25	7 x 9 matrix chars.	RS232C	1,175	VT100 compatible, 2-page memory
<b>MICRODATA CORP.</b>							
5750	Intelligent	12-inch, b&w	80 x 25	96ASCII	RS232C	5,100	2-page memory
7450	Intelligent	9-inch, b&w	40 x 13			1,990	
7510	Intelligent	12-inch, b&w	80 x 25			6,825	optional line/serial printer
Prism II	Dumb	12-inch, b&w	80 x 24	96ASCII, 5 x 7 matrix chars.	RS232C	2,200	
Prism IV	Editing	12-inch, green	80 x 25	96ASCII, 7 x 9 matrix chars.	RS232C	2,200	

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>MILTOPE CORP.</b>							
MIL-TERM-280	Editing	80 x 25	96, 128ASCII	RS232C, Mil-Std-188C, 8-bit parallel	15,600	militarized	
<b>MODULAR COMPUTER SYSTEMS</b>							
4614	Graphics/ Intelligent	12-inch, green	80 x 25	RS232C	1,095 (Q1)		
<b>MULTITECH INDUSTRIAL CORP.</b>							
D75	Editing	15-inch, b&w	80 x 24	USASCII, Chinese	RS232C, Centronics		
<b>NABU COMMERCIAL TERMINALS</b>							
415APL	Editing	12-inch; b&w, green, amber	80 x 25	APL, ASCII, 5 x 7 matrix chars., German, French, Swedish	RS232C	1,295	Lear Siegler ADM-3A compatible, optional buffered serial printer interface
414H	Editing	12-inch; b&w, amber, green	80 x 25	5 x 7 matrix chars., optional Swedish, German, French	RS232C	1,095	Hazeltine 1510 compatible
3100	Editing	12-inch; b&w, amber, green	80 x 24	graphics	RS232C, current loop optional	855 (Q100)	optional page of display memory, serial printer interface
4152	Dumb	12-inch; b&w, amber, green	80 x 25	ASCII, 5 x 7 matrix chars., optional Swedish, French, German	RS232C	1,095	optional parallel interface port
4404	Dumb	12-inch; b&w, green, amber	80 x 24	Swedish, German, French, Norwegian, Danish, Finnish, U.K.	RS232C, current loop optional	525 (Q100)	Lear Siegler ADM-3A compatible
4404-GX	Dumb/Graphics	12-inch; b&w, amber, green	80 x 25	Swedish, German, French, Norwegian, Danish, Finnish	RS232C		ADM-3A compatible, PLOT10, GINO-F software compatible
4503	Dumb	12-inch, green	80 x 24			450	
5000	Dumb	12-inch; green, amber	80 x 24		RS232C; current loop, parallel optional	615 (Q100)	
<b>NCR CORP.</b>							
7900-1	Dumb	12-inch; green, amber	80 x 25	7 x 7 matrix chars.	RS232C	1,500	
7901	Dumb	12-inch, green	80 x 24	5 x 8 matrix chars.	RS232C	850	auxiliary serial port
<b>NEWBURY DATA</b>							
8003	Editing	12-inch, green	80 x 24				3-page memory
8006 Graphics VDU	Intelligent/ Graphics	12-inch; green, amber		UKASCII, USASCII	RS232C, current loop		3-page memory, 640 x 250 pixel display, Tektronix 4010, 4012 compatible
8007/9	Intelligent	12-inch, green	80 x 24				7-page memory
<b>NORTHERN TECHNOLOGIES (SEE LANPAR TECHNOLOGIES)</b>							
<b>ONTEL CORP.</b>							
Amigo	Intelligent/ Graphics	12-inch, green	80 x 25		RS232C, parallel	1,100	64K-byte user memory, 44K-byte display buffer
1503	Intelligent/ Graphics	15-inch; b&w, green, amber	80 x 25		serial, parallel	1,195	64K-byte memory, printer port
1505	Intelligent/ Graphics	15-inch; b&w, green, amber	80 x 25		serial, parallel	1,495	64K-byte memory, printer port, DMA controller
1507	Intelligent/ Graphics	15-inch, b&w, green, amber	80 x 25		serial, parallel	2,695	64K-byte memory, 4 DMA controllers
<b>PARADYNE CORP.</b>							
PDS 270	Intelligent	15-inch, green	80 x 25	8 x 16 matrix chars.	RS232C, CCITT current loop	3,000	4 keyboards, optional light pen

