Fall Peripherals Handbook

Mini-Micro Systems

A CAHNERS PUBLICATION

NOVEMBER 15, 1985/$15.00

YOUR Problem-Solving Handbook

- **Test methods match controllers and disks**

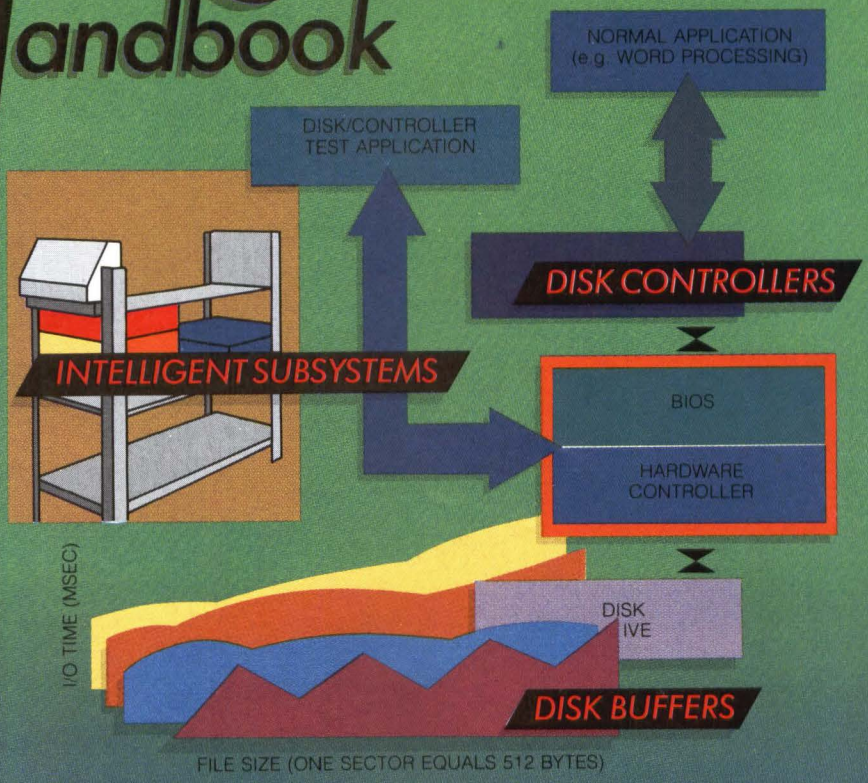
  Software tools help system integrators choose the right combination of controller and rigid disk drive

- **Buffer adjustment reduces disk processing**

  Choosing a disk buffer setting that best fits a system's configuration dramatically improves disk I/O times for PC-DOS/MS-DOS computers

- **Embedded intelligence eases the way to subsystems**

  By selecting and configuring off-the-shelf components and software, system integrators can create generic, intelligent mass-storage-based subsystems



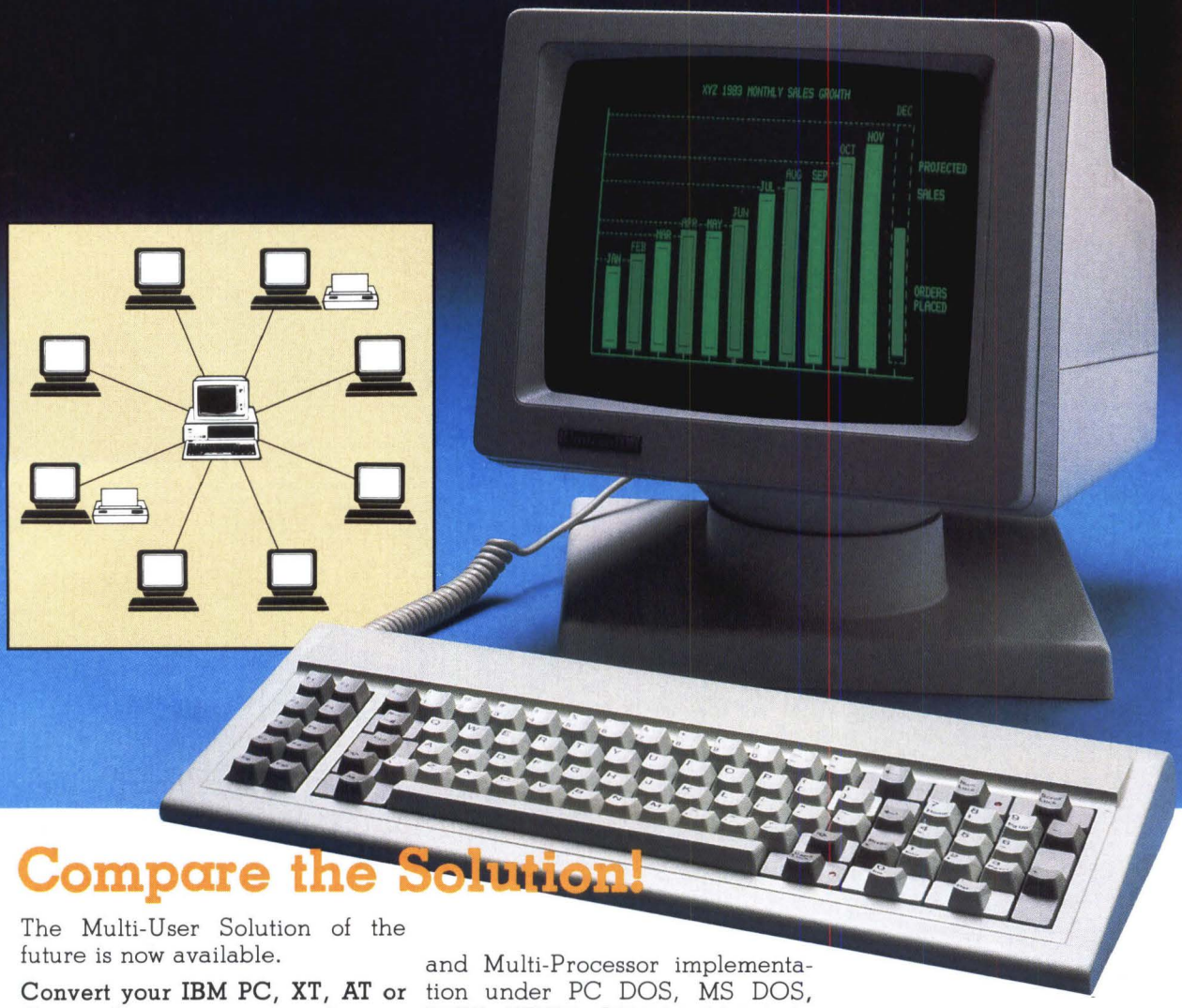
YOUR Product Reference File

- Disk Drives
- Printers
- Tape Drives
- Terminals

The source book for system integrators

Kimtron

MULTI-USER SOLUTION for IBM PC, XT, AT



Compare the Solution!

The Multi-User Solution of the future is now available.

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For more information about Kimtron's Multi-User Solution, or general video data terminals for other mini or micro multi-user systems, call your local computer dealers, distributors or Kimtron Corporation Today!

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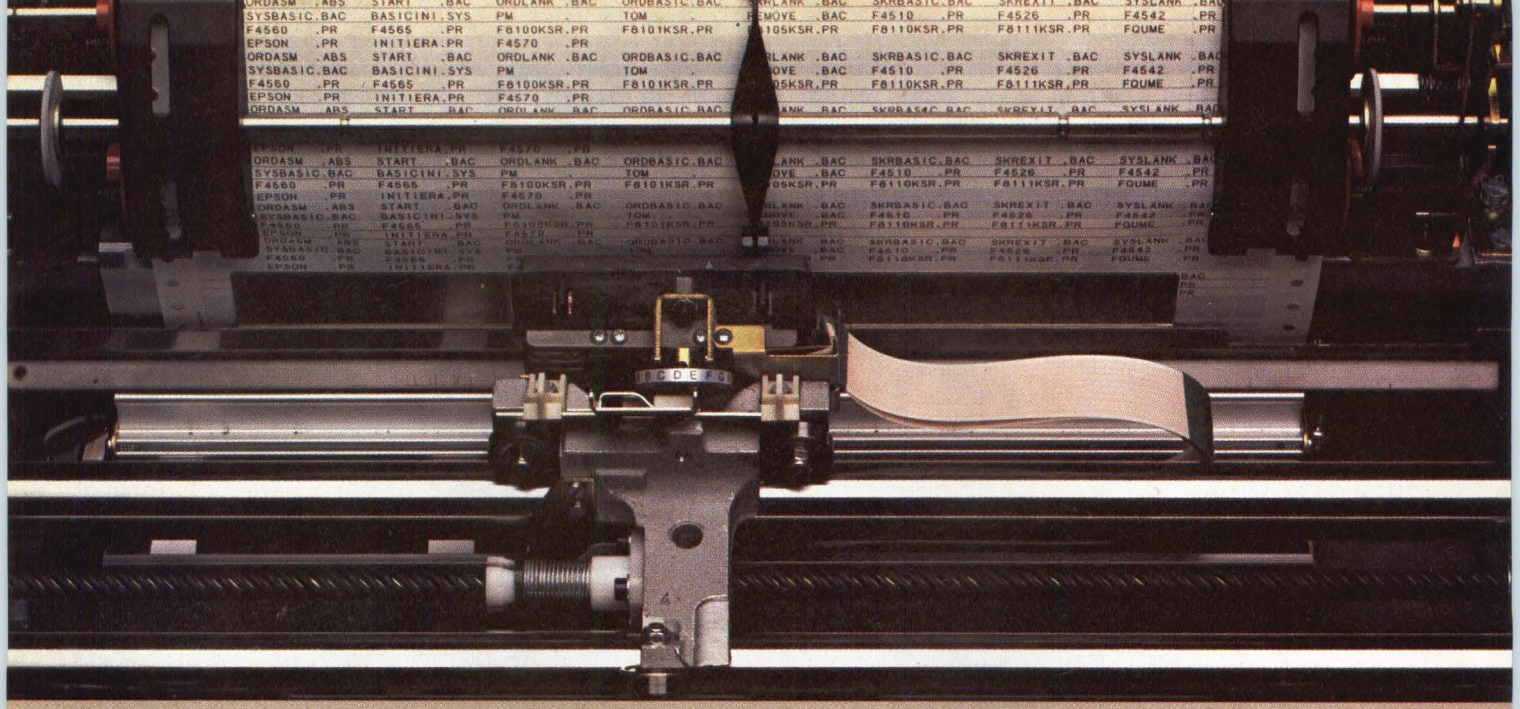


THE 1,000,000,000th CHARACTER AS PERFECT AS THE FIRST

Facit 4571 Matrix Printer incorporates all the essential qualities that define it as your central printer for large-volume printouts. As well as for handling draft and NLQ-printouts from several wordprocessing work-stations with automatic sheet-feeding.

Built for professional heavy-duty operations around the clock, it features Facit's unique Flexhammer Printhead. The innovation that gives you all-perfect, non-deteriorating printouts throughout the printhead's more than 1,000,000,000-character service life. At a speed of 350 cps draft or 80 cps NLQ.

Integrated in your word- and dataprocessing systems, its software intelligence and printing capability will convince you of its versatility and competitive edge.

Italic, bold and elongated characters in any combinations – as well as 16 different monospaced or proportional fonts – are easily selected from the keypad or host computer. All fonts are available in 12 national versions.

So when performance and 100% reliability are unconditional demands on the printer in your system, compare the one billionth character with the first.

You can't go wrong with the Facit 4571.

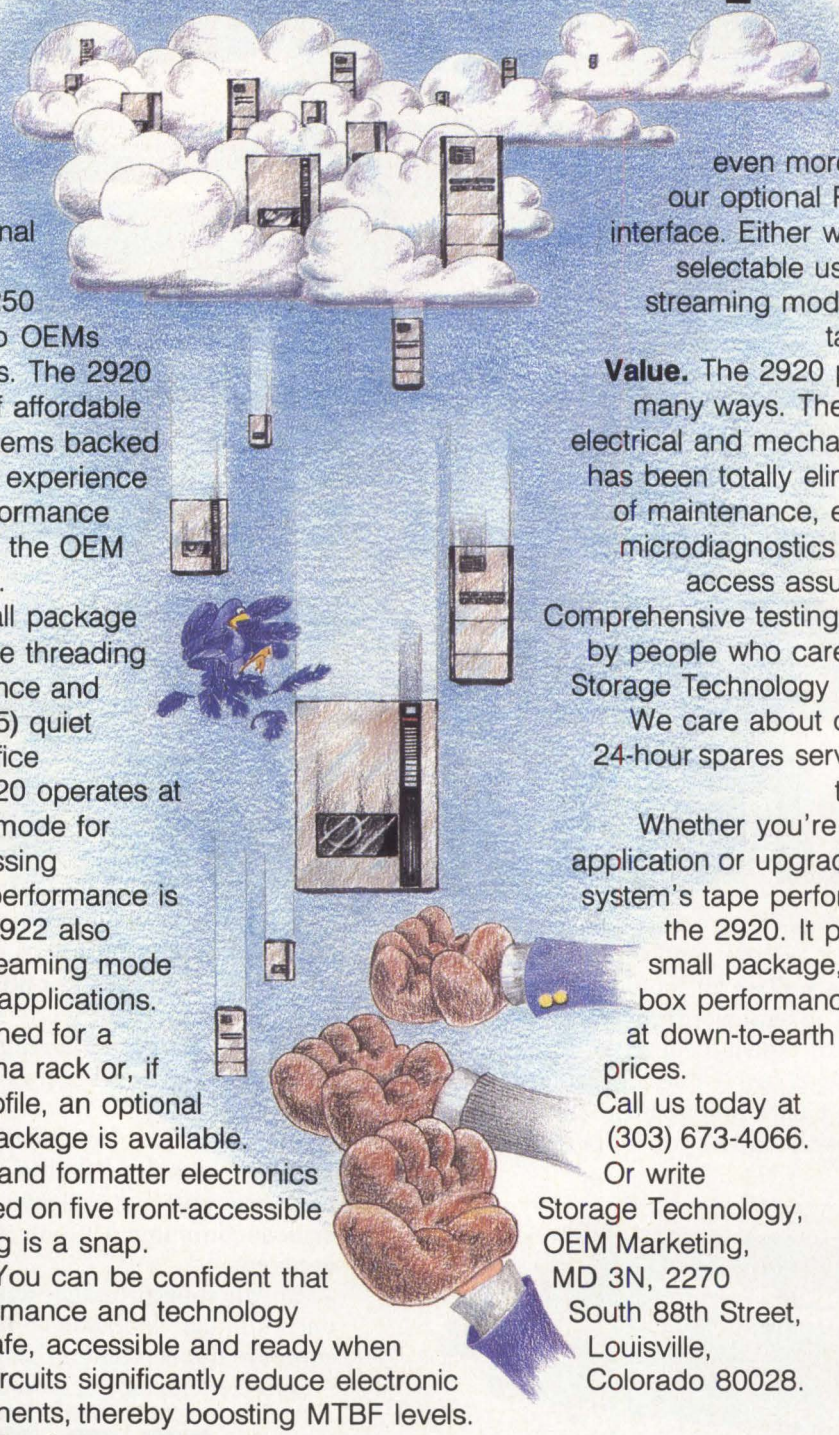
CIRCLE NO. 2 ON INQUIRY CARD

FACIT

Head Office: *Facit AB, S-172 91 Sundbyberg. Sweden. Phone: (8) 764 30 00.*
USA: *Facit Inc. P.O. Box 334, Merrimack. NH 03054. Phone: (603) 424-8000*

AUSTRALIA: EAI Electronics Associates Pty Ltd., 427-3322. *AUSTRIA*: Ericsson Information Systems GmbH, 0222-613641. *BELGIUM*: Ericsson S.A., 02-243 82 11. *CANADA*: Facit Canada Inc., 416-821-9400. *CYPRUS*: LBM (Lillytos) Ltd 516 46 34. *DENMARK*: Facit A/S, 02-92 24 00. *FINLAND*: OY Facit, 90-420 21. *FRANCE*: Facit S.A., 1-780 71 17. *GREAT BRITAIN*: Facit, 0634-40 17 21. *GREECE*: Computer Application Co., Ltd., 01-671 97 22. *HONGKONG*: Gilman & Co. Ltd., 5-893 00 22. *ICELAND*: Gisli J. Johnsen HF, 354-17 31 11. *INDIA*: Forbes Forbes Campbell & Co. Ltd., 22-26 80 81. *IRELAND*: Ericsson Information Systems Ltd., 753 093. *ITALY*: Facit Data Products S.p.A., 039-63 63 31. *JAPAN*: Electrolux (Japan) Ltd., 03-479-3411. *KOREA*: K.D.C. Corporation, 723-8555/8236. *THE NETHERLANDS*: Ericsson Information Systems B.V., 03480-709 11. *NEW ZEALAND*: Northrop Instruments and Systems, 501-801, 501-219. *NORWAY*: Ericsson Information Systems A/S, 02-35 58 20. *PORTUGAL*: Regisconta Sarl, 1-56 00 91. *SINGAPORE*: Far East Office Eqpts Pte Ltd., 745 82 88. *SPAIN*: Facit, 91-457 11 11. *SWEDEN*: Ericsson Information Systems Sverige AB, 08-28 28 60. *SWITZERLAND*: Ericsson Information Systems AG, 01-391 97 11. *WEST GERMANY*: Ericsson Information Systems GmbH, 0211-61 090.