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## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
<b>PDS TECHNOLOGIES INC.</b>							
1150	Intelligent/ Graphics	15-inch, green	80 x 24		RS232C, current loop	3,300	fully sealed keyboard, optional VT100, VT52, H1420 and Regent interfaces
<b>PERRY DATA SYSTEMS INC.</b>							
9200	Dumb	9-inch, green	80 x 24		RS232C, RS422	1,525	cash drawer, auxiliary RS232C port
9310	Dumb	12-inch, green	80 x 24		RS232C, RS422	3,500	internal 80-column printer, auxiliary RS232C port
9370	Dumb	9-inch, green	80 x 24		RS232C, RS422	4,500	256-key keyboard, internal 40-column printer, optional auxiliary RS232C port
9460	Dumb	12-inch, green	80 x 24		RS232C, RS422	3,500	internal 40-column printer, auxiliary RS232C port
<b>PHAZE INFORMATION MACHINES CORP.</b>							
P3278	Editing	12-inch, green			IBM 3274, 3276 coax	1,545	choice of keyboards; optional light pen, upgrade to desk top computer
<b>PHOENIX COMPUTER GRAPHICS INC.</b>							
1024	Intelligent/ Graphics	13-inch, color	80 x 64		RS232C, SNA, SDLC	3,992	19-inch color CRT available, digitizer, printer, plotter, video camera, joystick, NTSC compatible, optional PROM terminals
<b>PLESSEY PERIPHERAL SYSTEMS INC.</b>							
PT-100B	Intelligent/ Graphics	12-inch; b&w, amber, green	132 x 24		RS232C, current loop		VT100 emulation, optional voice input
PT-600	Intelligent/ Graphics	12-inch, color	132 x 24		RS232C, current loop		VT100 emulation, optional voice input
<b>PRIME COMPUTER INC.</b>							
PST 100	Intelligent/ Graphics	15-inch, white	80 x 25		EIA	1,595	windows
<b>PROTOCOL COMPUTERS INC.</b>							
51	Dumb	12-inch, green	80 x 25	96ASCII, special EBCDIC chars.	RS232C	995	
78	Dumb	12-inch, green	80 x 25	96ASCII, special EBCDIC chars.	RS232C	995	
<b>PSITECH</b>							
GTC 214, GTC 224	Intelligent/ Graphics	14-inch, color	85 x 26	128ASCII	dual RS232C ports	5,000 (Q100)	32 programmable function keys, expandable to 63K bytes RAM/ROM
GTC 319, GTC 329	Intelligent/ Graphics	19-inch, color	85 x 26	128 ASCII	dual RS232C ports	7,000 (Q100)	32 programmable function keys, expandable to 63K bytes RAM/ROM
<b>QUADRAM CORP.</b>							
Omega Data X7	Editing/ Graphics	17-inch, white	160 x 66	96ASCII, graphics		2,595	split screen
<b>QUME CORP.</b>							
QVT-102	Editing/ Graphics	12-inch; green, amber	80 x 25	line drawing	RS232C, current loop optional	695	menu set-up mode
QVT-103	Editing/ Graphics	12-inch; green, amber	132 x 25	line drawing	RS232C, current loop optional	895	DEC VT100 compatible, 2 pages memory
QVT-108	Editing/ Graphics	12-inch; green, amber	80 x 25	line drawing	RS232C, current loop optional	895	TVI 925 compatible, 2 pages memory, 11 function keys
<b>RACAL-MILGO, COMPUTER PRODUCTS DIV.</b>							
4010 8AI	Intelligent	15-inch, green	80 x 25	ASCII	RS232C	3,555	six programmable function keys, 8 pages of memory
4015 8AI	Intelligent	15-inch, green	80 x 24	ASCII	RS232C	4,155	printer buffer, six programmable function keys, downline loading of date and time of day and security password
4220/U200	Intelligent	15-inch, green	80 x 24	ASCII	RS232C	3,370	four programmable function keys, field and character blink and blank, protected fields
4220/UTS 20	Intelligent	15-inch, green	80 x 24	ASCII	RS232C	3,370	22 programmable function keys
4270	Intelligent	15-inch, green	80 x 24	ASCII, EBCDIC		2,560	24 programmable function keys, off-line self diagnostics, password data security
4276	Intelligent	15-inch, green	80 x 24	ASCII, EBCDIC	RS232C	3,950	24 programmable function keys, off-line self diagnostics, field blink, audible alarm