Compact 6250 tape at down-to-earth prices



Storage Technology's 2920 OEM tape subsystem breaks traditional size-price barriers by bringing affordable 6250 bpi tape technology to OEMs and system integrators. The 2920 is a new generation of affordable compact tape subsystems backed by more than 10 years experience in delivering high-performance tape products to both the OEM and end-user markets.

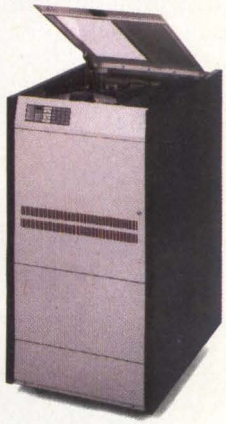
Compact. This small package features automatic tape threading for operator convenience and operation levels (NC55) quiet enough for today's office environments. The 2920 operates at 50 ips in a start/stop mode for traditional tape processing applications. If more performance is required, our model 2922 also features a 100 ips streaming mode ideal for disk backup applications. The 2920 is dimensioned for a standard 19-inch Retma rack or, if you prefer a lower profile, an optional horizontal mounting package is available. All read/write, control and formatter electronics are conveniently located on five front-accessible cards so field servicing is a snap.

Full performance. You can be confident that our blending of performance and technology means your data is safe, accessible and ready when you are. CMOS-LSI circuits significantly reduce electronic and hardware components, thereby boosting MTBF levels. Error detection-correction features, plus continuously monitored write velocity, ensure data integrity. Choose from Storage Technology's industry-accepted 6250 bpi subsystem interface or, for even more flexibility, select our optional Pertec-compatible interface. Either way, you get host-selectable use of start/stop or streaming modes and maximum tape performance.

Value. The 2920 pays dividends in many ways. The need for routine electrical and mechanical adjustments has been totally eliminated. For ease of maintenance, extensive resident microdiagnostics and front service access assure prompt repair. Comprehensive testing before shipment, by people who care, is a hallmark of Storage Technology OEM Operations. We care about on-time deliveries, 24-hour spares service and qualified technical support.

Whether you're designing a new application or upgrading your present system's tape performance, consider the 2920. It packs value into a small package, yet delivers big-box performance at down-to-earth prices.

Call us today at (303) 673-4066. Or write Storage Technology, OEM Marketing, MD 3N, 2270 South 88th Street, Louisville, Colorado 80028.



StorageTek

Storage Technology. It's More Than Our Name. It's Our Commitment.

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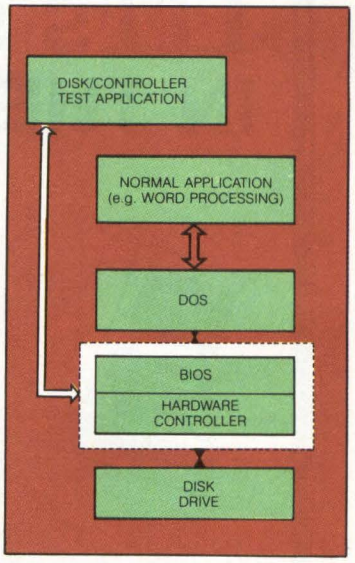

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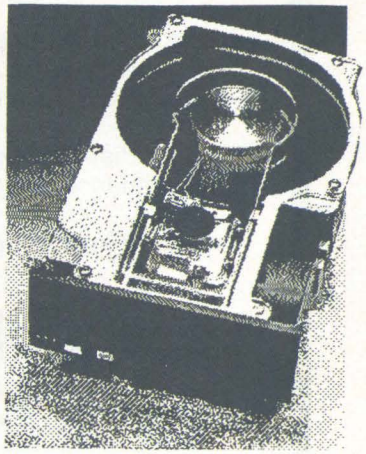

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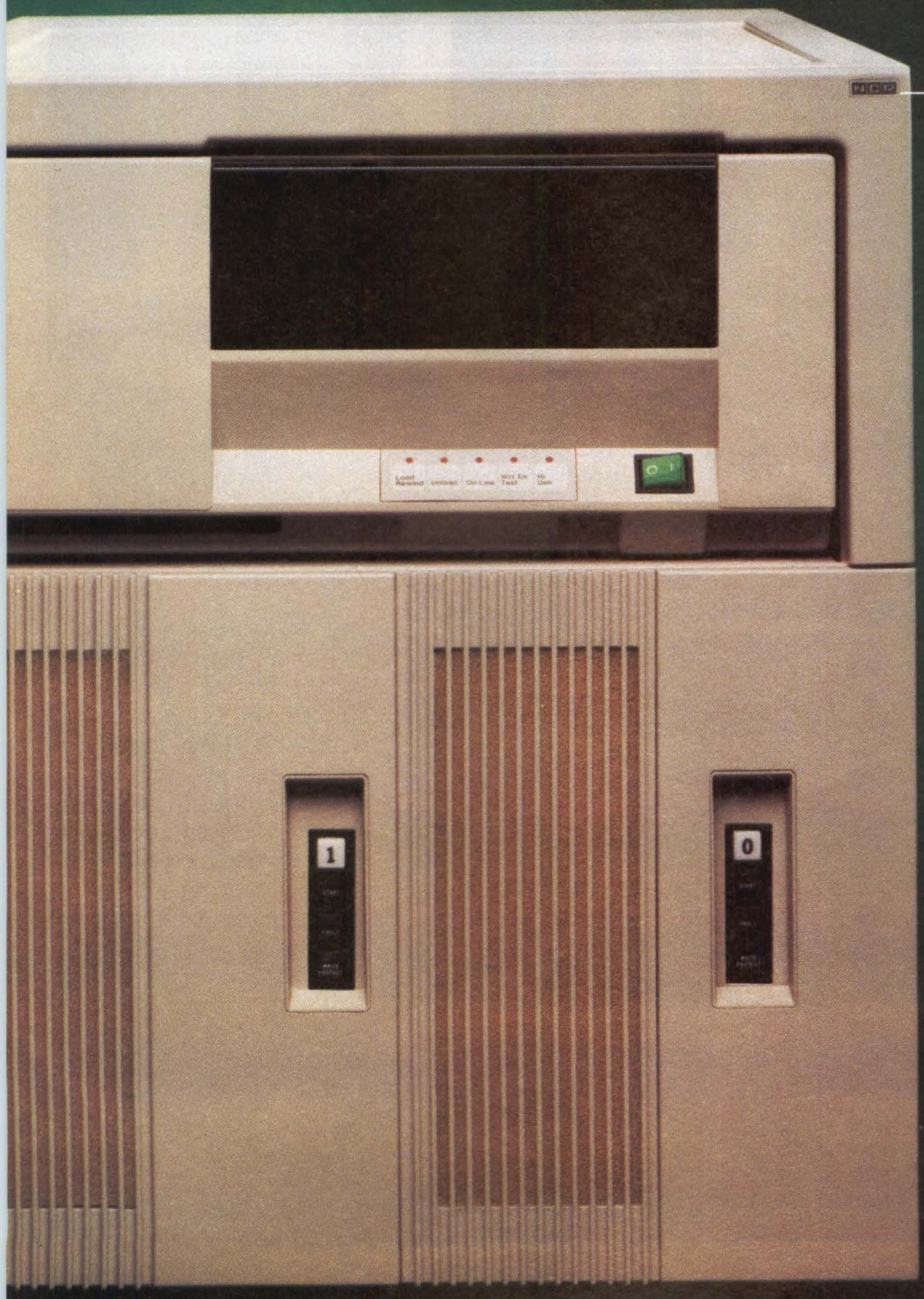

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SCSI simplifies the task of integrating new peripherals into your system. And now you can offer SCSI subsystems from NCR bearing your name. The products of leading-edge VLSI controller design, exhaustive drive qualification and the most rigorous testing and advanced manufacturing procedures in the industry. Fully certified—by UL, CSA and VDE.

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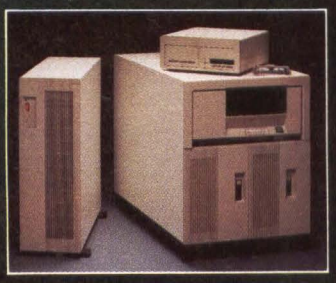

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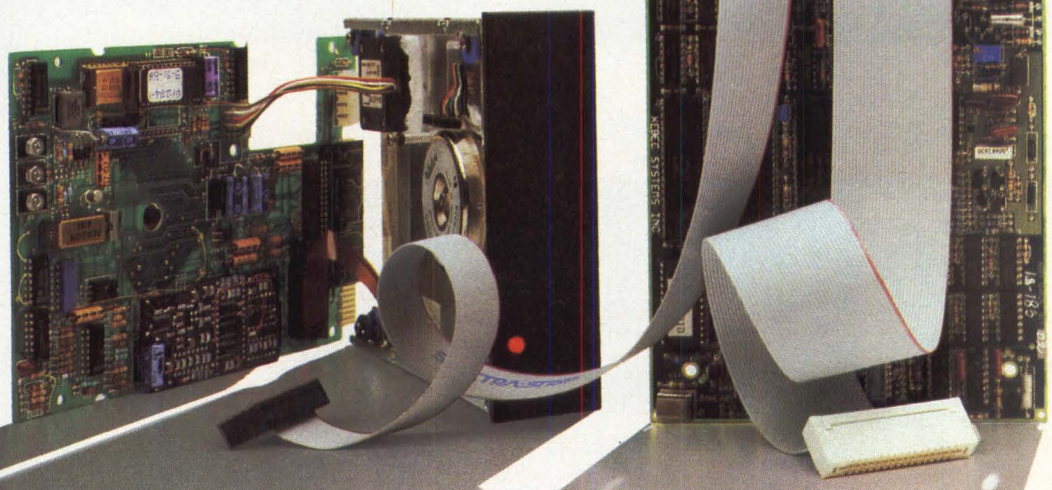
Xebec's New Owl Reduc Storage To

Then.



Microcomputer storage history has progressed by a series of small "next logical steps." A replacement of a component here, a refinement of technology there. But now Xebec has taken a giant step, with its Owl intelligent disk file.

On the surface, the Owl might look like other 10-megabyte, 5¼" half-high Winchesters. Underneath, however, it's an example of superior technology. The integration of controller logic and drive electronics on a single board means not just one less PCB, but the elimination of expensive connectors and cabling, low power consumption (15 watts typical) and enhanced data integrity.

Single-board drive and controller electronics insure higher reliability

Integrated data separation within disk drive delivers higher data integrity

Ruggedized design includes head landing zone

Comprehensive diagnostics eliminate "What's wrong?" guesswork

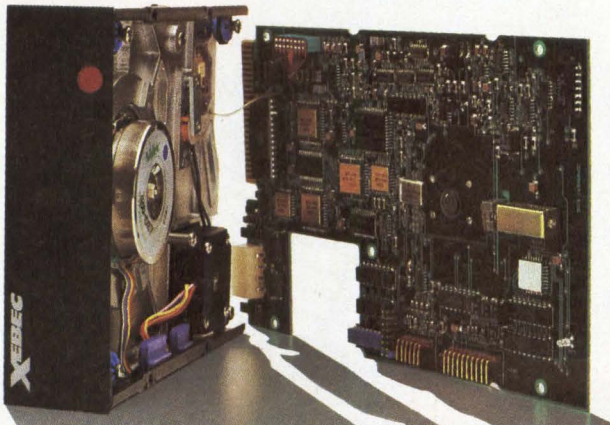
Compatible with industry-standard Xebec SASI bus for faster system integration

We've put data separation in the HDA for precise control of data windowing and the elimination of background noise. We've provided a diagnostics channel to the host that delivers meaningful error messages.

Just as our superiority in minicomputer controllers led the way to a similar superiority in micro controllers, and our tested pairs solutions evolved from our considerable subsystem and testing experience, so too the Owl reflects our "top-down" engineering strategy—creating both technological and cost-of-owner-

es Microcomputer Disk Two Words.

Now.



ship breakthroughs by designing sophisticated high performance, multi-user features into small-system, single-user environments.

The System-Engineered Solution.™

As a major user of drives, and a major testing resource for other drive manufacturers, we are concerned about drive reliability. And we've learned that it's not just a question of improving a component or consolidating some board real estate. The answer lies in careful consideration of overall system integration requirements.

The Owl epitomizes what we call the Xebec System-Engineered Solution. The focus is two-fold: on today and on tomorrow. Compatible now with industry-standard Xebec SASI, the Owl—by eliminating the ST506 interface—is upwardly compatible for future higher densities, capacities and performance.

In broader perspective, Xebec's approach to OEM satisfaction rests on our proven experience, our vertical integration strengths—which now include production of heads and plated media—and our commitment to zero defect quality, by way of computer-aided design and robotics manufacturing.

Call Xebec today. Let us tell you more about the Owl. And how we can deliver the difference between then and now. Now.

XeroD.

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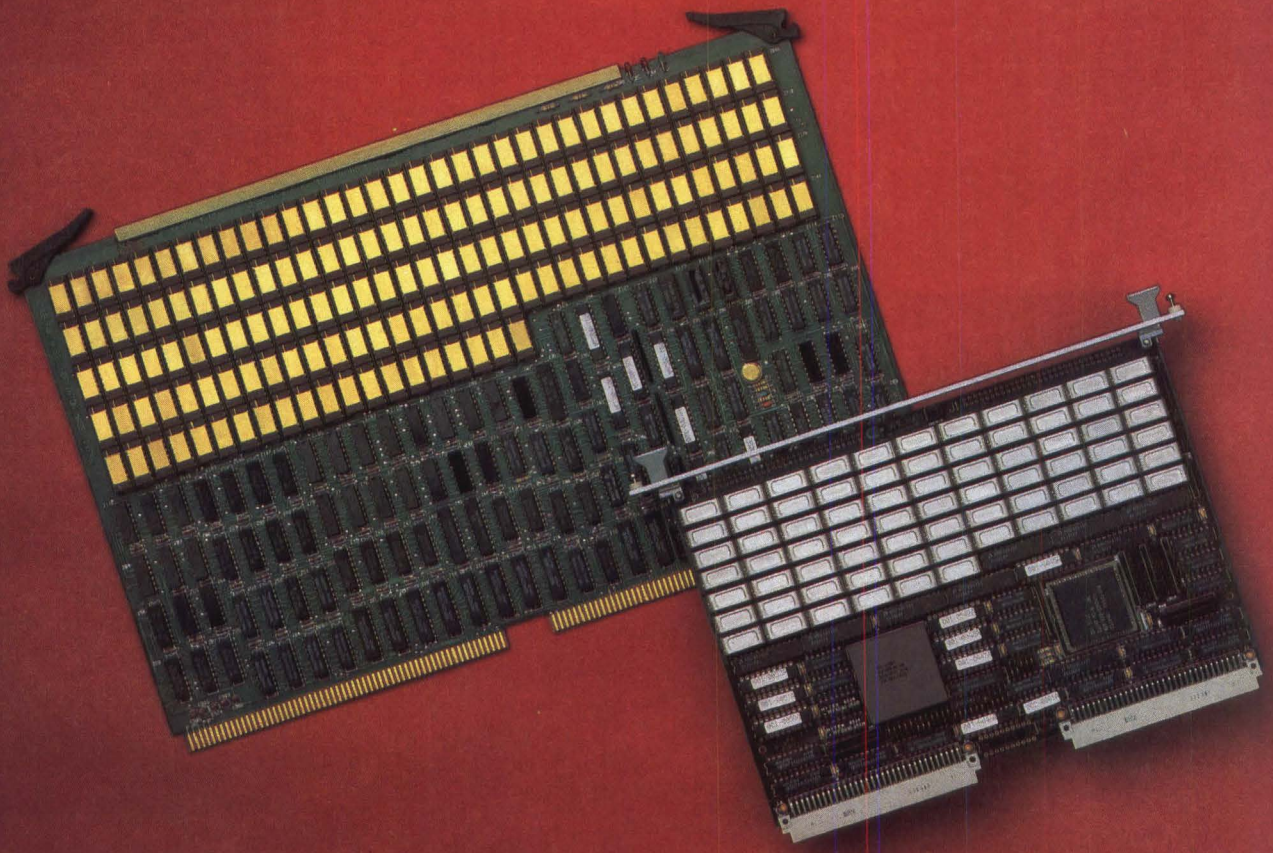
Clearpoint Defines State-of-the-Art for VME and VERSAbus Memory



Error Detection and Correction with the Price, Performance and Density of Parity Memory

Clearpoint has established a reputation in the DEC marketplace for unparalleled performance, quality and density in memory design. Now available for the VME and VERSAbus, Clearpoint memories set the standard for state-of-the-art capabilities.

Error Detection and Correction
Clearpoint's proprietary technology allows true single bit error correction and double bit error detection. The VMERAM achieves the same high density as parity memory: 2 MB on a dual card and up to 4 MB with a daughter card. The 64 bit cache reduces average access time to as low as 180 ns on reads and 100 ns on writes.

Maximum Versatility for the VME Bus
The VMERAM uses 8, 16 or 32 bit data transfers and 16, 24 or 32 bit addressing. Options include addressing on 64K boundaries, low power refresh, stand-by power backup, and a programmable Control and Status Register.

Unparalleled Performance on the VERSAbus
The V-RAM 68 is still the price/performance leader on the VERSAbus — 4 MB of EDC memory with a 220 ns access time.

5 Year Warranty.
Clearpoint memories are warranted for 5 years, with a 24 hour repair/replacement policy.

CIRCLE NO. 7 ON INQUIRY CARD

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If my memory serves me right... it must be Clearpoint.

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EDITORIAL

AN EDITORIAL EXPANSION

Starting with this Nov. 15 issue, the *Mini-Micro Systems Peripherals Digest* evolves into a more powerful reference resource for system integrators under a new title: *Peripherals Handbook*. And with this title change comes a definitive expansion in feature article coverage. Previously, in our digests, the articles focused on product and marketing information, issues and trends.

For the past three years, this type of information has served our readers well. But now the technology has grown more complex. Chips have expanded into subsystems; subsystems into systems; and systems into supersystems. And with this growth in technology has come the need for more detailed analysis and explanation.

Therefore, in this and each subsequent handbook, the feature articles will similarly expand and concentrate on system configuration, integration and implementation from an engineering viewpoint. This viewpoint means that a more detailed, more technical and more "hands-on" editorial thrust will be incorporated into the articles. The goal is to convey more practical, useful and updated information to our readers—system integrators.

The Product Guides, however, will remain unchanged. These highly researched listings will continue to serve as comprehensive tabulations of available products. The tables will still help system integrators evaluate, select and specify the products that meet their requirements.

Adopting an engineering approach to article content covering peripherals, computers and software translates into a more probing analysis of system problems and pitfalls. And these articles will be written by leading industry experts. Only these skilled engineers, consultants and programmers possess the experience and competence to deal with the system complexities emerging from current computer technology.

Coincidentally, our readership studies reveal that system integrators are looking for more depth and technicality on interfaces, controllers, drivers and communications. In addition, the studies indicate that our readers want more detailed information on how to evaluate integration options, understand emerging industry standards and keep abreast of evolving technologies, techniques and tools.

And confronted with the myriad of available hardware, software, interfaces, protocols and de facto standards, system integrators are, to say the least, confused. Mixing, matching and integrating products from different manufacturers proves difficult, expensive and time-consuming. Consequently, to keep pace with the ever-changing computer industry, *Mini-Micro Systems* now provides a handbook containing the technical know-how that will keep system integrators abreast of the latest problem-solving processes, procedures and practices. What's more, we will also make much of the technical-article information available to you on disk—free of charge. You will thus be able to apply our solutions directly to your problems—at your workplace.

Let us know whether we made the right decision in our editorial redirection. Use the enclosed Reader Service Cards to express your judgment.

George V. Kotelly

George V. Kotelly
Editor-in-Chief

The difference is on the inside.

Most laser printers are similar—on the outside.

They're compact.

They resemble table-top office copiers. (Which isn't surprising, since the technology inside is similar to xerography.)

They're quiet.

And their output is close to typeset quality.

But that's where the similarity ends.

We've designed the Desktop Printshop™ so it delivers more capability than other laser printers. And it's also easier to develop software for the Desktop Printshop. Here's how:

A unique, 1.8 MBit/second video interface card plugs right into a slot in an IBM PC™ or compatible computer. It gives the Desktop Printshop faster data transfer, powerful graphics capability, and Epson™ emulation.

But our innovations didn't stop with the hardware. The Desktop Printshop has more of its features in software than other laser printers. So type fonts load from diskette. Not expensive cartridges. (There are 38 fonts available, and new ones are regularly added.) And fonts are automatically loaded as specified in a document being printed.

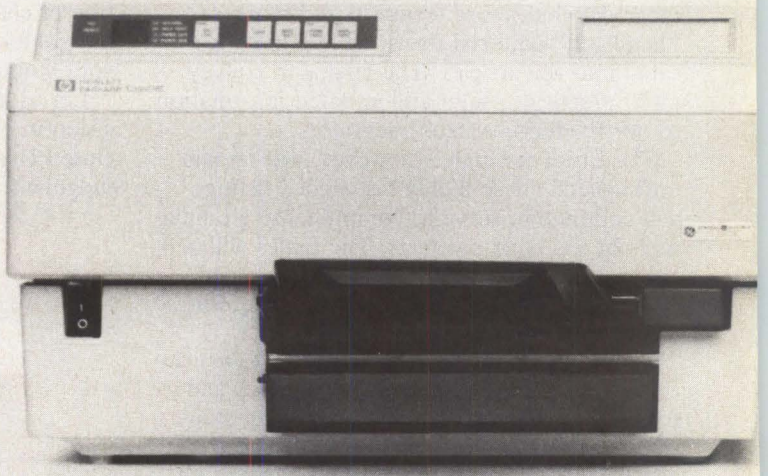
A simple forms editing language makes it easier to write applications for the Desktop Printshop. And because features are in software, new features can be added with the change of a diskette. Not an expensive hardware modification.

Compare Corona's Desktop Printshop features with the Hewlett-Packard LaserJet and LaserJet Plus.

Corona Desktop Printshop Comparison

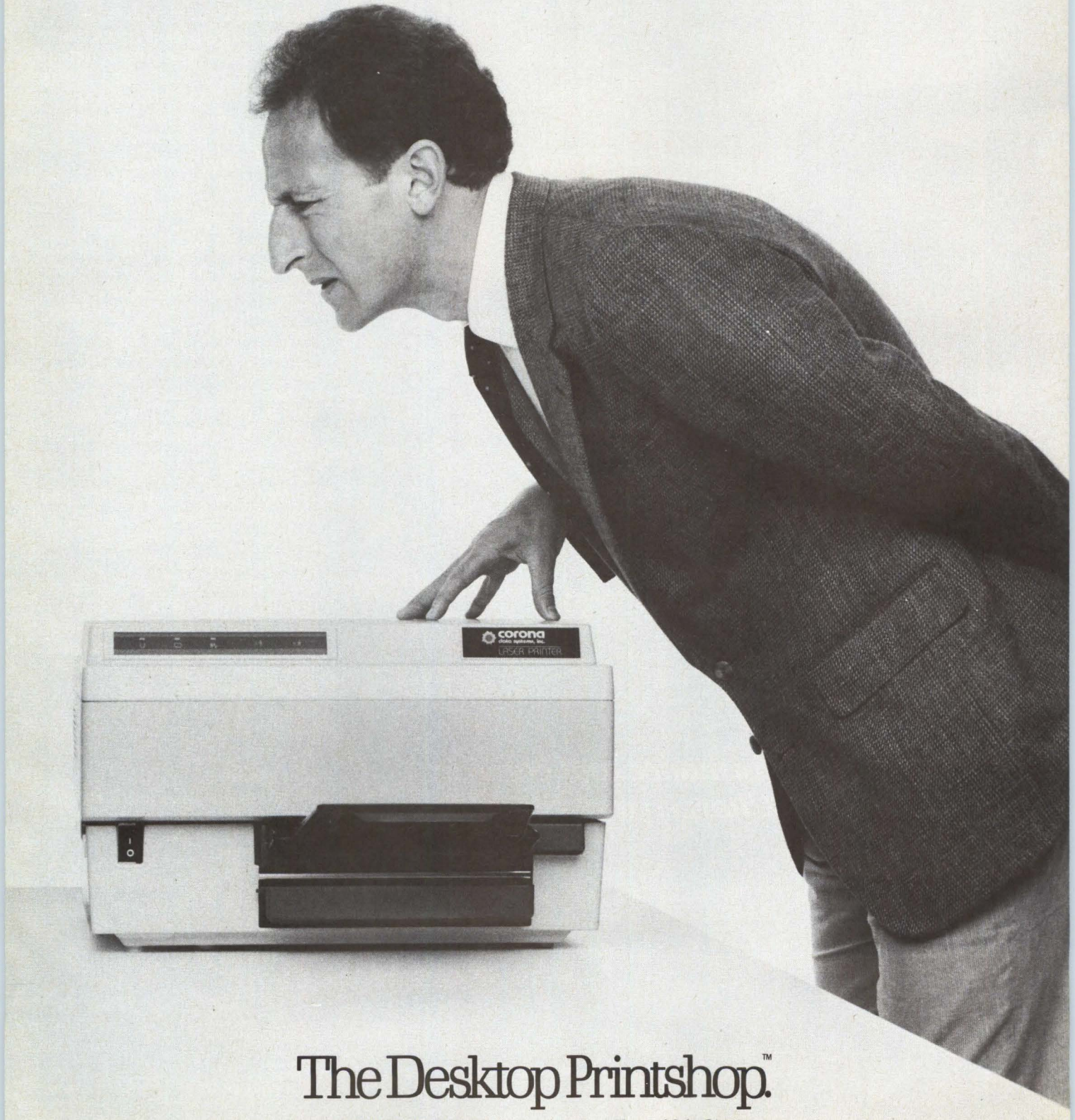
Feature	Desktop Printshop	LaserJet	LaserJet+
Price			
• End User Price	$3395	$2995	$3995
• Cable	Included	$ 50	$ 50
Interface	IBM-PC long slot	RS232	RS232/ Centronics
Emulations	Epson	None	None
Memory			
• Total Memory	704K	128K	512K
• Memory Available to User	>400K	59K	395K
Graphics			
• Graphic area/page	36%	6%	33%
• 30% Graphic Page Time	20 sec	N/A	2-3 min
• Type of Graphics	Raster/Epson	Raster	Raster
• Box/Line Drawing	Yes	No	Line only
Fonts			
• Fonts included w/system	38	2	3
• Auto Downloadable Fonts	Yes	No	No
• Change Default Font	Yes	No	No
• Change Font Memory Size	Yes	No	Yes
• Max' Fonts Per Page	32	8	16
• Print Entire PC Font	Yes	No	No
Features			
• User Defined Macros	99	No	32
• Justification Command	Yes	No	No
• Indent Command	Yes	No	No
• Horz' Moves Relative/Absolute	Yes	Yes	Yes
• Vert' Moves	Yes	No	Yes
• Absolute Tabs	Yes	No	No
• Variable Pitch Command	Yes	No	No
• Variable Super/Subscripts	Yes	No	No
• Repeat Character Command	Yes	No	No
• Change Command Characters	Yes	No	No
• Simple Commands	Yes	No	No

Then call Corona Data Systems toll-free at (800) 621-6746. In CA: (805) 495-5800. And find out how Corona's VAR Support Program makes the Desktop Printshop the best value in laser printing.



corona data systems, inc.

in laser printers



The Desktop Printshop.™

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Get your PC on the fast track.

Increase performance and capacity with SuperCharger™ and Stretch™.

Supercharge!
Rev your PC up to AT power and performance with Persyst's SuperCharger™, the fastest PC accelerator board in its class. This pace-setting PC performance enhancer propels you onto another plane of computing. SuperCharger's 8086 engine will accelerate your number-crunching calculations and image-manipulating simulation up to 3 times faster and more — faster than Orchid® or Quadram®. And SuperCharger requires no special software drivers, so you can run *all* your application programs.

Stretch That Payload!
Burning up more and more memory with bigger spreadsheets and billowing data bases? Pour it on and take the lead with the new Persyst Stretch™ Memory Board. Carrying an onboard payload of 2 megabytes per Stretch module, your system's capacity goes way beyond the full 640KB! With Stretch, take full advantage of the Lotus Expanded Memory Specification so you can run the latest versions of Lotus 1-2-3™, Symphony™, Framework™, and all other memory-hungry software yet to come.

Get It Together.
Get both — and really get it on. Using Stretch with its RAM disk software and SuperCharger as your calculations accelerator, you'll breeze through even your largest database sorts. And SuperCharger's triple-speed will ripple through your spreadsheets in a blur.

Let's Roll.
Escalate your ordinary PC to truly high-class, high-performance technology — and extend your system's life for years to come. To get moving, call tollfree (800) EMULEX3; (714) 662-5600 in California.

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CIRCLE NO. 9 ON INQUIRY CARD

HOW TO USE THE PRODUCT GUIDES

This edition of the *Peripherals Handbook* contains nine Product Guides beginning on Page 39. Each Product Guide contains price and specification information, arranged alphabetically by company name. These tables are based on mail- and telephone-survey information.

Accompanying each vendor's name is the mailing address, telephone number and a circle number with which you may request additional information using the reader-service card located at the end of the *Handbook*.

At the end of each Product Guide is a list of vendors that did not respond to our survey. Accompanying each name is the company's mailing address and telephone number.

To check product prices or specifications:

- Turn to the appropriate product category using the colored tabs
- Find the appropriate product table
- Find the alphabetically listed vendor.

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- Study the product offerings
- Use the address information found with the company name to contact the vendor.

To comment on the *Peripherals Handbook,* or to suggest future product coverage or entries, contact the Editor-in-Chief, *Mini-Micro Systems, Peripherals Handbook,* Cahners Publishing Co., 275 Washington St., Newton, Mass. 02158-1630.

The *Peripherals Handbook* research and editorial staff includes Frances Michalski, associate editor; Pamela Gorski, assistant editor; and Megan Nields, assistant editor.

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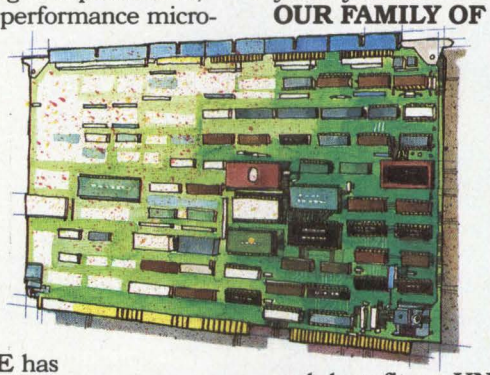

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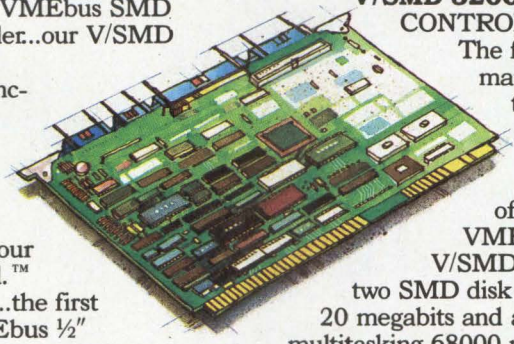

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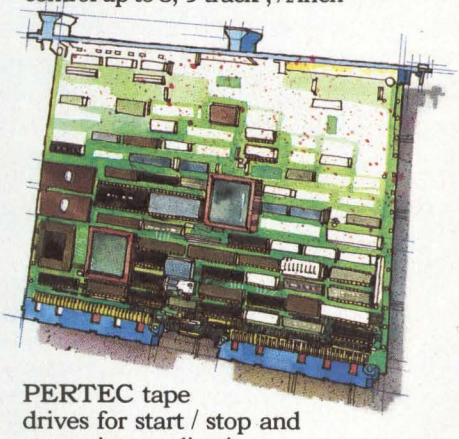

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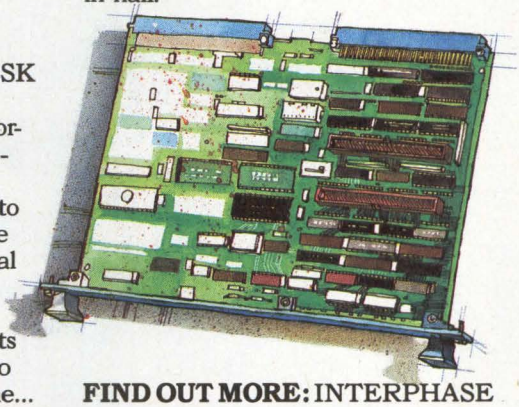

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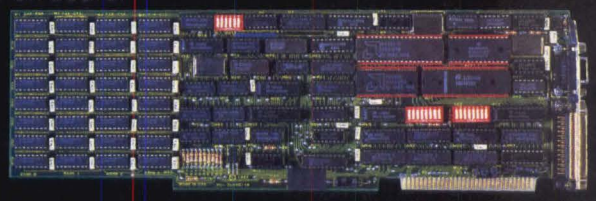