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
4278	Intelligent	15-inch, green	132 x 43	ASCII, EBCDIC			security key lock
<b>RADIO SHACK</b>							
TRS-80, DT-1	Dumb		80 x 24		RS232C, CCITT V.24, parallel	699 (Q1)	compatible with Radio Shack, NCR/ADDS Regent 25, Televideo 910, Hazeltine 1410
<b>RAMTEK CORP.</b>							
6221	Intelligent/ Graphics	13-inch, color	160 x 48		RS232C, Centronics, RS170	5,995	VT100 emulation, Tektronix 4014 emulation, optional light pen, color thermal printer, color impact printer, 35-mm film recorder
<b>SCI SYSTEMS INC.</b>							
2404 I, K, 2405	Intelligent	9-inch; green, white	80 x 24		RS232C		integral electrostatic printer
<b>SCOTT SYSTEMS INC.</b>							
C530	Editing/Graphics	12-inch, green	80 x 25		RS232C	595	Soft start setup from keyboard
<b>SIEMENS COMMUNICATION SYSTEMS INC.</b>							
T4100 message terminal	Editing	12-inch, b&w	80 x 25	7 x 9 matrix chars.	Telex, TWX, DDD	2,500	
<b>SOROC TECHNOLOGY</b>							
C530	Editing/Graphics	12-inch, green	80 x 25		RS232C	695	optional integral modem
C540	Editing/Graphics	12-inch, green	80 x 25		RS232C	995	9 single-stroke function keys, optional integral modem
C550	Editing/Graphics	12-inch, green	80 x 25		RS232C	1,250	16 function keys, ADM-2 compatible, optional integral modem
<b>SPERRY COMPUTER SYSTEMS</b>							
UTS 10	Editing	12-inch, green	80 x 24	ASCII	dual RS232C ports	1,428	communication line monitor
UTS 20	Editing	12-inch, green	80 x 24	ASCII	dual RS232C ports	2,165	communication line monitor
UTS 30	Intelligent	12-inch, green	80 x 24	ASCII	dual RS232C ports	3,235	multiple intensities, communication line monitor, 128K bytes RAM, optional 5.25-inch floppy disk drives
UTS 40	Intelligent	12-inch, green	80 x 24	ASCII	dual RS232C ports, parallel	3,266	multiple intensities, communication line monitor, 128K bytes RAM, optional 8-inch floppy disk drives
<b>SRA COMMUNICATIONS AB</b>							
SRA-11		15-inch, amber	80 x 24	8 x 16 matrix chars.	twinax for IBM S/34, IBM S/38	2,200	
<b>TAB PRODUCTS CO.</b>							
132/15	Intelligent/ Graphics	15-inch, green	132 x 27	ASCII	RS232C, current loop optional	2,100	DEC, ANSI, Prime compatible; underline, reverse video, blinking and bold attributes, double-high, double-wide characters, optional printer port
132/15-G	Intelligent/ Graphics	15-inch; green, white	132 x 27	ASCII, APL	RS232C, current loop optional	3,295	Tektronix 4010 compatible
132/15-H	Intelligent	15-inch; green, white	132 x 27	ASCII		2,200	Honeywell VIP series 7800 and 7200 compatible, 14 programmable soft-key functions
<b>TANDBERG DATA INC.</b>							
TDV 2200	Intelligent/ Graphics	15-inch, green	80 x 25		RS232C, RS422, current loop	1,410 (Q50)	16 programmable keys, soft switch menu, optional eight pages RAM, magnetic card reader, video output, security key locks
<b>TEC INC.</b>							
ET80	Intelligent/ Graphics	15-inch, white	132 x 25	Spanish, French, Swedish/ Finnish, British, Danish/ Norwegian, German	RS232C; current loop, RS449 optional	1,975	18 programmable function keys, five pages memory, optional magnetic card reader
ET100	Intelligent/ Graphics	15-inch, white	132 x 25	Spanish, French, Swedish/ Finnish, British, Danish/ Norwegian, German	RS232C; current loop, RS449 optional	1,995	VT131 emulation, 9 user-programmable function keys



## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/ Code	Interfaces	Unit price (\$)	Features/ Options
630	Editing/Graphics	12-inch; white, green	80 x 25	French, German, Spanish, Greek, British, Danish/ Norwegian, Swedish/ Finnish	RS232C, current loop optional	1,310	6 function keys, optional card reader, rack-mount configuration
<b>TEKTRONIX INC.</b>							
4105	Editing/Graphics	13-inch, color	132 x 30	USASCII, UKASCII, French, Swedish, Danish, German	RS232C, parallel	3,995	ANSI X3.64, VT100 compatibility, 4110-style graphics, 64-color palette, optional color graphics copier
4107	Editing/Graphics	13-inch, color	132 x 32	USASCII, UKASCII, French, Swedish, Danish, German	RS232C, parallel	6,950	ANSI X3.64, VT100 compatibility, 4110-style graphics, 64-color palette, zoom and pan, optional graphics tablet, color graphics copier
4109	Editing/Graphics	19-inch, color	132 x 32	USASCII, UKASCII, French, Swedish, Danish, German	RS232C, parallel	9,950	ANSI X3.64, VT100 compatibility, 4110-style graphics, 4096-color palette, zoom and pan, optional graphics tablet, color graphics copier
<b>TELCON INDUSTRIES INC.</b>							
GC 100	Intelligent/ Portable	7-inch, green	80 x 24	128ASCII	RS232C		emulates DEC VT52 and VT100
GC 500	Intelligent/ Portable	7-inch, green	80 x 24	128ASCII	RS232C		emulates DEC VT52 and VT100, ADDS Viewpoint
<b>TELERAY DIVISION OF RESEARCH INC.</b>							
7	Intelligent/ Graphics	12-inch; green, white, amber	80 x 25	128ASCII, line drawing	RS232C, current loop optional	1,295	two pages memory, 32 programmable macro keys
16	Intelligent/ Graphics	12-inch; green, white, amber	80 x 25	128ASCII, line drawing	RS232C, current loop optional	1,545	four pages memory, 32 macro keys
16APL	Intelligent/ Graphics	12-inch; green, white, amber	80 x 25	128ASCII, APL, line drawing, scientific	RS232C, current loop optional	1,695	four pages memory, 32 macro keys, calculator mode
16GRF	Intelligent/ Graphics	12-inch; green, white, amber	80 x 25	128ASCII, line drawing, scientific	RS232C, current loop optional	3,040	PLOT10 compatible, TEK 4010, 4014 emulation, 240 x 640 graphics
16/7801	Intelligent/ Graphics	12-inch; green, white, amber	80 x 25	128ASCII, line drawing, scientific	RS232C, current loop optional	1,795	Honeywell 7801 compatible
100	Intelligent/ Graphics	12-inch; green, white, amber	132 x 24	128ASCII, line drawing	RS232C, current loop optional	1,395	non-volatile function memory
<b>TELETEX COMMUNICATION CORP.</b>							
3000	Editing/Graphics	12-inch, green	80 x 25	128ASCII	RS232C	599	11 function keys
<b>TELETYPE CORP.</b>							
4420	Editing	13-inch, b&w	80 x 24	ASCII	RS232C, current loop		buffered display, char./line/page transmission
4430	Editing	13-inch, b&w	80 x 24	ASCII	RS232C		multi-point poll selectable
4541	Editing	13-inch, b&w	80 x 25	EBCDIC, ASCII	RS232C		IBM 3270 compatible, remote or local cluster configurations
4543	Editing	13-inch, b&w	80 x 25	EBCDIC	RS232C		
5410	Dumb/Graphics	12-inch, b&w	132 x 24	ASCII, line drawing	RS232C	995	ANSI X3.64 compatible protocol
5420	Editing/Graphics	12-inch, b&w	132 x 24	ASCII, line drawing	RS232C	1,495	9600-character display memory, windowing, ANSI X3.64 protocol
5540	Editing	12-inch, b&w		95EBCDIC	RS232C		IBM 3270 compatible, 13-inch CRT available
5620	Intelligent/ Graphics	15-inch, green			RS232C	6,115	256K bytes RAM, uses UNIX software
<b>TELEVIDEO SYSTEMS INC.</b>							
910	Dumb	12-inch, green	80 x 24	7 x 8 matrix chars.	dual RS232C ports, current loop optional	645	ADDS Regent 25, Lear Siegler ADM-3A, ADMS, Hazeltine 1410 emulation

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
914	Editing/Graphics	12-inch, green	80 x 25	7 x 8 matrix chars.	dual RS232C ports, current loop optional	699	ADDS Viewpoint emulation
924	Intelligent/Graphics	12-inch, green	80 x 25	7 x 8 matrix chars.	dual RS232C ports, current loop optional	899	32 programmable function keys
925	Editing	12-inch, green	80 x 25	matrix chars.	dual RS232C ports, current loop optional	995	bidirectional printer port
950	Intelligent	12-inch, green	80 x 25	8 x 10 matrix chars.	dual RS232C ports, current loop	1,195	22 programmable function keys, buffered bidirectional printer port
970	Editing	14-inch, green	132 x 25	6 x 8 matrix chars.	dual RS232C ports, RS422 optional	1,495	ANSI X3.64, DEC VT100 compatible, 16 non-volatile function keys
<b>TELEX COMPUTER PRODUCTS INC.</b>							
178	Dumb	12-inch, color	80 x 24		IBM 3274, IBM 3276, Telex 174/276	1,550	
278	Editing	15-inch	132 x 43		IBM 3274, IBM 3276, Telex 174, Telex 276	2,500	
279	Editing	14-inch	80 x 24		IBM 3274, IBM 3276, Telex 174, Telex 276	3,900	
<b>TELPAR INC.</b>							
801	Editing/Graphics	12-inch, 8-color	80 x 24	96ASCII, 128 graphic symbols	RS232C or current loop	2,990	160 x 96 vector plot mode, optional light pen, RS170 output
802	Editing/Graphics	19-inch, 8-color	80 x 48	64ASCII, 64 graphic symbols	RS232C or current loop	3,950	160 x 96 vector plot mode, optional light pen, rack-mount configuration
<b>TERAK CORP.</b>							
8510B	Intelligent/Graphics	12-inch, green			RS232C	8,345	
<b>TEXAS INSTRUMENTS INC.</b>							
940	Intelligent/Graphics	12-inch; b&w, amber, green	132 x 24		RS232C	1,895	three pages additional memory storage, scrolling regions, reverse video, character highlighting
<b>THOMAS ENGINEERING CO.</b>							
TE-780X	Editing/Graphics	12-inch, b&w	80 x 25		RS232C	1,895	24 function keys
<b>TRANSIC CORP.</b>							
TR1024	Dumb/Graphics	15-inch, green	145 x 72	96ASCII	RS232C, CAMAC	4,500	zoom/pan
<b>TRIVEX DIVISION OF MOHAWK DATA SCIENCES</b>							
8078-1	Dumb	15-inch, green	80 x 12	94ASCII, 94EBCDIC, 7 x 14 matrix chars.	Trivex 8074 or IBM 3274/3276 controller	1,700	selectable cursor, automatic self-test, optional security keylock
8078-2	Dumb	15-inch, green	80 x 24	94 ASCII, 94EBCDIC, 7 x 14 matrix chars.	Trivex 8074 or IBM 3274/3276 controller	1,700	selectable cursor, automatic self-test, optional security keylock
8078-3	Dumb	15-inch, green	80 x 32	94ASCII, 94EBCDIC, 7 x 14 matrix chars.	Trivex 8074 or IBM 3274/3276 controller	1,700	selectable cursor, automatic self-test, optional security keylock
8078-4	Dumb	15-inch, green	80 x 43	94ASCII, 94EBCDIC, 7 x 9 matrix chars.	Trivex 8074 or IBM 3274/3276 controller	1,700	selectable cursor, automatic, self-test, optional security keylock
8078-5	Dumb	15-inch, green	132 x 27	94ASCII, 94EBCDIC, 9 x 7 matrix chars.	Trivex 8074 or IBM 3274/3276 controller	2,350	selectable cursor, automatic self-test, optional security keylock
<b>TYMSHARE INC.</b>							
410	Intelligent/Portable/Graphics	9-inch, gray	80 x 24	5 x 9 matrix chars.	RS232C, RS449	495	12 programmable function keys
415	Dumb/Portable/Graphics	9-inch, gray	80 x 24	5 x 9 matrix chars.	RS232C, RS499	649	automatic dial, automatic log on, internal 300-baud modem
420	Editing	12-inch, gray	80 x 24		RS232C	2,127	
425	Editing	12-inch, gray	80 x 24		RS232C, current loop	1,195	2-page display
430	Dumb	12-inch, gray	80 x 24		RS232C	649	