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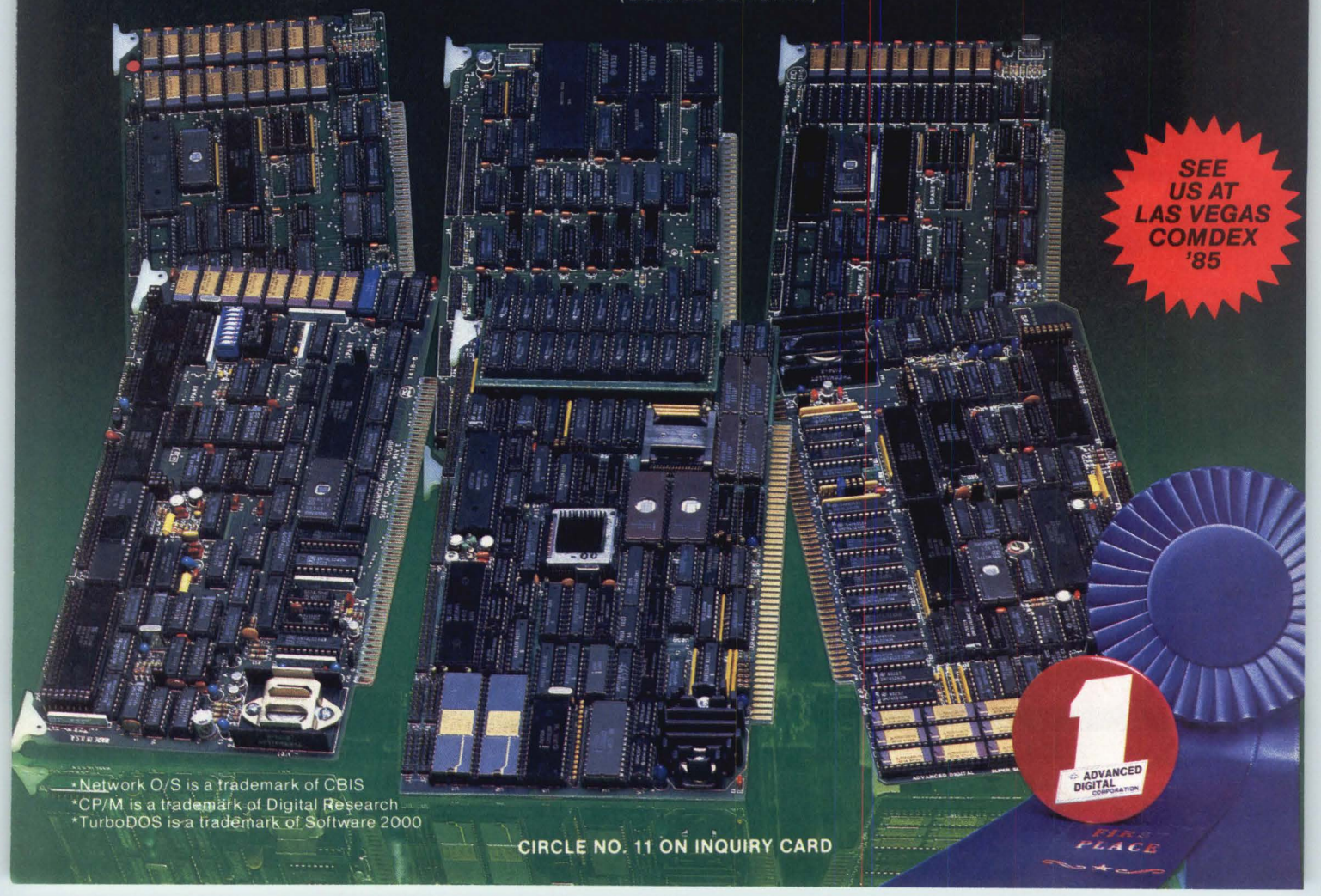

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CIRCLE NO. 11 ON INQUIRY CARD

TEST METHODS MATCH CONTROLLERS AND DISKS

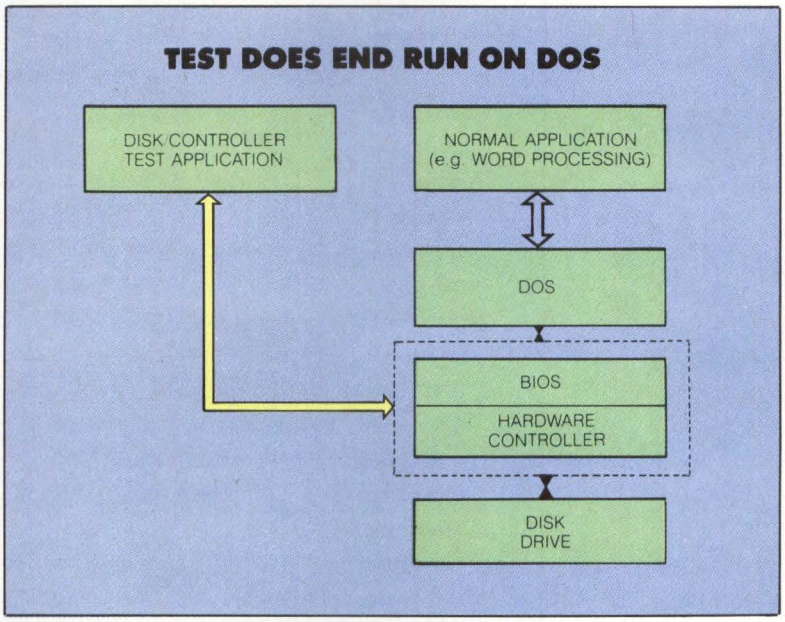
Software tools help system integrators choose the right combination of controller and rigid disk drive

Richard Steincross, RMS Laboratories

System integrators often choose controllers and Winchester disk drives without carefully relating their performances to either their price or application. With the right software tools and test methods, however, you can define variations in performance over a range of controllers. This approach allows you to properly match controllers and disk drives to each other and to the rest of the system components and, more importantly, to the application.

Although the test methods described in this article use single-threaded controllers for the IBM Corp. PC bus, the test methodology works regardless of the computer system. For example, controllers for system buses, such as Multibus and VMEbus, also have a range of performance characteristics that require you to carefully match the controller to the disk drive.

If you're going to test disk drives for non-PC-bus systems, the procedures and critical considerations will be similar to those described below. However, be aware that you have to access the firmware that controls the data-storage subsystem. In the case of the PC, we've done that for you.



The disk/controller-test software *bypasses DOS by making direct calls to interrupt 13, the disk-handling routine in the BIOS on the controller ROM. In contrast, a normal application—such as word processing—is filtered through DOS, which makes the BIOS calls.*

Establish the test environment

Adding a Winchester disk drive to an IBM PC is relatively simple. All that's necessary is a controller, cabling and, depending on the controller, driver software. Generally, the goal is to add extra storage to the system; performance is a secondary consideration. However, because PC-type systems are employed in an ever-growing range of applications, matching the controller to the drive in relation to the application is becoming more critical. For example, a low-cost single-user system doesn't need a high-performance Winchester/controller combination. On the other hand, applications that require handling large amounts of data in a multiuser environment do need fast disk drives and controllers.

The proper selection requires testing a variety of controllers and disk drives. Ideally, you should perform tests on large samples of both. To illustrate the system used for this article, only single samples of disk drives and controllers were employed.

Normally, it's impossible to get meaningful information about an underlying piece of hardware with an operating system in the way. There-

The aim of this testing procedure is to compare controllers in a fair and consistent manner.

fore, we developed a special testing program. This test tool, called HD, bypasses DOS by directly passing information into system interrupt 13, which is handled by the basic input/output system supplied on the controller cards. This method allows you to test each controller BIOS and establish performance ratings without worrying about the inconsistencies and unknowns of DOS. Additionally, because host-specific controllers were tested, factors introduced by intelligent interfaces such as the Shugart Associates system interface (SASI), or the proposed ANSI-standard small computer systems interface were ignored.

The aim of this testing procedure isn't to make the controllers look their best, but, rather, to compare them in a fair and consistent manner. Moreover, the test allows you to develop a library of quantitative data about the controller/drive combinations that you can use to make the proper integration match.

The rigid-disk test program is written in 8088

CONTROLLER/DRIVE PERFORMANCE COMPARISON

Controller / Disk drive	Seek 0 to 300	Recalibrate 300 to 0	Read 300 cylinders	No. of drives supported in ROM	Interleave factor*
	(All times are in seconds)				
WD-1002/**				4	adjustable (3)
CMI 6 heads	.12 - .18	5.2 - 5.3	84.8		
CMI 4 heads	see data below				
Microscience	.21 - .27	8.3 - 9.2	65.9		
WD-1002-S/**				4	adjustable (3)
CMI 6 heads	.16 - .21	5.3	84.8		
CMI 4 heads	.14 - .19	5.3	54.9		
Microscience	.21 - .27	8.3 - 8.7	65.9		
DTC-5150-BX/				13	6
CMI 6 heads	.14 - .19	5.3	159.6		
CMI 4 heads	.16 - .21	5.3	99.7		
Microscience	.14 - .19	10.0	106.3		
Xebec 1210A/				4	5
CMI 6 heads	drive not supported				
CMI 4 heads	.16 - .21	5.3	104.8		
Microscience	.18	10.1	96.2		
Adaptec ACB-2002A/				4+	adjustable (2)
CMI 6 heads	.16 - .21	5.5	59.9		
CMI 4 heads	.16 - .21	5.4	40.4		
Microscience	.21	10.2	50.6		
Adaptec ACB-2010A/				4+	adjustable (2)
CMI 6 heads	.20	5.7	79.8		
CMI 4 heads	.21	5.7	49.9		
Microscience	.14-.20	10.4	50.7		
IBM PC/XT/				4	6
4 heads 300 cylinders	.12	5.4	100.1		
IBM PC/AT/				16	3
4 heads 300 cylinders	.05	2.7	50.4		

* Adaptec and Western Digital controller interleave is adjustable; what is shown in parenthesis is the preferred setting.

** Western Digital WD-1002 and WD-1002-S (short) are functionally identical; only the form factor and VLSI differentiates the controllers.

assembly code, and provides the following functions:

/2—allows switching to a second drive,
/I—reports information about the number of drives attached to the controller, and the number of tracks, heads, and sectors on the selected drive,
/S n—performs seek test from track 0 to track "n" and recalibrates from the nth track to track 0,
/R n—reads "n" tracks and reports how long it takes,
/P—parks the drive on the last track,
/?—HELP displays a summary of the HD test program commands.

The seek function determines the basic performance of the drive. Recalibrate speed is based on the time it takes a drive to step, settle and return to the ready state. In operation, the read/write head is placed on track n, and each track heading is read in succession as the drive is stepped toward track zero. After a recalibrate sequence, the drive is stepped to the last track it is allowed to access. This track is used by IBM for diagnostics and is the highest track many microprocessor-controlled drives will reach.

The HD program lets you enter several commands simultaneously. For example, entering HD /I / S 300 /R 300 causes the program to deliver information about the drive, position the head at track 300, recalibrate to zero and then move the head back to track 300 and read back to track zero. The above command sequence produces the data listed in the accompanying table.

Consider the disk drive

There are basically two types of drives in the 10M- to 50M-byte range: open-loop stepper designs and closed-loop voice-coil models. These drives typically have average access times ranging from 45 msec to 85 msec. All the drives use the industry-standard ST506/412 interface and thus transfer data at 5M bits per second (bps). Therefore, performance differences are largely a factor of access time.

Higher-performance drives in the 20M- to 50M-byte range typically employ voice-coil actuators, which speed access times to 45 msec and faster. Most of these drives use the ST506/412 interface as well, and thus are subject to the limitations of its 5M-bps transfer rate. So, to improve performance, manufacturers provide microprocessor control and buffered seeks and commands, all of which let the controller perform faster.

The goal of testing controllers is, of course, to properly match the disk drive with the controller.

Because the tested controllers work with IBM PCs and compatibles we tested drives that are sold commercially for such systems, with the exception of the Maxtor Corp. drive and the Xebec Owl drive, which is an intelligent, SASI-based disk subsystem. Specifically, we tested the Microscience International Corp. HH612 drive formatted to 10.65M bytes and a Computer Memories Inc. 5619 drive formatted to 15.98M bytes. Because the Microscience drive has four heads and the CMI drive has six heads, we tested the CMI drive both with six heads and with four heads to obtain proper comparison points.

The Microscience drive uses a "servo wedge" to verify and correct the position of the read/write heads. The servo information is written on every track and is under all the heads at the same time. You might think of the servo wedge as a small, reserved sector that the drive hides from the user.

Although the servo-wedge scheme enhances track positioning, a small price is paid in seek performance. The recalibrate times are longer for the Microscience drive than for the CMI drive. This is a result of longer settling times of the read/write heads after a seek.

List of companies mentioned in this article

Adaptec Inc.
580 Cottonwood Drive
Milpitas, Calif. 95035
(408) 946-8600
Circle 601

Computer Memories Inc.
9216 Eton Ave.
P.O. Box 2740
Chatsworth, Calif. 91311
(818) 709-6445
Circle 602

Data Technology Corp.
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Santa Clara, Calif. 95051
(408) 496-0434
Circle 603

Maxtor Corp.
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San Jose, Calif. 95134
(408) 942-1700
Circle 604

Microscience International Corp.
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Western Digital Corp.
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Irvine, Calif. 92714
(714) 863-0102
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Xebec
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The recalibrate function issues a step-out command, waits until the drive goes ready and then checks for the track zero signal. If it isn't at track zero, the operation is repeated. The controller must wait until the read/write head has come to a rest, then wait again until the servo wedge information rotates under the head to confirm the track location. Typically, a full disk rotation takes about 16 msec. This additional time for settling is reflected in the manufacturers' specifications. CMI specifies 16 msec; Microscience, 35 msec. The testing verifies these times.

When stepping one track at a time, as in the recalibrate test, settling time becomes more apparent. In a typical environment, the drive normally seeks many tracks at full speed and settles only at the last track.

How to obtain the rigid disk test program

If you're interested in obtaining a copy of the rigid disk test program in both object and source form, please send a 5¼-inch disk formatted for an IBM Corp. PC with a self-addressed, stamped disk mailer to: Carl Warren, Western Editor, *Mini-Micro Systems*, Cahners Publishing Co., Suite 109, 2041 Business Center Drive, Irvine, Calif. 92715. Please request HD-TAR0001.

The 300-track Seek time shows little difference between the Microscience and CMI drives. The narrowing of the differences can be attributed to the coarseness of the IBM real-time system clock, rather than to the drives or controllers. The data obtained indicates a consistency of plus or minus one clock tick on almost every observation of the Seek times with a clock resolution of 5.5 msec.

Both the CMI and Microscience drives used in the tests operate in buffered-seek mode. This mode allows the controller to send all the step pulses very quickly. The drive then determines the distance to travel to the target track and ramps the heads up to maximum speed. At the end of the seek operation, the heads are slowed down in time to come to rest on the final target track. After a pause for head-settling, the drive READY signal goes TRUE, and the appropriate read or write operation executes.

The alternative to buffered-seek mode is to step the drive at the specified rate of 3 msec. This step rate was employed by an Adaptec Inc. 2002 controller when retesting the CMI drive with four heads. The resulting time, 93 msec, doesn't compare favorably with the 20 msec obtained when using buffered-seek mode.

Don't forget the interleave factor

Other matters besides the characteristics of the drives and controllers must be considered in determining performance. One is the interleave factor. This refers to the number of sectors that pass under the read/write head before a read or write operation takes place.

In our testing, we used interleaves of one through six to determine the optimal setting for the drive and controller. In most cases, as shown in the table, interleaves of two and three yield the best performance.

Interestingly, only the Adaptec controller could support a 1:1 interleave (e.g., every sector is read). But this isn't necessarily helpful in all cases. For example, a 1:1 interleave on the CMI drive yields a timing factor of 153 seconds for a 300-sector read, which is effectively a 17:1 interleave. This means that the drive has to complete a full rotation before the next sector in line is read because the drive tries to transfer data faster than the bus hardware permits. As a result, performance degrades drastically.

The reason for this performance drop is that the controller reads the sector, transfers it to the buffer on the controller, then sends it to the computer-system memory. This process determines how much time is required to come back and read the next sector. In the case of the CMI drive, on an IBM PC/XT, the optimum interleave factor is two in order to read 300 cylinders in less than 50 seconds.

Although the Adaptec controller can support the faster transfer rate, the host channel and drive channel must be optimized to handle the faster I/O requests.

Intelligence gets in the way

All the controllers tested are IBM PC-bus-specific. Thus, each is optimized to handle commands and timing in relationship to that bus. However, newer interfaces such as SASI, as used on the Xebec 4000 Owl subsystem, add another command layer from the host bus to the device. This layer increases flexibility by integrating the drive to virtually any bus, but it can be at the expense of performance. The 10M-byte Owl drive isn't a speed demon, having an average access time of 88 msec, including settling. Although SASI does provide flexibility in integrating the drive to the bus by making all the drive functions transparent to the host and user, it adds an extra command layer that has to be considered.

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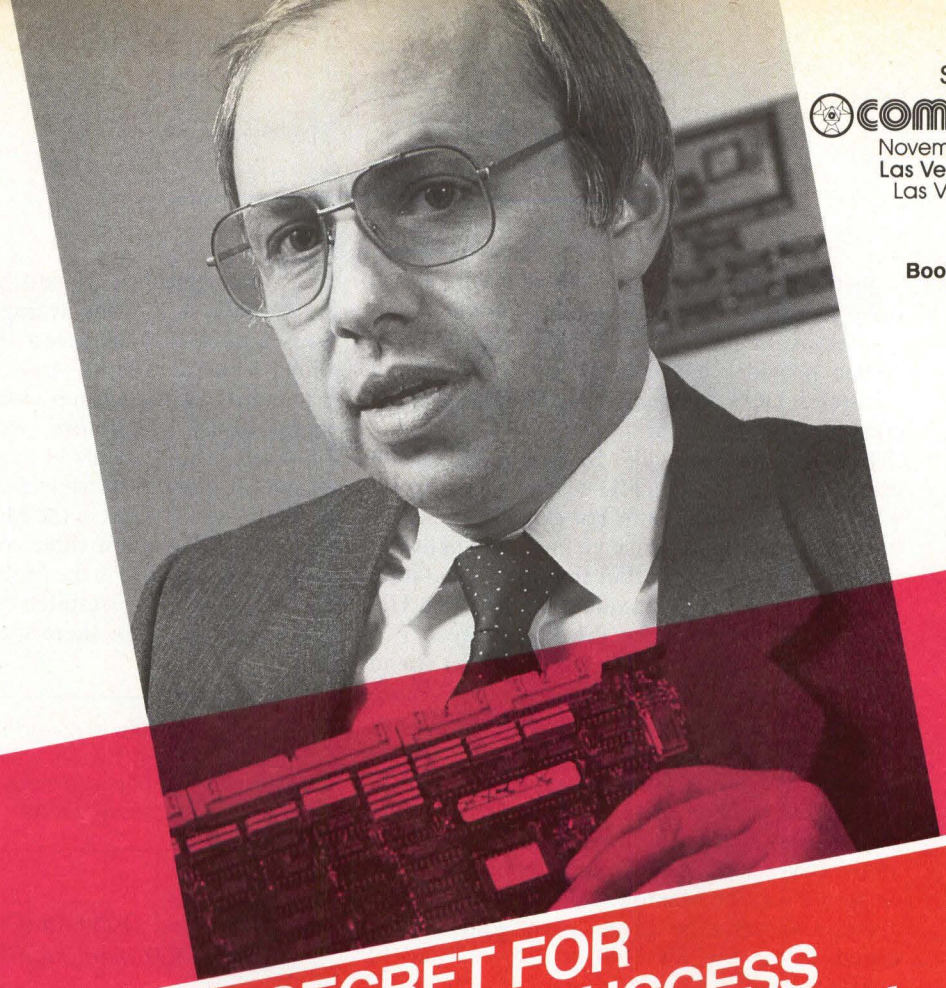

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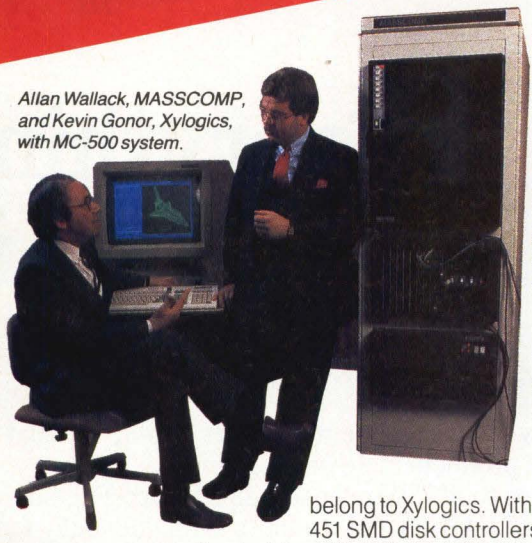

Allan Wallack, MASSCOMP, and Kevin Gonor, Xylogics, with MC-500 system.