## ALPHANUMERIC DISPLAY TERMINALS

Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets/Code	Interfaces	Unit price (\$)	Features/Options
444	Intelligent	11-inch, gray	80 x 24		RS232C	3,740	integral 120-cps thermal printer, 4K bytes memory
470	Intelligent	12-inch, gray	80 x 24		RS232C	1,995	IBM 3270 compatible, 16 programmable function keys
<b>VISUAL TECHNOLOGY</b>							
50	Editing	12-inch; green, white	80 x 25	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	RS232C, current loop optional	695	DEC VT52, Lear Siegler ADM-3A, Hazeltine Esprit, ADDS Viewpoint emulations
55	Intelligent	12-inch; green, white	80 x 25	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	RS232C, current loop optional	895	12 programmable function keys, DEC VT52, Lear Siegler ADM-3A, Hazeltine Esprit, ADDS Viewpoint, V210 emulations
102	Editing/Graphics	14-inch; green, white	132 x 25	Spanish, French, Swedish/Finnish	RS232C, current loop optional	1,095	DEC VT100, VT52 emulation, optional Tektronix 4010/4014 graphics
300	Intelligent	12-inch; green, white	80 x 25	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	RS232C, current loop	1,150	DEC VT52, VT100, ANSI X3.64 emulation; 12 programmable function keys, optional printer port, eight pages memory, 14-inch CRT available
330	Intelligent	12-inch; green, white	80 x 24	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	RS232C, current loop	1,150	DEC VT52, Lear Siegler ADM-3A, Hazeltine 1500, Data General D200 emulation; 12 programmable function keys, optional printer port, 14-inch CRT available
383	Editing	14-inch; green, white	80 x 24	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	Burroughs TDI, RS232C		6 24-line pages
500	Intelligent/Graphics	14-inch, green	80 x 33	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	RS232C, current loop	2,495	DEC VT52, Lear Siegler ADM-3A, Hazeltine 1500, Data General D200, TEK 4010, 4014 emulation; 12 programmable function keys
550	Intelligent/Graphics	14-inch, green	80 x 33	Portuguese, Spanish, Norwegian, Danish, Swedish/Finnish, German, French	RS232C, current loop	2,695	ANSI X3.64, DEC VT100, TEK 4010, 4014 emulation; 12 programmable function keys
<b>WANG LABORATORIES INC.</b>							
5536-A	Editing	12-inch, green	80 x 24		RS232C, Wang Datalink optional	4,900	
Ergo 2	Editing	12-inch, green	80 x 24		RS232C, Wangnet, Wang Datalink optional	5,200	
Ergo 3	Editing	12-inch, b&w	80 x 24		RS232C, Wangnet, Wang Datalink optional	5,300	