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When stepping one track at a time, as in the recalibrate test, settling time becomes more apparent.

In the case of the IBM PC, the Xebec Owl drive is integrated by using a host adapter that resides at E800 in the system memory map. Xebec provides an onboard BIOS ROM that translates DOS commands to the proper SASI commands.

Because interfaces like SASI and SCSI add extra intelligence, the HD test program won't work properly with them. For example, a recalibrate test on the Owl drive yields a time of over 3 minutes. It is apparent that the actual operation takes less than half that value. Because the HD program is optimized for the single-thread PC-bus-type controllers, overheads of the SASI and SCSI buses aren't taken into account. Consequently, to test SASI- or SCSI-based systems, you need a program that directly passes parameters that SASI or SCSI expects.

Another class of drives important to system integrators are high-capacity drives—those above 75M bytes. The only drive in this class that we tested was the Maxtor XT-1140, which has an average access time of 30 msec. Like all the tested drives, the XT-1140 uses the ST506/412 interface.

A drive such as Maxtor's, with voice-coil positioning, a 30-msec average access time and 5-msec track-to-track access time, including settling, seeks across 300 tracks so fast that the granularity of the system clock prevents meaningful results. Therefore, we did not include Maxtor's testing results in our table.

System integrators should also note that the seek-and-settle times in the Maxtor drive's recalibrate mode is about three to four times faster than the drives used in the primary test. The Maxtor class of drive is best suited for multiuser, multitasking applications where speed is essential. □

Richard Steincross is president of RMS Laboratories, Long Beach, Calif. He specializes in system integration and board design for data storage and communications.

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TAILORED BUFFERS SPEED DISK PROCESSING

Choosing a disk buffer setting that best fits a system's configuration dramatically improves disk I/O times for PC-DOS/MS-DOS computers

Steve Bostwick, Local Data Inc.

Microcomputer systems that process large and complicated files often spend considerable time reading from, and writing to, mass-storage devices. This operation creates long processing pauses that annoy end users. By simply enlarging the PC-DOS/MS-DOS disk-buffer setting from its normal default value of 2, you can dramatically reduce disk I/O delays.

A disk buffer is a block of main memory in which the DOS holds data that is being read from, or written to, a disk. Each time DOS is requested to read or write a record, it first looks to see whether the sector containing that record is already in a buffer. By increasing the size of the disk buffer, the more likely it is that sought-after data will be in main memory. If it is, then DOS simply transfers the record to the application without the need to read the data from the disk which, of course, saves time.

The logical solution would seem to be to move all the data used by an application into the disk-buffer area. Unfortunately, microcomputer systems are not blessed with huge blocks of main memory and a compromise must be made between the amount of memory used for disk buffering and the main memory required for other system operations. Selecting the best compromise is the aim of the Timing Model test program.

Measurements are required

Obviously, the more an application program interacts with disk-based files the more likely disk I/O will be the major factor in processing delays. If you could calculate the relationship between increased disk-buffer size and processing delays, then an informed choice could be made.

Because so many factors interact to cause disk delays (including facets of the specific hardware configuration and operating system), they cannot be derived theoretically. Instead, they must be measured empirically using the actual system configuation, operating system and "typical" disk transactions made in actual applications. The disk I/O timing model program has been developed to allow you to make the necessary measurements.

At the end of this article you will find a mailing address where you may obtain a timing model test program to determine your own disk I/O timing data. But, before describing the program itself, it is helpful to know how the measurement data can be applied.

The logical solution would seem to be to move all the data used by an application into the disk-buffer area.

The timing model

Measuring something as complicated as the timing of disk I/O in a microcomputer system requires a system model. A model developed by Michael A. Pechura and James D. Schoeffler, at the Department of Computer and Information Science, Cleveland State University, takes into account various hardware and software factors that affect I/O timing. The model produces accurate results when the proper constants have been determined for measurement.

The model consists of four basic disk-access timings:

- T_{sr}—Sequential sector read time is the time required to read a sector, given that the previous logical sector has just been read. This model assumes that the sequential sector read time is constant and independent of file size or location.
- T_{sw}—Sequential sector write time is the time required to write a sector, given that the previous logical sector has just been accessed (read or written). This model assumes that the sequential sector write time is constant and independent of

file size or location. If the sector is written with VERIFY ON, add one full rotation time to the write time.

- T_{rr}—Random sector read time is the time required to read a sector with a given file whose relative sector number is randomly chosen from a uniform distribution.
- T_{rw}—Random sector write time is the time required to write a sector with the data from a given file whose relative sector number is randomly chosen from a uniform distribution. It is measured from the completion of a previous random sector read or write within the same file.

Because of the large amount of time consumed in seeking data, random read times depend on the size of the file. For instance, the equation is:

$$T_{rr}(S) = c_1 + c_2 * S$$

where S is the number of sectors in the file, c_1 is the fixed overhead rate (msec) and c_2 is the effective seek rate (msec/sector).

Random write times also depend on the file size. The equation is:

$$T_{rw}(S) = c_3 + c_4 * S$$

where S is the number of sectors in the file, c_3 is the fixed overhead rate (msec) and c_4 is the effective seek rate (msec/sector).

Both formulas assume a random uniform distribution of head movement, with an average seek time of S/3. If another average seek time is needed, S/k, for example, substitute 3*S/k for S. If, for instance, each random access began at one end of the file then the formulas would change to:

$$T_{rr}(S) = c_1 + 1.5 * c_2 * S$$

and

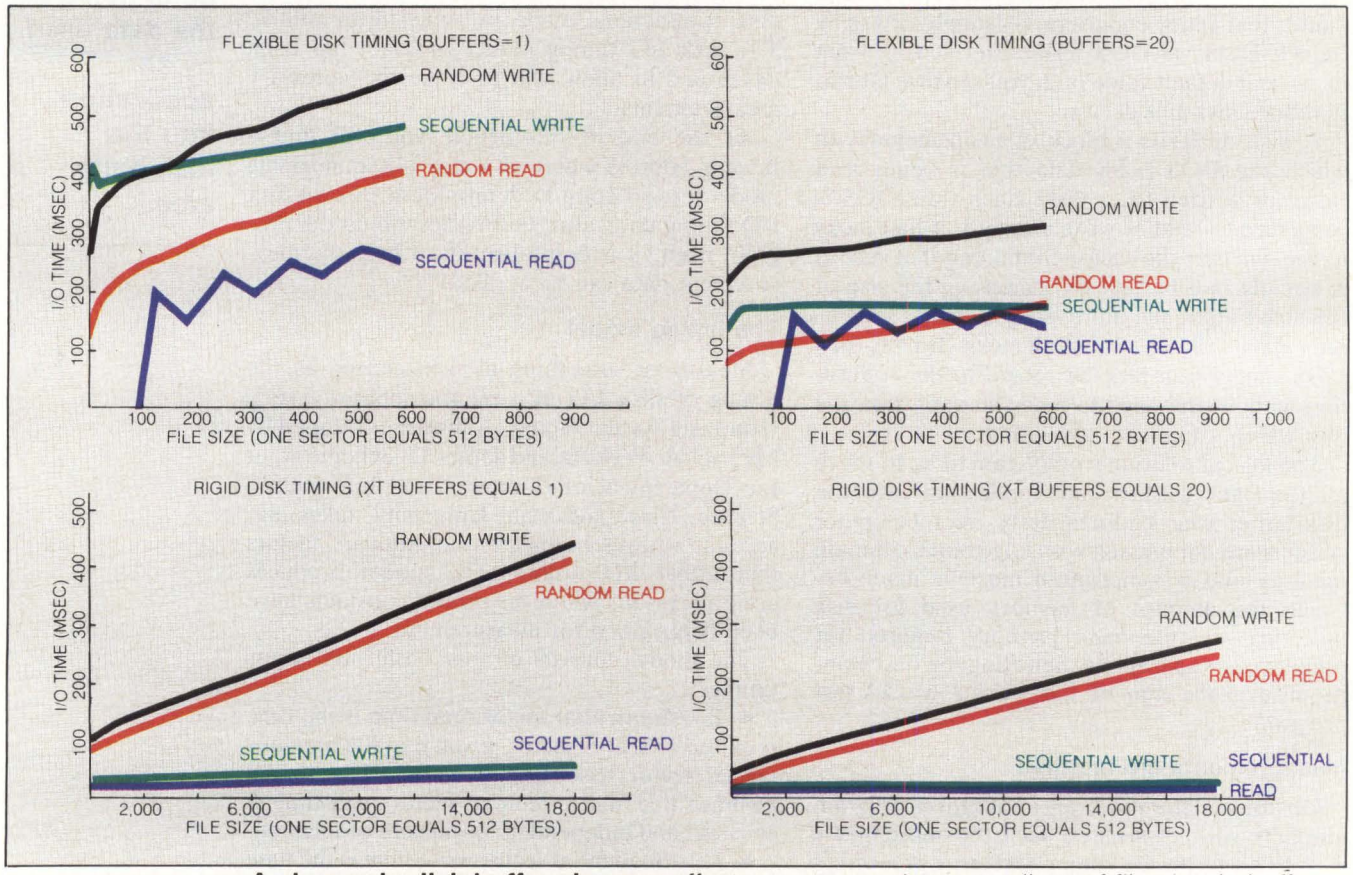
$$T_{rw}(S) = c_3 + 1.5 * c_4 * S$$

Derive the maximum, or worst case, access time for reads by:

$$T_{max}(S) = c_1 + 3 * c_2 * S$$

To determine worst cases access time for writes, substitute c_3 and c_4 for c_1 and c_2.

The fixed overhead includes all factors related to latency, operating system computation time, access of file-mapping information and overhead resulting in missed sectors. The effective seek rate includes the actual seek time, head settling



A change in disk buffer size *can affect disk I/O times. As shown, on an IBM PC/XT with BUFFERS set at 1, I/O processing is slow. Adjusting the BUFFER to 20 speeds processing regardless of file size (a buffer is equal to one sector of 512 bytes). Similarly, rigid disk performance, which has larger file sizes, is equally enhanced.*

To obtain the Timing Model test program

If you're interested in obtaining a copy of the Timing Model test program, developed by the author, in both object and source form, please send a 5¼-inch disk formatted for an IBM Corp. PC with a self-addressed stamped disk mailer to: Carl Warren, Western Editor, *Mini-Micro Systems*, Cahners Publishing Inc., Suite 109, 2041 Business Center Drive, Irvine, Calif. 92715. Request Timing Model TAR0004.

time and hidden disk accessing for such things as file-extent processing. All factors are determined experimentally.

Apply test data

After using the test program to generate measurements of random and sequential reads and writes for both flexible and rigid drives at different disk-buffer settings, you can start to zero in on the setting that provides the fastest retrieval of data without degrading performance. For example, testing one configuration of the IBM Corp. PC/XT reveals that a disk-buffer setting of 20 provides the best overall performance. Then, you choose some examples of actual disk I/O-related activities that are representitive of your actual application programs and calculate the time required for each activity, using the timings achieved with your optimized disk-buffer setting.

For example, consider the activity surrounding a hypothetical telephone sales order. The order is for 15 "old" items in a particular customer's history file and one new item. The system user wishes to confirm the order and allocate the goods from inventory. This request involves the following file activity:

- Order file—six random writes (five data, one indexed sequential overhead). Assume that the file is 3,062 sectors large (20 orders per day, 30 days of orders). Six random writes require 0.712 seconds according to the test program.
- Inventory master file—15 random writes are treated as one random write and 14 sequential writes. The file is four sectors long. This process requires 0.407 seconds.
- Logging file—1,600 bytes written sequentially to flexible disk. This requires 1.559 seconds.

A total of 2.679 seconds is required in this example, with the majority of the time being used to write the log file onto the flexible disk. This is considered to be a reasonable response time for transactional processing.

In the previous example, the size of the files and the number of transactions required are the largest that would occur under normal conditions. Transactions that require more processing (more inventory entries, for example) would take longer. If, in another application, the total time reached more than 10 seconds, it would be wise to consider hardware enhancements, such as combination of a faster disk drive and controller or the creation of a RAM disk, to speed up the process. However, in most business applications, transactions are usually small and a simple disk buffer adjustment is sufficient. □

The model produces accurate results when proper constants have been determined for measurement.

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Pechura, M. A. and Schoeffler, J. D., *Corregendum: Estimating File Access Time of Floppy Disks. Communications of the ACM,* Vol. 27, No. 1 (January 1984) Page 53.

Steve Bostwick, group manager for Local Data Inc., Torrance, Calif., has worked in aerospace software development for Hughes Aircraft Corp. He has a bachelor of science degree in physics from the University of California, Los Angeles.

NEXT MONTH IN MMS

The December issue of Mini-Micro Systems examines integration options in such areas as:

- Local area networking
- Optical disk drives
- Electronic publishing systems.

LOOKING AHEAD IN MMS

Be sure to watch for these editorial highlights in coming issues of Mini-Micro Systems:

- The January issue will cover printers/plotters (including PC-compatibles)
- PC storage devices and controllers will be profiled in the February issue
- The Communications Handbook with an editorial emphasis on local area networks will appear February 14.

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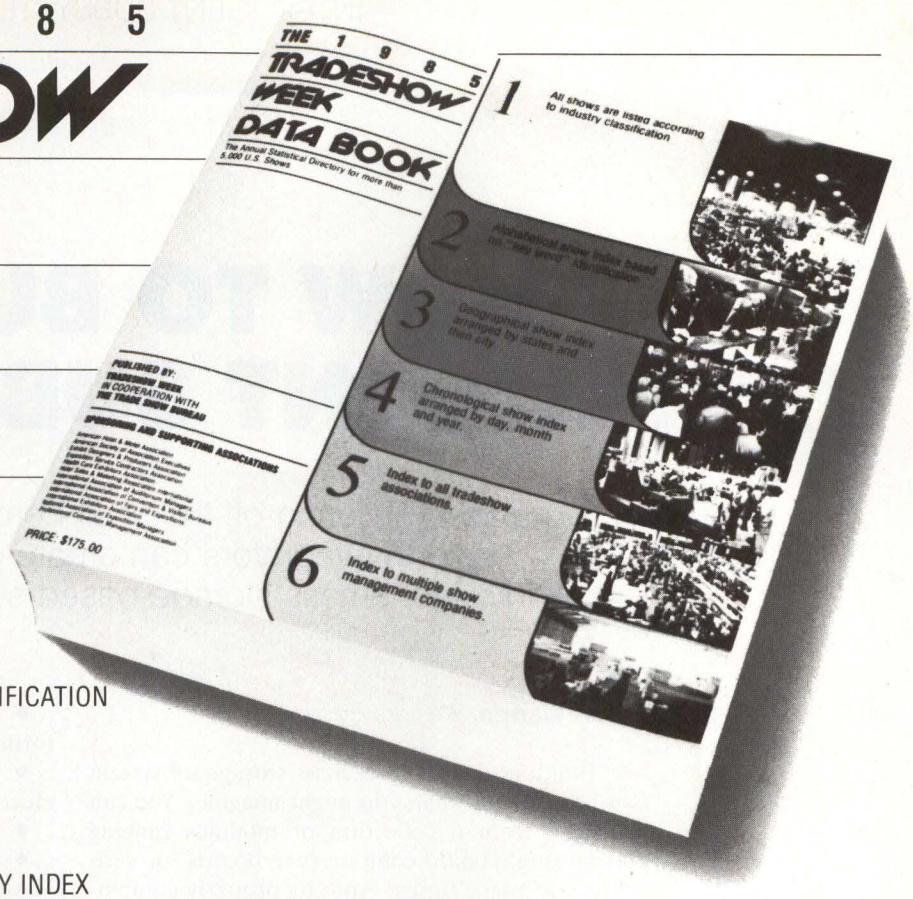

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HOW TO BUILD INTELLIGENT SUBSYSTEMS

By selecting and configuring off-the-shelf components and software, system integrators can create generic, intelligent mass-storage-based subsystems

Carl Warren, Western Editor

Building an intelligent mass-storage subsystem is less difficult than you might imagine. You can choose from a collection of modules ranging from single-board computers to boards for various backplane buses. And, by properly combining these elements, you create a subsystem that's independent of any host-specific bus and can be tailored to a wide variety of applications.