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Company Model	Terminal type	Display (diagonal)	Screen format (col. x lines)	Character sets	Interfaces	Unit price (\$)	Features/Options
<b>WICAT SYSTEMS</b>							
MG8000	Intelligent/Graphics	12-inch		128ASCII, graphics	RS232C		optional touch panel, ANSI X3.64 compatible, 400 x 300 resolution
T7000	Intelligent	12-inch		128ASCII	RS232C		programmable function keys, ANSI X3.64 compatible
<b>WESTINGHOUSE CANADA INC.</b>							
1640	Intelligent/Graphics	12-inch, green	80 x 24	ASCII	RS232C	3,250	compatible with Honeywell protocols
1642	Intelligent/Graphics	12-inch, green	80 x 24	ASCII	RS232C	2,860	compatible with Univac protocols
1643	Intelligent/Graphics	12-inch, green	80 x 24	ASCII	RS232C		compatible with IBM protocols
<b>WYSE TECHNOLOGY</b>							
50	Intelligent/Graphics	14-inch, green	132 x 26	128ASCII, line drawing, German, French, Danish, Spanish	RS232C	695	16 programmable function keys
75	Editing/Graphics	14-inch, green	132 x 26	128ASCII, line drawing, German, French, Danish, Spanish	RS232C	795	ANSI X3.64 compatible
100	Editing	12-inch, green	80 x 26	96ASCII, line drawing	dual RS232C ports	995	
200	Intelligent	14-inch, green	132 x 26	96ASCII, line drawing	dual RS232C ports	1,295	multiple windows, 32K bytes memory
210	Intelligent	14-inch, green	132 x 26	96ASCII, line drawing	dual RS232C ports	1,595	multiple windows, 128K bytes memory
220	Intelligent	14-inch, green	132 x 26	96ASCII, line drawing	RS232C, RS422	1,695	multiple windows, 128K bytes memory
300	Editing	12-inch, color	80 x 26	96ASCII, line drawing	dual RS232C ports	1,295	soft character generator
<b>ZENITH DATA SYSTEMS</b>							
Z-19	Editing/Graphics	12-inch, green	80 x 25		RS232C	999	
Z-29	Editing/Graphics	12-inch, green	80 x 25		RS232C	849	power-up diagnostics, 15-min. screen saver
ZT-1	Editing/Graphics	12-inch, green	80 x 25		RS232C, parallel	499	built-in auto-dial 300-baud modem
<b>ZENTEC</b>							
Cobra	Editing	12-inch, green	80 x 25	128ASCII	RS232C, current loop	875 (Q250)	
Zephyr	Editing	12-inch, b&w	80 x 25	128ASCII	RS232C, current loop	800 (Q250)	
ZMS-35	Editing	12-inch, b&w	80 x 25		RS232C, current loop	950 (Q250)	
8000	Intelligent	12-inch; green, white, amber	80 x 25	128ASCII	RS232C, current loop	1,200 (Q250)	16K bytes memory

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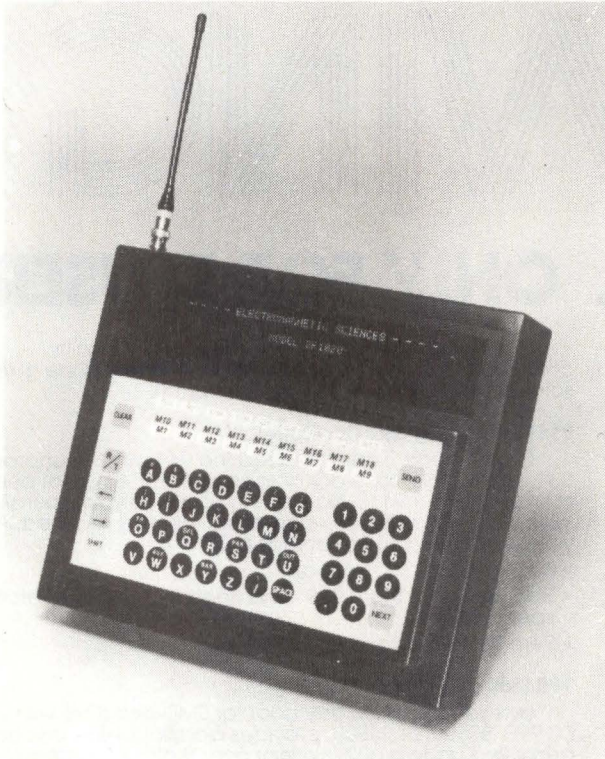


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**Microprocessor adaptive controls** eliminate the need for routine maintenance. Further cost-of-ownership savings accrue from a **5000 hour MTBF**.

System throughput is assured by the 2920's full **start/stop** capability and its very fast **5.0 millisecond** nominal start time.