In building a custom subsystem, you can configure a product that offers one or more of the following advantages:

- Bus compatibility between SCSI and a variety of computers
- A choice of peripherals in 5¼- and 8-inch form factors
- File sharing, record- and file-locking and electronic mail
- Multiple ports
- High-capacity disk or tape storage and RAM.

Use modules for options

Mini-Micro Systems recently set out to demonstrate some things that integrators can do to build their own intelligent subsystems. To this end, MMS designed the "Smart Box," an expandable and adaptable intelligent subsystem.

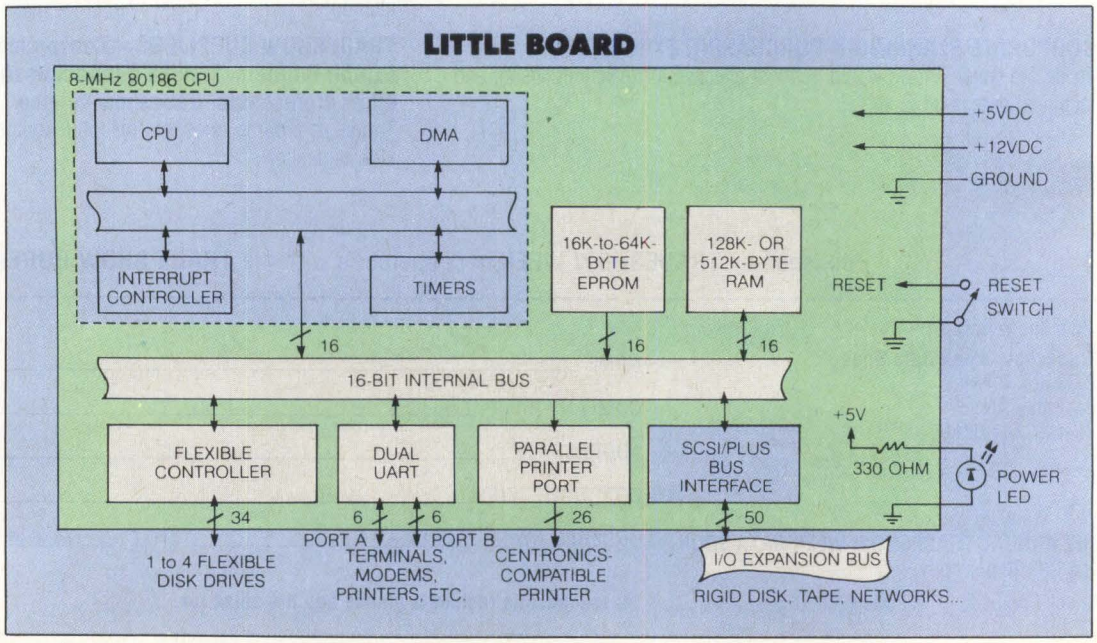


Fig. 1. Ampro's Little Board/186 *combines a SCSI bus with a 16-bit, 8-MHz, 80186-CPU-based, IBM-PC-compatible computer on a board that matches the dimensions of a 5¼-inch disk drive.*

The first consideration is choosing a chassis. An appropriate configuration for use in an office environment is a tower, available in OEM designs from a number of companies. The subsystem selected was a Trimm Industries' OEM tower, which accommodates a range of disk and tape drives in form factors ranging from 5¼ inches to 8 inches, an eight-slot multibus card cage and a switching-power supply. But towers aren't the only option. Another alternative is the Multibus unit from Electronic Solutions, an IEEE-P796-compatible chassis with a four-slot backplane and a 175W switching-power supply.

Secondly, to incorporate local intelligence, an Ampro Computers Inc. Little Board/186 was chosen. You can, of course, choose among several single-board computers from numerous manufacturers. But, the Little Board's length and width match the 5¼-inch disk drive form factor. It also contains an 8-MHz Intel Corp. 80186 CPU with direct-memory access (DMA) and, importantly, a SCSI bus, which contributes mightily to design expandability (Fig. 1).

With the chassis and basic intelligence unit selected, you turn to the task of expanding the unit. If you have chosen the Multibus, you need a translator running from the SCSI bus on the Little Board/186 to the Multibus. Regardless of the bus used, some kind of translator is required. You can, of course, rely on the SCSI bus as the system link. However, that particular configuration requires several 50-pin, flat-cable connectors, which, depending on the number of devices selected, adds bulk.

If you choose to use both a SCSI bus and a standard computer bus, the subsystems require a host-adapter card to connect the SCSI bus to the target bus. In the case of an intelligent subsystem, the host-adapter configuration (MMS, February, Page 123) is straightforward, consisting primarily of latches and translation circuitry. In some cases, an additional translation from the target bus to another bus is necessary. Here, interface units from companies such as ILC Data Device Corp. match buses by providing full arbitration and buffering to handle the data transfers.

Seek sophisticated software

One of the reasons for adding intelligence to a subsystem to is to relieve the host system of I/O processing. Therefore, subsystem software is crucial.

The Ampro board solves part of the problem by providing an IBM Corp.-PC-compatible basic input/output system. Consequently, PC-DOS can be used on the subsystem without modification. However, the software can be more sophisticated. The Ampro board allows the use of any firmware BIOS or operating system kernel. For

MMS developed the 'Smart Box,' an expandable and adaptable intelligent subsystem.

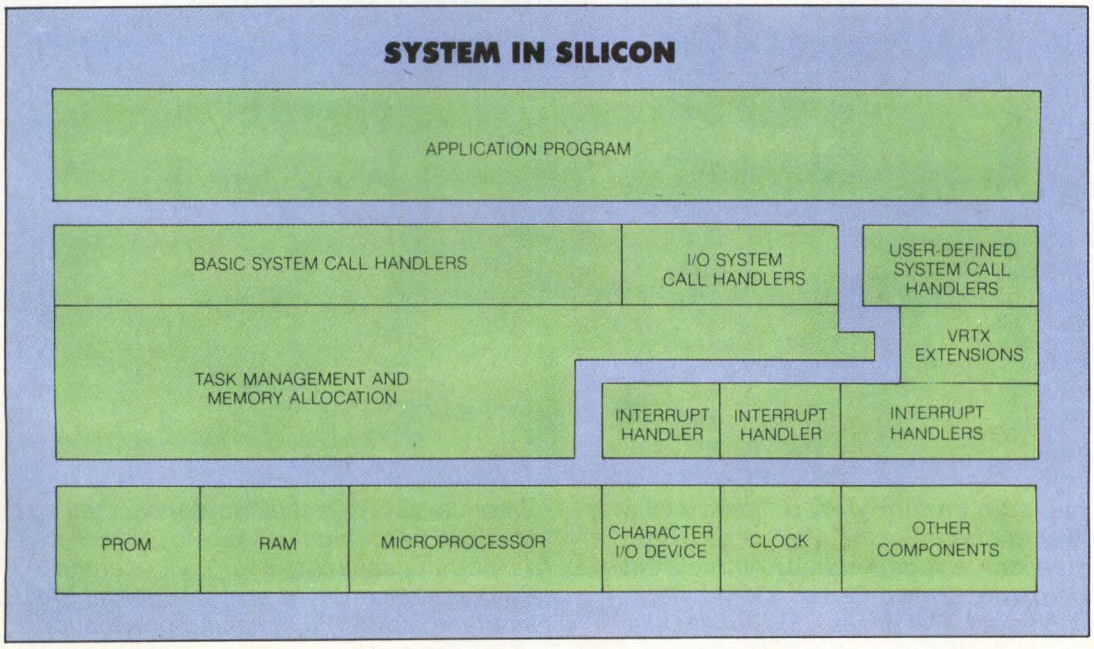


Fig. 2. The VRTX operating system, *embedded in silicon, provides interfaces to user-defined system calls and VRTX extensions. Moreover, VRTX can work as a standalone supervisor by using system event timers and adding user-established controls, such as doing backup while the system isn't being accessed.*

example, you might use Hunter & Ready Inc.'s VRTX 86 operating system, a complete multitasking operating system in silicon. The VRTX utilizes intelligent interfaces and controllers such as SCSI (Fig. 2).

Consider, therefore, the following Smartbox configuration: an Ampro Little Board/186 with a host adapter connected to an eight-slot Multibus backplane; the VRTX operating system added to the Ampro board and an interface on a Multibus add-in board to link the Multibus to the SCSI bus. Now the subsystem provides:

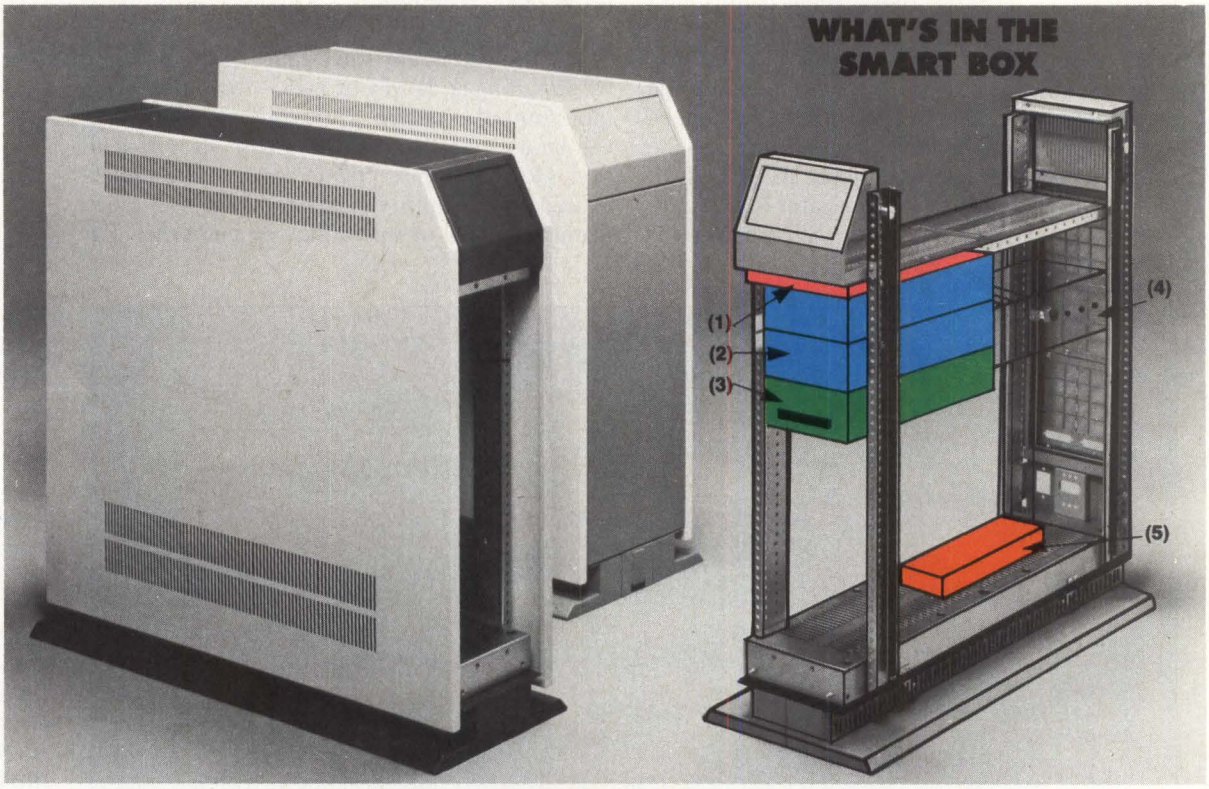
- A total of 660M bytes of rigid disk storage, using two Pertec Peripherals Corp. 330M-byte, 8-inch drives with a storage module device interface board from Interphase Corp
- A half-inch tape backup, using a Cipher Data Products Inc. GCR Cachetape with SCSI interface
- A Systech Corp. Multibus I/O controller board that provides up to 16 serial ports
- Open board slots for a future LAN connection or other add-in boards.

Obviously, you may choose alternative drives, backup units and I/O interfaces.

Both Pertec drives fit comfortably into a tower enclosure, thus keeping all the data-storage devices in one area. The power supply and the tape system mount stably on the bottom. Next, add the Multibus card cage and a separate mount for the Ampro board. Finally, connect a cable from the Ampro board to the Cipher tape drive via the SCSI bus, and through a host-adapter to the Multibus. All the Multibus boards, of course, plug into the card cage.

How to obtain SCSI specifications

If you're interested in obtaining a copy of the small computer systems interface specifications, please send two 5¼-inch disks, formatted for an IBM PC, with a stamped disk mailer to: Carl Warren, Western Editor, *Mini-Micro Systems*, Cahners Publishing Co., 2041 Business Center Drive, Suite 109, Irvine, Calif. 92715. Request: SCSI TAR0003.



This is an interior view *of Trimm's OEM tower enclosure in the MMS Smart Box configuration. Included are: (1) Ampro's Little Board/186; (2) two Pertec 330M-byte, 8-inch rigid disk drives; (3) Cipher Data Products' GCR Cachetape; (4) an eight-slot Multibus card cage containing Systech's 16-port I/O controller board, an Interphase SMD controller board and an optional LAN interface; and (5) a switching-power supply.*

Software links all the components of the subsystem. The Systech I/O controller board allows the VRTX operating system to serve as the intelligent communications channel. (Systech offers a complete tool kit that system integrators may use to customize the software to suit their applications.)

Because this subsystem is also a computer system, housekeeping functions—such as backing up the disk drive on tape—can be programmed to be done automatically either at a specific time of day or periodically, when the disk drive is idle. Here, the VRTX real-time executive controls these events with its interrupt-controlled mailbox scheme.

Filling one of the extra board slots with a LAN connection allows the subsystem to work as a file-server. (VRTX handles the scheduling via interrupts.) Multiple devices and connection to the IBM Systems Network Architecture are made possible without host intervention via the Systech board. Of course, adding multiple functions risks overloading the system and reducing efficiency.

Note that, in this setup, all the I/O processing is intelligent. The Systech board isolates the rest of the subsystem from I/O tasks, only passing on data when necessary, thus minimizing traffic on the Multibus. The Ampro board handles most of its tasks via the SCSI bus. And, of course, the tape drive is used only when the system is not being accessed.

How the subsystem is linked to the host computer is important. The best link is one that requires the least impact on the host's software. In the Smart Box, little or no changes to the host's operating system are required. For example, an IBM PC's operating system sees the subsystem simply as an additional drive, not as a collection of individual disk and tape drives.

Adding a network card to a vacant slot in the card cage provides a shared network interface for up to 16 personal computers or terminals; it also allows those on the LAN to use the Smart Box as a network resource. □

Interest Quotient (Circle One)
High 465 Medium 466 Low 467

List of companies mentioned in this article

Ampro Computers Inc.
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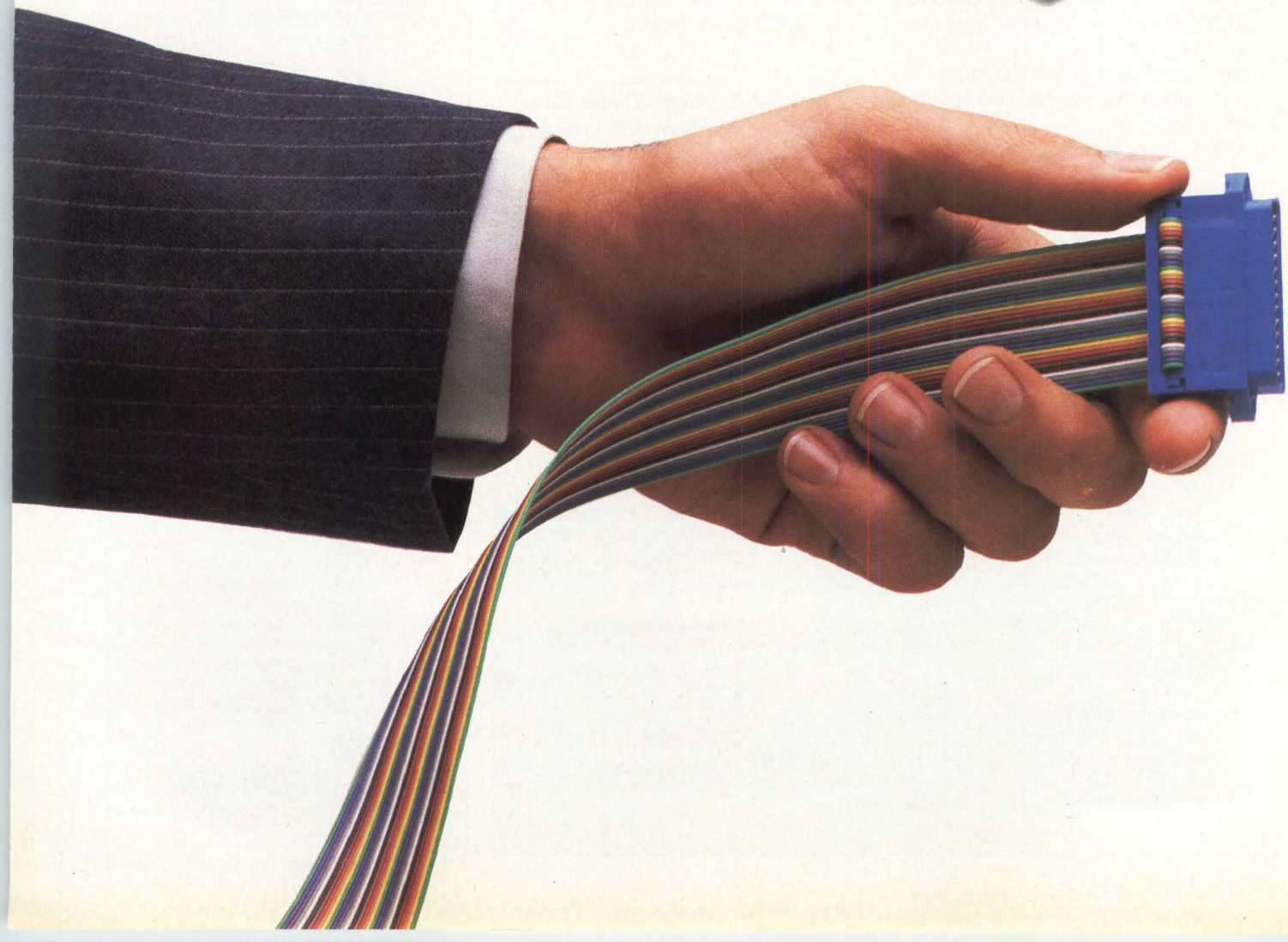

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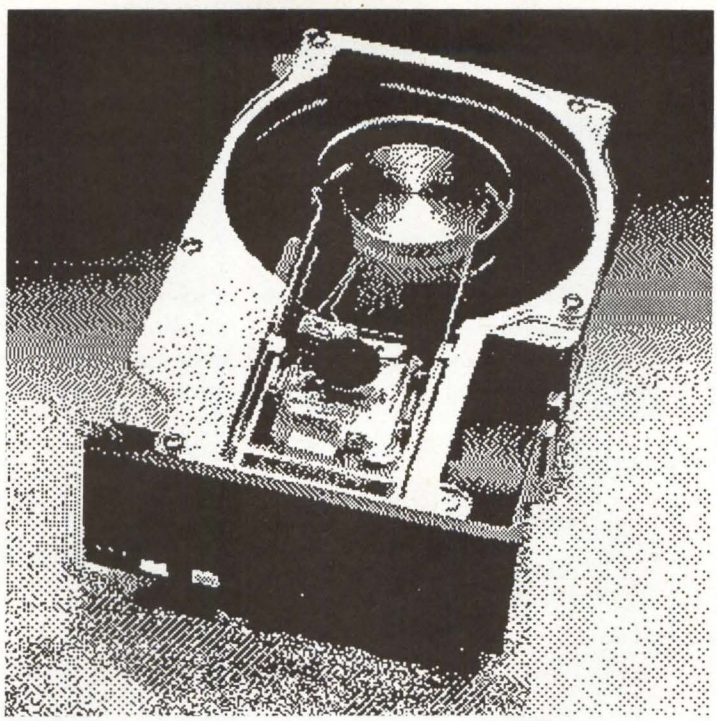
5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1



Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features options
ALPS ELECTRIC (USA) INC. 3553 N. First St., San Jose, CA 95134, (408) 946-6000										Circle 151
DRA010A	5¼	12.75	80	4	4	stepper motor	1.61 x 5.75 x 8	ST506/412		
DRA020A	5¼	25.5	80	4	4	stepper motor	1.61 x 5.75 x 8	ST506/412		
DRB040	5¼	51	40					ST506/412		
DRL010A	3½	12.75	80	4	4	stepper motor	1.61 x 4 x 5.95	ST506/412		
DRM020A	3½	25.5	80	4	4	stepper motor	1.61 x 4 x 5.95	ST506/412		
APPLIED INFORMATION MEMORIES 776 Sycamore Dr., Milpitas, CA 95035, (408) 263-9321										Circle 152
DART 130	5¼	129.27	18	7	7	linear voice coil	3.25 x 5.25 x 8	ESDI, SMD, SCSI		automatic carriage and spindle lock, dedicated landing zone, thin-film media
DART 170	5¼	166.19	18	9	9	linear voice coil	3.25 x 5.25 x 8	ESDI, SMD, SCSI		automatic carriage and spindle lock, dedicated landing zone, thin-film media
DART 250	5¼	250.38	18	9	9	linear voice coil	3.25 x 5.25 x 8	SCSI		automatic carriage and spindle lock, dedicated landing zone, thin-film media
ATASI CORP. 2075 Zanker Rd., San Jose, CA 95131, (408) 995-0335										Circle 153
3051	5¼	51.3	33		7	closed-loop linear voice coil	3.25 x 5.75 x 8	ST506/412	1,495(Q1)	dedicated head landing zone
3085	5¼	85.3	29		8	closed-loop linear voice coil	3.25 x 5.75 x 8	ST412	2,200(Q1)	dedicated head landing zone
BASF AG Gottlieb-Daimler-Strabe 10, 6800 Mannheim 1, West Germany, 0621/4008										Circle 154
6188 R	5¼	12.7, 25.4	75	2, 4	2, 4	closed-loop rotary stepper motor	1.6 x 5.75 x 8	ST506		
6192	5¼	52	30	5	5	closed-loop rotary	3.25 x 5.75 x 8	ST506/412		
6193	5¼	73	30	7	7	closed-loop rotary	3.25 x 5.75 x 8	ST506/412		
6194	5¼	94	30	9	9	closed-loop rotary	3.25 x 5.75 x 8	ST506/412		

← CIRCLE NO. 22 ON INQUIRY CARD

5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1

Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features options
BULL PERIPHERALS CORP. 766 San Aleso, Sunnyvale, CA 94086, (408) 745-0855										Circle 155
D530	5¼	30.8	30	3	3	rotary voice coil	3.25 x 5.75 x 8	ST506/412	1,175(OEM)	thin-film media
D550	5¼	51.4	30	5	5	rotary voice coil	3.25 x 5.75 x 8	ST506/412	1,325(OEM)	thin-film media
D570	5¼	72	30	7	7	rotary voice coil	3.25 x 5.75 x 8	ST506/412	1,545(OEM)	thin-film media
D585	5¼	85	30	7	7	rotary voice coil	3.25 x 5.75 x 8	ST506/412	1,610(OEM)	thin-film media
COGITO SYSTEMS CORP. 2355 Zanker Rd., San Jose, CA 95131, (408) 942-8262										Circle 156
CG912	5¼	12.76	85	4	4	linear stepper motor	5.75 x 1.625 x 8	ST506/412		
PT925	5¼	25.5	85	4	4	rotary stepper motor	5.75 x 1.625 x 8	ST506/412		
COMPUTER MEMORIES INC. 9216 Eton Ave., Chatsworth, CA 91311, (818) 709-6445										Circle 157
CM3426	5¼	25.6	85	4	4	stepper motor	1.61 x 5.75 x 8	ST506/412	1,055(Q1); 520(Q500)	opt. full height bezel
CM4426	5¼	26.6	40	4	4	closed-loop	1.61 x 5.75 x 8	ST506/412	1,340(Q1); 800(Q500)	opt. full height bezel
CM6426	5¼	26.6	39	4	4	closed-loop	3.25 x 5.75 x 8	ST506/412	1,300(Q1); 760(Q500)	
CM6640	5¼	40	39	6	8	closed-loop	3.25 x 5.75 x 8	ST506/412	1,385(Q1); 845(Q500)	
CM6853	5¼	53.3	39	8	8	closed-loop	3.25 x 5.75 x 8	ST506/412	1,485(Q1); 945(Q500)	
DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911										Circle 158
6301	5¼	38	35	7	7	linear	3.25 x 5.75 x 8	ST506	5,745(Q1)	includes controller
6338	5¼	71	32	8	8	linear	3.25 x 5.75 x 8	ST506	6,500(Q1)	includes controller
6339	5¼	120	30	15	15	linear	3.25 x 5.75 x 8	ST506	12,000(Q1)	includes controller
DISC TECH ONE INC. 849 Ward Dr., Santa Barbara, CA 93111, (805) 964-3535										Circle 159
512	5¼	13	85	4	4	stepper motor	1.63 x 5.75 x 8	ST506	625(Q1); 325(Q500)	
5019	5¼	19	77	8	8	stepper motor	3.25 x 5.75 x 8	ST506	675(Q1); 455(Q500)	
5026	5¼	25.5	77	6	6	stepper motor	3.25 x 5.75 x 8	ST506	700(Q1); 480(Q500)	
EICON RESEARCH INC. 1226 W. Broadway, Hewlett, NY 11557, (516) 374-6887										Circle 160
Discache 10MB	5¼	13.3	8	2	4	stepper motor	5.75 x 9.5 x 17.5	ST506	3,350(Q1)	includes power supply
Discache 20MB	5¼	26.6	8	4	8	stepper motor	5.7 x 9.5 x 17.5	ST506	4,250(Q1)	includes power supply
Discache 40MB	5¼		8			stepper motor	5.75 x 9.5 x 17.5	ST506	5,600–6,000(Q1)	includes power supply
EMERALD SYSTEMS CORP. 4757 Morena Blvd., San Diego, CA 92117, (619) 270-1994										Circle 161
PS36-3002	5¼	36	30	3	5	voice coil		ST506	2,750(Q1); 1,650(Q500)	½- and ¼-inch tape drive backup available
PS50-3002	5¼	50	30	3	5	voice coil		ST506	4,950(Q1); 2,970(Q500)	½- and ¼-inch tape drive backup available
PS70-3002	5¼	70	30	4	8	voice coil		ST506	6,150(Q1); 3,690(Q500)	½- and ¼-inch tape drive backup available
PS140-3002	5¼	140	30	8	16	voice coil		ST506	9,250(Q1); 5,550(Q500)	
PS280-3002	5¼	280	30	16	32	voice coil		ST506	15,850(Q1); 9,510(Q500)	

5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1

Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features options
EPSON AMERICA INC. 23600 Telo St., Torrance, CA 90505, (213) 534-4500										**Circle 162**
HD-830	5¼	12, 8	85	2	2	stepper motor rack and pinion	1.63 x 5.76 x 8	ST506/412	330	plated media
HD-860	5¼	25.6	85	4	4	stepper motor rack and pinion	1.63 x 5.76 x 8	ST506/412	400	plated media
EVEREX SYSTEMS INC. 47777 Warm Springs Blvd., Fremont, CA 94539, (415) 498-1111										**Circle 163**
HH-612	5¼	12.76	70	1	4	rotary		ST506	495(Q1)	low power consumption
HH-725	5¼	26	70	2	6	rotary		ST506	620(Q1)	low power consumption
FUJITSU AMERICA INC. 3055 Orchard Dr., San Jose, CA 95134, (408) 946-8777										**Circle 164**
M2233	5¼	13.33	83	4	4	stepper motor	3.3 x 5.7 x 8	ST506/412	820(Q1); 525(Q499)	
M2234	5¼	20	83	6	6	stepper motor	3.3 x 5.7 x 8	ST506/412	1,095(Q1); 625(Q499)	
M2235	5¼	26.66	83	8	8	stepper motor	3.3 x 5.7 x 8	ST506/412	1,195(Q1); 690(Q499)	
M2241	5¼	31.4	33	4	4	voice coil	3.3 x 5.7 x 8	ST506/412		
M2242	5¼	54.9	33	7	7	voice coil	3.3 x 5.7 x 8	ST506/412	1,995(Q1); 1,490(Q499)	
M2243	5¼	86.3	33	11	11	voice coil	3.3 x 5.7 x 8	ST506/412	2,295(Q1); 1,710(Q499)	
M2233AT	5¼	13.3	95	4	4	stepper motor	1.6 x 5.7 x 8	ST506/412	750(Q1); 430(Q499)	
M2246E	5¼	171.4	25	10	10	voice coil	3.3 x 5.7 x 8	ESDI	3,495(Q1); 2,475(Q499)	
HEWLETT-PACKARD CO. (DISC MEMORY DIV.) P.O. Box 39, Boise, ID 83707, (208) 323-6000										**Circle 165**
HP 7941A	5¼	30	30	3	3	linear	5.1 x 12.8 x 11.2	HP-IB	5,500(Q1)	
HP 7942A	5¼	30	30	3	3	linear	8.4 x 12.8 x 11.2	HP-IB	8,500(Q1)	
HP 7945A	5¼	72	30	7	7	linear	5.1 x 12.8 x 11.2	HP-IB	7,500(Q1)	
HEWLETT-PACKARD CO. (GREELEY DIV.) 3000 Hanover St., Palo Alto, CA 94304, (415) 857-1501										**Circle 166**
HP 97501A	3½	14.09	75	2	2	closed-loop rotary stepper motor	2 x 4 x 5.1	IEEE-488, SCSI	565(Q1)	thin-film media
HITACHI AMERICA LTD. 950 Elm Ave., San Bruno, CA 94066, (415) 872-1902										**Circle 167**
DK301-1	3½	12.7	85	4	4	stepper motor	1.63 x 4 x 5.75	ST506/412		opt. mounting frame for shock resistance
DK301-2	3½	19.1	85	6	6	stepper motor	1.63 x 4 x 5.75	ST506/412		opt. mounting frame for shock resistance
DK511-3	5¼	36.4	30	5	5	rotary voice coil	3.25 x 5.75 x 8	ST506/412		oxide coated media; opt. SCSI controller
DK511-5	5¼	51	25	7	7	rotary voice coil	3.25 x 5.75 x 8	ST506/412		oxide coated media; opt. SCSI controller
DK511-8	5¼	85.7	23	10	10	rotary voice coil	3.25 x 5.75 x 8	ST506/412		oxide coated media; opt. SCSI controller
DK512-8	5¼	85.7	23	5	5	rotary voice coil	3.25 x 5.75 x 8	ESDI		oxide coated media; opt. SCSI or SMD controller
DK512-12	5¼	120	23	7	7	rotary voice coil	3.25 x 5.75 x 8	ESDI		oxide coated media; opt. SCSI or SMD controller
DK512-17	5¼	171.4	23	10	10	rotary voice coil	3.25 x 5.75 x 8	ESDI		oxide coated media; opt. SCSI or SMD controller
IDEASSOCIATES INC. 35 Dunham Rd., Billerica, MA 01821, (617) 663-6878										**Circle 168**
IDEAdisk DA-40-FI	5¼	40	55	8	8	stepper motor	3.25 x 5.75 x 8	ST506, SASI		includes software, compatible with IBM PC/XT/AT, 10M–120M bytes of storage

5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1

Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features options
INTERNATIONAL MEMORIES INC. 7675 4th St., White City, OR 97503, (503) 826-3733										Circle 169
5006H	5¼	6.38	68	2	2	stepper motor	3.25 x 5.75 x 8	ST506	415(Q1); 375(Q500)	thin-film media, dedicated shipping zone
5012H	5¼	12.75	68	4	4	stepper motor	3.25 x 5.75 x 8	ST506	450(Q1); 395(Q500)	thin-film media, dedicated shipping zone
5018H	5¼	19.13	68	6	6	stepper motor	3.25 x 5.75 x 8	ST506	500(Q1); 400(Q500)	thin-film media, dedicated shipping zone
MAXTOR CORP. 150 River Oaks Pkwy., San Jose, CA 95134, (408) 942-1700										Circle 170
EXT-4175	5¼	178.28	29	7	7	rotary voice coil	3.25 x 5.75 x 8.2	ESDI	4,440(Q1); 3,550(Q100)	
EXT-4280	5¼	280.16	29	11	11	rotary voice coil	3.25 x 5.75 x 8.2	ESDI	6,205(Q1); 4,960(Q100)	
EXT-4380	5¼	382.03	29	15	15	rotary voice coil	3.25 x 5.75 x 8.2	ESDI	7,710(Q1); 6,165(Q100)	
XT-1085	5¼	85.32	28	8	8	rotary voice coil	3.25 x 5.75 x 8.2	ST506	2,730(Q1); 2,160(Q100)	thin-film media
XT-1105	5¼	105.27	28	11	11	rotary voice coil	3.25 x 5.75 x 8.2	ST506	3,340(Q1); 2,660(Q100)	thin-film media
XT-1140	5¼	143.55	28	15	15	rotary voice coil	3.25 x 5.75 x 8.2	ST506	4,290(Q1); 3,430(Q100)	thin-film media
XT-2085	5¼	89.24	30	7	7	rotary voice coil	3.25 x 5.75 x 8.2	ST506	2,630(Q1); 2,080(Q100)	thin-film media
XT-2140	5¼	140.24	30	11	11	rotary voice coil	3.25 x 5.75 x 8.2	ST506	3,675(Q1); 2,930(Q100)	thin-film media
XT-2190	5¼	191.24	30	15	15	rotary voice coil	3.25 x 5.75 x 8.2	ST506	4,720(Q1); 3,775(Q100)	
MICROCOMPUTER MEMORIES INC. 7444 Valjean Ave., Van Nuys, CA 91406, (818) 782-2222										Circle 171
M-112	3½	12.75	75		4	stepper motor	1.625 x 4 x 5.75	ST412		
M-125	3½	25.5	75		8	stepper motor	1.775 x 4 x 5.75	ST412		
M-212	3½	12.75	75		4	stepper motor	1.625 x 5.75 x 8	ST412		mounted in 5¼-inch half-height frame
M-225	3½	25.5	75		8	stepper motor	1.775 x 5.75 x 8	ST412		mounted in 5¼-inch half-height frame
M-312	3½	12.75	75		4	stepper motor	3.25 x 5.75 x 8	ST412		mounted in full size 5¼-inch frame
M-325	3½	25.5	75		8	stepper motor	3.25 x 5.75 x 8	ST412		mounted in full size 5¼-inch frame
MICROPOLIS CORP. 21123 Nordhoff St., Chatsworth, CA 91311, (818) 709-3394										Circle 172
1323/ 1323A	5¼	42.7/ 53.3	28		4/5	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506		dual chassis
1324/ 1324A	5¼	64/ 74.7	28		6/7	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506		dual chassis
1325	5¼	85.3	28		8	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506		dual chassis
1353	5¼	85.3	28		4	closed-loop rotary voice coil	3.25 x 5.75 x 8	ESDI		dual chassis
1354	5¼	128	28		6	closed-loop rotary voice coil	3.25 x 5.75 x 8	ESDI		dual chassis
1355	5¼	170.6	28		8	closed-loop rotary voice coil	3.25 x 5.75 x 8	ESDI		dual chassis
MICROSCIENCE INTERNATIONAL CORP. 575 E. Middlefield Rd., Mountain View, CA 94043, (415) 961-2212										Circle 173
HH-312	3½	12.76	70	4	4	closed-loop linear stepper motor	1.625 x 4 x 5.75	ST506/412		plated media, self-diagnostics
HH-325	3½	25.52	105	4	4	closed-loop stepper motor	1.69 x 4 x 5.75	ST506/412		thin-film media