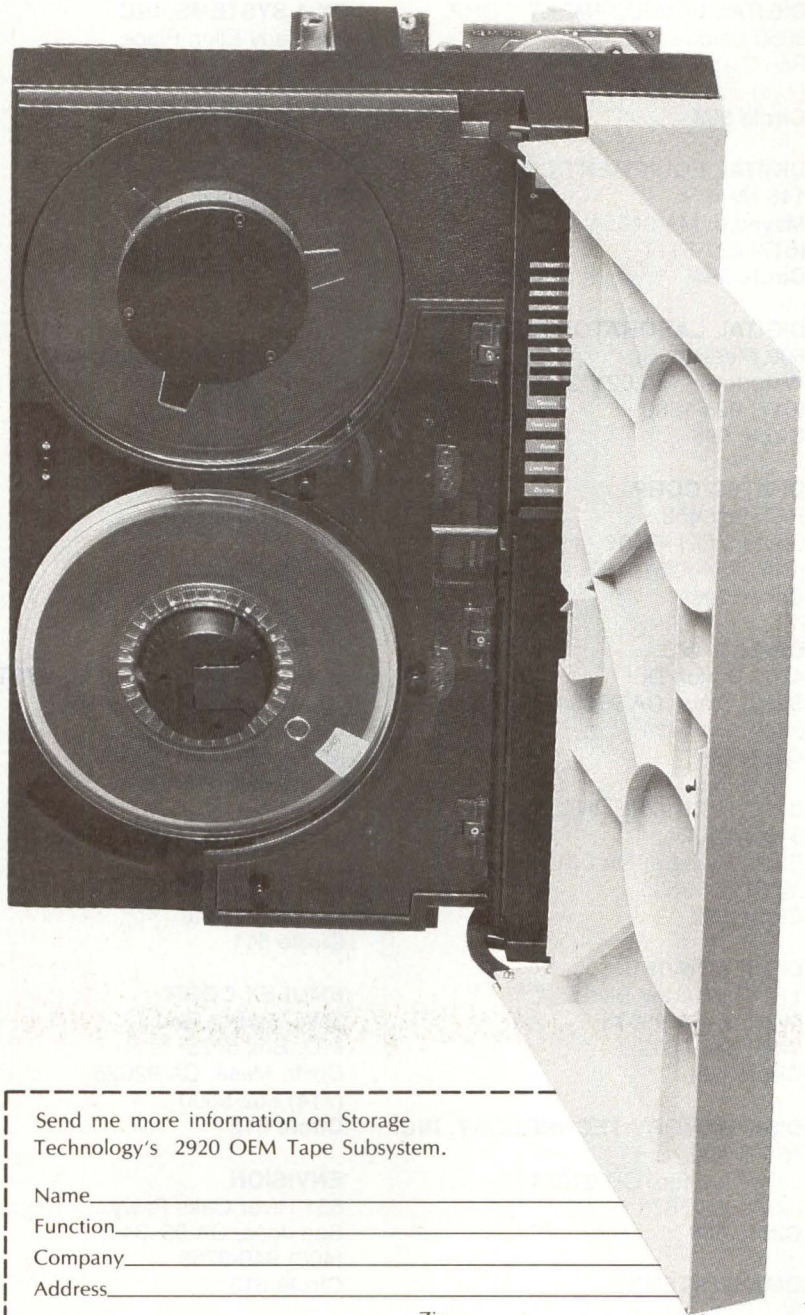
Using 6250 bpi (GCR) format, a tape library can be reduced in size by up to 70% while dramatically improving **data reliability**.

Mixed format libraries can easily be accommodated by the 2920's standard **dual-density** features (both 1600 bpi PE and GCR).

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An innovative mechanical design, extensive LSI and an **integrated formatter/controller** are the component parts that make the 2920 what it is—a low cost, start/stop, high-performance tape subsystem. **Priced at \$6779\***—the 2920 can perform for you. For additional information, call us at (303) 673-4066 or mail the following:

\*OEM quantity 100 over 24 months.



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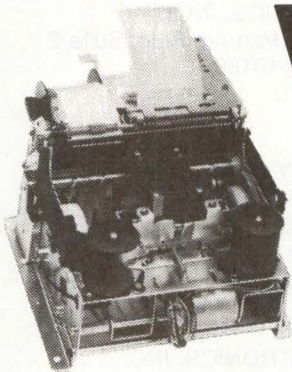
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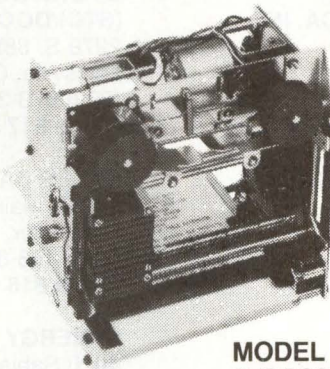
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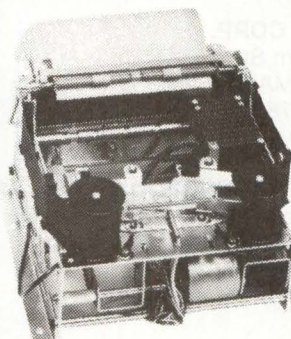
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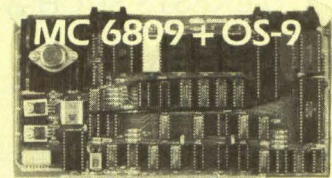
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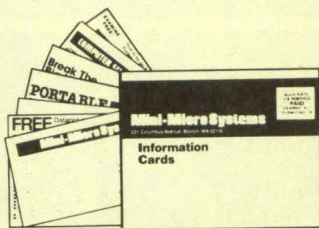
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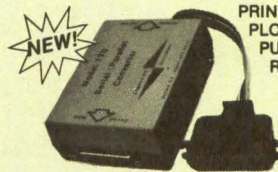
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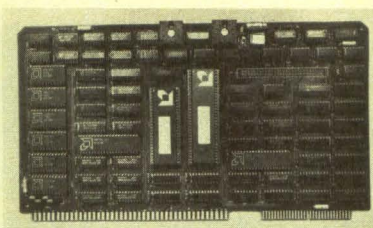
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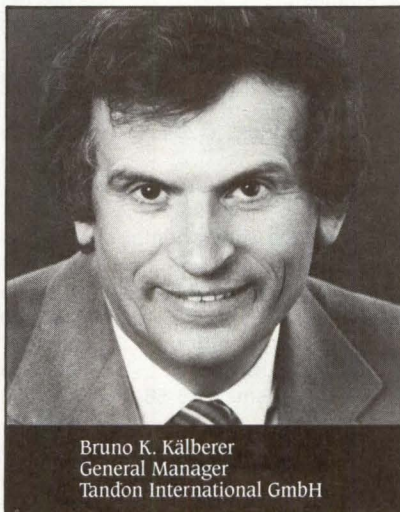
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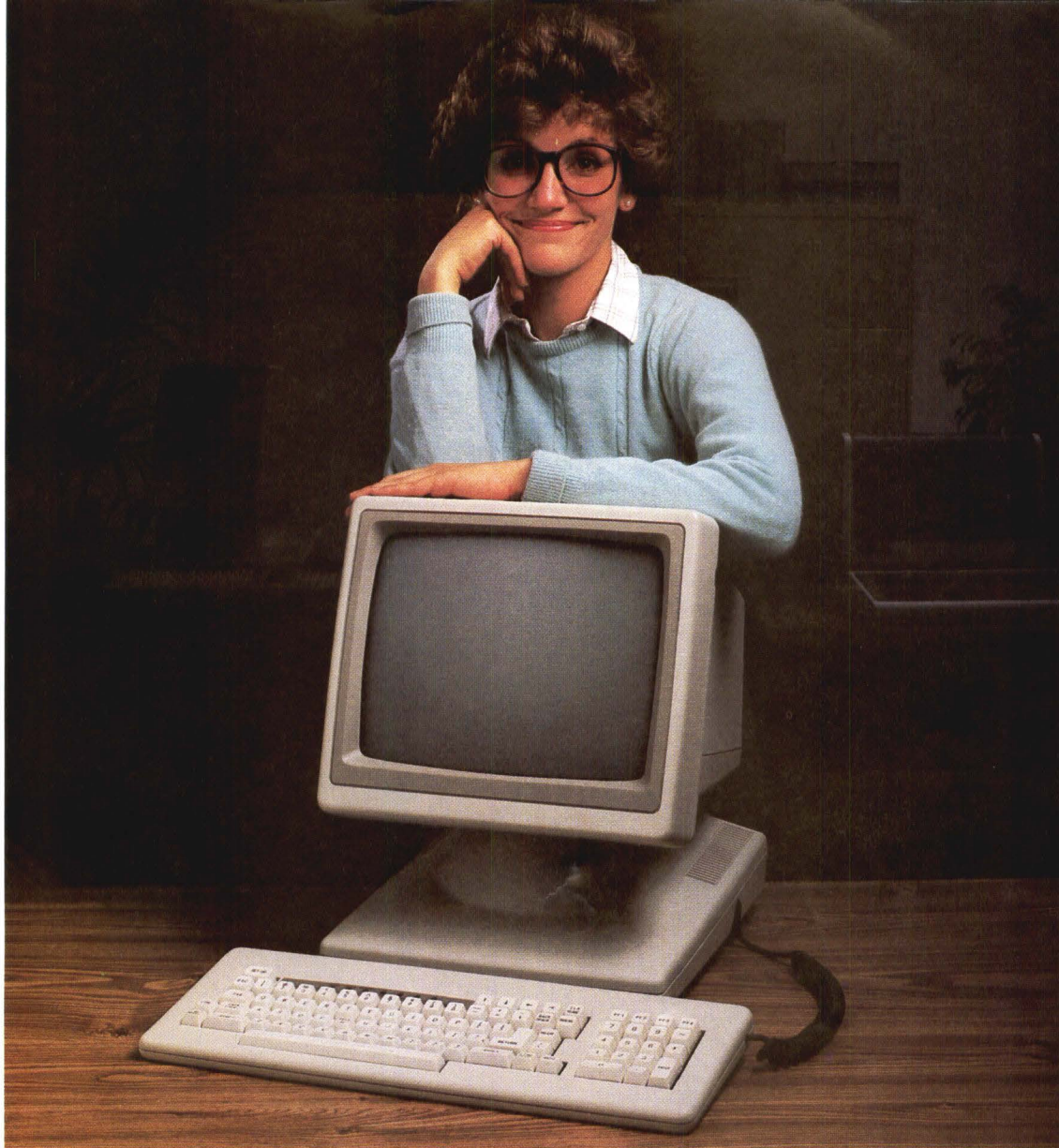
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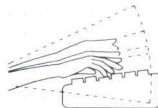
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