5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1

Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features, options
HH-612	5¼	12.76	70	2	4	closed-loop linear stepper motor	1.625 x 5.75 x 8	ST506/412		
HH-725	5¼	25.52	80	4	4	closed-loop stepper motor	1.69 x 5.88 x 8	ST506/412		thin-film media, self-diagnostics
MINISCRIBE CORP. 1861 Lefthand Circle, Longmont, CO 80501, (303) 651-6000										**Circle 174**
3212	5¼	12.75	85	2	2	stepper motor rack and pinion	1.625 x 5.75 x 8	ST412	510(Q1); 460(Q500)	
3425	5¼	25.6	85	4	4	stepper motor rack and pinion	1.625 x 5.75 x 8	ST412	650(Q1); 575(Q500)	
6032	5¼	32	28	3	3	closed-loop linear voice coil	3.25 x 5.75 x 8	ST412	1,165(Q1); 845(Q500)	actuator lock, Whitney technology
6053	5¼	53.3	28	5	5	closed-loop linear voice coil	3.25 x 5.75 x 8	ST412	1,500(Q1); 1,085(Q500)	actuator lock, Whitney technology
6085	5¼	85.3	28	8	8	closed-loop linear voice coil	3.25 x 5.75 x 8	ST412	2,040(Q1); 1,475(Q500)	actuator lock, Whitney technology
8425	3½	25.6	68	4	4	stepper motor rack and pinion	1.625 x 4 x 5.75	ST412	760(Q1); 635(Q500)	thin-film media
MITSUBISHI ELECTRONICS AMERICA INC. 991 Knox St., Torrance, CA 90502, (213) 515-3993										**Circle 175**
MR321	3½	12.75	70	2	2	closed-loop rotary stepper motor	1.63 x 4 x 5.75	ST506		
MR322	3½	25.5	70	4	4	closed-loop rotary stepper motor	1.63 x 4 x 5.75	ST506		
MR521	5¼	12.75	85	2	2	closed-loop rotary stepper motor	1.6 x 5.7 x 8	ST506		dedicated head landing/ shipping zone
MR522	5¼	25.5	85	4	4	closed-loop rotary stepper motor	1.6 x 5.7 x 8	ST506		dedicated head landing/ shipping zone
MR533	5¼	30.33	38	3	3	closed-loop rotary voice coil	1.6 x 5.7 x 8	ST506		head landing/shipping zone
MR535	5¼	50.55	38	5	5	closed-loop rotary voice coil	1.6 x 5.7 x 8	ST506		head landing/shipping zone
MR5310	5¼	101.1	38	5	5	closed-loop rotary voice coil	1.6 x 5.7 x 8	ESDI		head landing/shipping zone
NEC INFORMATION SYSTEMS INC. 1414 Massachusetts Ave., Boxborough, MA 01719, (617) 264-8000										**Circle 176**
D3126	3½	25.62	85	4	4	stepper motor	1.6 x 4 x 5.94	ST506		automatic carriage lock, landing zone
D5124	5¼	12.91	85	4	4	stepper motor	1.63 x 5.75 x 8	ST506		automatic carriage lock, head landing zone
D5126	5¼	25.49	85	4	4	stepper motor	1.63 x 5.75 x 8	ST506		automatic carriage lock, head landing zone
NEWBURY DATA RECORDING LTD. Hawthorne Rd., Staines, Middlesex TW18 3BJ, England, 0784/61500										**Circle 177**
NDR 320 Penny	3½	25.5	40	4	4	closed-loop linear	1.625 x 4 x 6.37	ST506		Whitney heads
NDR 340 Penny	3½	51	40	8	8	closed-loop linear	1.625 x 4 x 6.37	ST506		Whitney heads
NDR 1065	5¼	66.9	30	7	7	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506		dedicated head landing/shipping zone, Whitney heads
NDR 1105	5¼	105.2	30	11	11	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506		dedicated head landing/shipping zone, Whitney heads
NDR 1140	5¼	143.4	30	15	15	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506		dedicated head landing/shipping zone, Whitney heads
OTARI DATA INC. 2 Davis Dr., Belmont, CA 94002, (415) 592-8311										**Circle 178**
C-214	5¼	12.75	85	2	2	stepper motor	1.65 x 5.75 x 8	ST506/412	450(Q1)	self-test mode

5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1

Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features, options
C-226	5¼	25.5	85	4	4	stepper motor	1.65 x 5.75 x 8	ST506/412	550(Q1)	self-test mode
C-526	5¼	25.5	79	8	8	stepper motor	3.25 x 5.75 x 8	ST506/412	600(Q1)	self-test mode
PRIAM CORP. 20 W. Montague Expressway, San Jose, CA 95134, (408) 946-4600										Circle 179
514	5¼	140.2	20	11	11	linear voice coil	3.25 x 5.75 x 8	ST506	1,750(Q1000)	dedicated head landing/ shipping zone
519	5¼	191.2	20	15	15	closed-loop voice coil	3.25 x 5.75 x 8	ST506	3,075(Q1); 2,025(Q500)	head landing/shipping zone
V130	5¼	30.8	30	3	3	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506	1,825(Q1); 1,175(Q500)	dedicated head landing/ shipping zone
V150	5¼	51.4	30	5	5	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506	2,050(Q1); 1,325(Q500)	dedicated head landing/ shipping zone
V170	5¼	72	30	7	7	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506	2,375(Q1); 1,545(Q500)	dedicated head landing/ shipping zone
V185	5¼	85	30	7	7	closed-loop rotary voice coil	3.25 x 5.75 x 8	ST506	2,450(Q1); 1,610(Q500)	dedicated head landing/ shipping zone
QUANTUM CORP. 804 McCarthy Blvd., Milpitas, CA 95035, (408) 262-1100										Circle 180
Q520	5¼	21.33	45	4	4	rotary voice coil		ST506/412	895(Q1000)	includes Airlock, automatic mechanical shipping lock
Q530	5¼	31.99	45	6	6	rotary voice coil		ST506/412	995(Q1000)	includes Airlock, automatic mechanical shipping lock
Q540	5¼	42.66	45	8	8	rotary voice coil		ST506/412	1,095(Q1000)	includes Airlock, automatic mechanical shipping lock
RODIME INC. 901 Broken Sound Pkwy. NW, Boca Raton, FL 33431, (305) 994-6200										Circle 181
R0201E	5¼	13.33	63.3	1	2	stepper motor	8 x 5.75 x 3.25	ST506		
R0202E	5¼	26.67	63.3	2	4	stepper motor	8 x 5.75 x 3.25	ST506		
R0203E	5¼	40	63.3	3	6	stepper motor	8 x 5.75 x 3.25	ST506		
R0204E	5¼	53.34	63.3	4	8	stepper motor	8 x 5.75 x 3.25	ST506		
R0351	3½	6.38	93.3	1	2	stepper motor	5.75 x 4 x 1.625	ST506		
R0352	3½	12.75	93.7	2	4	stepper motor	5.75 x 4 x 1.625			
SEAGATE TECHNOLOGY 920 Disc Dr., Scotts Valley, CA 95006, (408) 438-6550										Circle 182
ST225	5¼	25.62	85	2	4	rotary	1.63 x 5.75 x 8	ST412		dedicated head shipping zone
ST4026	5¼	25.62	40	4	4	linear voice coil	3.25 x 5.75 x 8	ST412		dedicated head shipping zone
ST4038	5¼	38.17	40	5	5	linear voice coil	3.25 x 5.75 x 8	ST412		dedicated head shipping zone
ST4051	5¼	50.88	40	5	5	linear voice coil	3.25 x 5.75 x 8	ST412		dedicated head shipping zone
SIEMENS COMMUNICATION SYSTEMS INC. (MEMORY PRODUCTS DIV.) 5655 Lindero Canyon Rd., Westlake Village, CA 91362, (818) 706-8872										Circle 183
1100	5¼	102	25	4	4	closed-loop rotary voice coil	3.25 x 5.75 x 8	ESDI	3,100(Q1); 2,560(Q500)	thin-film media and heads
1200	5¼	204	25	8	8	closed-loop rotary voice coil	3.25 x 5.75 x 8	ESDI	4,120(Q1); 3,460(Q500)	thin-film media and heads
1300	5¼	306	25	12	12	closed-loop rotary voice coil	3.25 x 5.75 x 8	ESDI	4,860(Q1); 4,080(Q500)	thin-film media and heads
SUMITRONICS INC. 580 N. Pastoria Ave., Sunnyvale, CA 94085, (408) 737-7683										Circle 184
NP-04	5¼	55, 87	30	10	10	closed-loop voice coil	3.25 x 5.75 x 8	ST506	1,000(Q1)	
RD-3000	5¼	10, 20	85	4	4	linear stepper motor	1.63 x 5.75 x 8	ST506	500(Q1)	
RD-4000	5¼	10, 20	85	8	8	linear stepper motor	3.25 x 5.75 x 8	ST506	500(Q1)	

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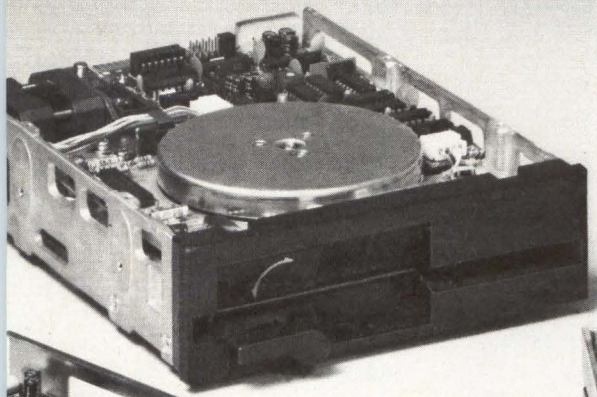
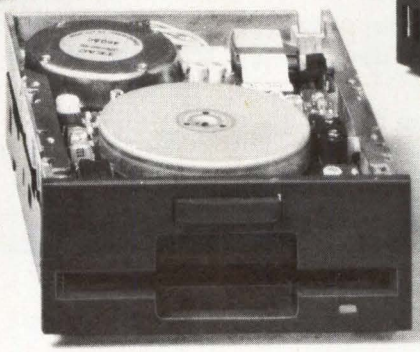
East (617) 475-7311 South/Midwest (312) 351-9124 Rocky Mountain (602) 242-4025 (303) 337-6329 (801) 532-2111
Northwest (408) 727-1427 Southern California (213) 726-0303



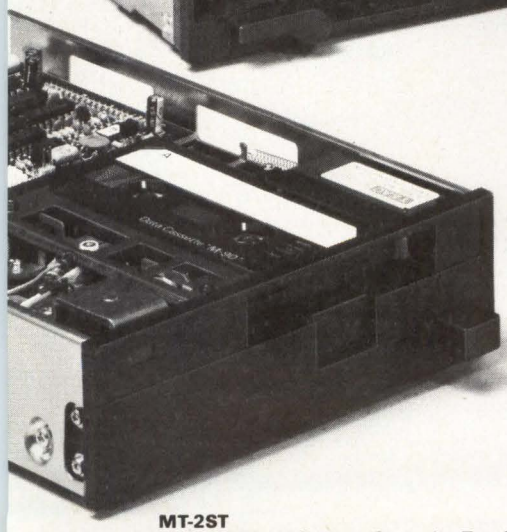
FD-55 Series
5¼-Inch Half-High Floppy Disk Drives
Capacities from 250 KB – 1.6 MB.
2 new LSI's, 4.9 watts operating power.
Brushless DC Direct Drive Motor.

SD-510
Half-High 5¼-Inch Winchester Disk Drive
12.76 MB unformatted, 10 MB formatted storage cap.
5 MB per sec. transfer rate.
Industry standard ST-506 interface.



COMDEX Booth #464

FD-35 Series
3.5-Inch Micro Floppy Disk Drives
Capacities from 250 KB – 1 MB.
Interface Compatible with 5¼" Floppy Disk Drives.
Power Saver Version: 1.72 watts Read/Write, 2.9 watts Seek, 27 milliwatts Waiting.



MT-2ST
Half-High Digital Cassette Streaming Tape Drive
Backs-up 20 MB in 4 min.
Industry standard QIC (02) interface.
Low cost media.

TEAC®
Instrumentation and Computer Products Division.

CIRCLE NO. 23 ON INQUIRY CARD

5¼-INCH AND SMALLER RIGID DISK DRIVES TABLE 1

Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interfaces	Price $ (quantity)	Notes, features options
SYQUEST TECHNOLOGY 47923 Warm Springs Blvd., Fremont, CA 94539, (415) 490-7511										Circle 185
SQ325F	3.9	25, 5	85	4	4		1.625 x 4.8 x 8	ST506	900(Q1); 625(Q500)	thin-film media
SQ338F	3.9	38.2	85	6	6		1.625 x 4.8 x 8	ST506	1,100(Q1); 725(Q500)	thin-film media
TEAC CORP. OF AMERICA/ICPD 7733 Telegraph Rd., Montebello, CA 90640, (213) 726-0303										Circle 186
SD-510-01	5¼	12.76	65	4	4	linear stepper motor	1.625 x 5.75 x 8	ST412		shipping zone
SD-520	5¼	25.52	85	4	4	closed-loop linear stepper motor	1.625 x 5.75 x 8	ST412		shipping zone
TECMAR INC. 6225 Cochran Rd., Solon, OH 44139, (216) 349-3130										Circle 187
ATHD	5¼	23	85		4				1,595(Q1)	
XTHD	5¼	10	85		4				989(Q1)	includes cables
Quick 60W20	5¼	21	85		4				3,495(Q1)	includes cables, power supply and tape drive backup
TOSHIBA AMERICA INC. (DISK PRODUCT DIV.) 3910 Freedom Circle, Santa Clara, CA 95054, (408) 727-3939										Circle 188
MK-53FB	5¼	43.2	25	5	5	voice coil	3.25 x 5.75 x 8	ST506/412	1,365(Q500)	center stack servo surface for improved on-track performance
MK-54FB	5¼	60.5	25	7	7	voice coil	3.25 x 5.75 x 8	ST506/412	1,475(Q500)	center stack servo surface for improved on-track performance
MK-56FB	5¼	86.5	25	10	10	voice coil	3.25 x 5.75 x 8	ST506/412	1,640(Q500)	center stack servo surface for improved on-track performance

Information was solicited but not received from the following manufacturers:

Ampex Corp.
401 Broadway
Redwood City, CA 94063
(415) 367-2011

Citizen America Corp.
2425 Colorado Ave.
Santa Monica, CA 90404
(800) 556-1234

Micro Peripherals Inc.
4426 S. Century Dr.
Salt Lake City, UT 84123
(801) 263-3081

Xebec Systems Inc.
2055 Gateway Place
San Jose, CA 95110
(408) 263-4100

Control Data Corp.
P.O. Box 0
Minneapolis, MN 55440

IBM Corp.
900 King St.
Rye Brook, NY 10573
(914) 934-4839

Tandon Corp.
20320 Prairie St.
P.O. Box 2107
Chatsworth, CA 91311
(818) 993-6644

WREN—SUPER-PERFORMING 5¼" WINCHESTERS IN 21 TO 86 MEGABYTE CAPACITIES.

OVER 180,000 SHIPPED

HEADS never land on data areas. All WREN drives use a dedicated media zone for head take-off and landing. Even in the event of a total power loss to the system, the actuator will return the heads to the dedicated landing zone.

ROTARY VOICE COIL ACTUATOR provides 40 millisecond typical average access for the 21 and 36 MB capacities and a 28 millisecond average typically for the 48, 67 and 86 MB models (includes head settling).

DEDICATED CLOSE-LOOP SERVO SYSTEM for added positioning accuracy and maximum system performance.

INTERFACE FLEXIBILITY: Three industry standard interfaces—ST506/412, ESDI (Enhanced Small Device Interface) and SCSI (Small Computer Systems Interface). The ST506/412 interface is available in all capacity versions up to 86 MB. The ESDI and SCSI are available in the 48, 67 and 86 MB models.

T H E W R E N™

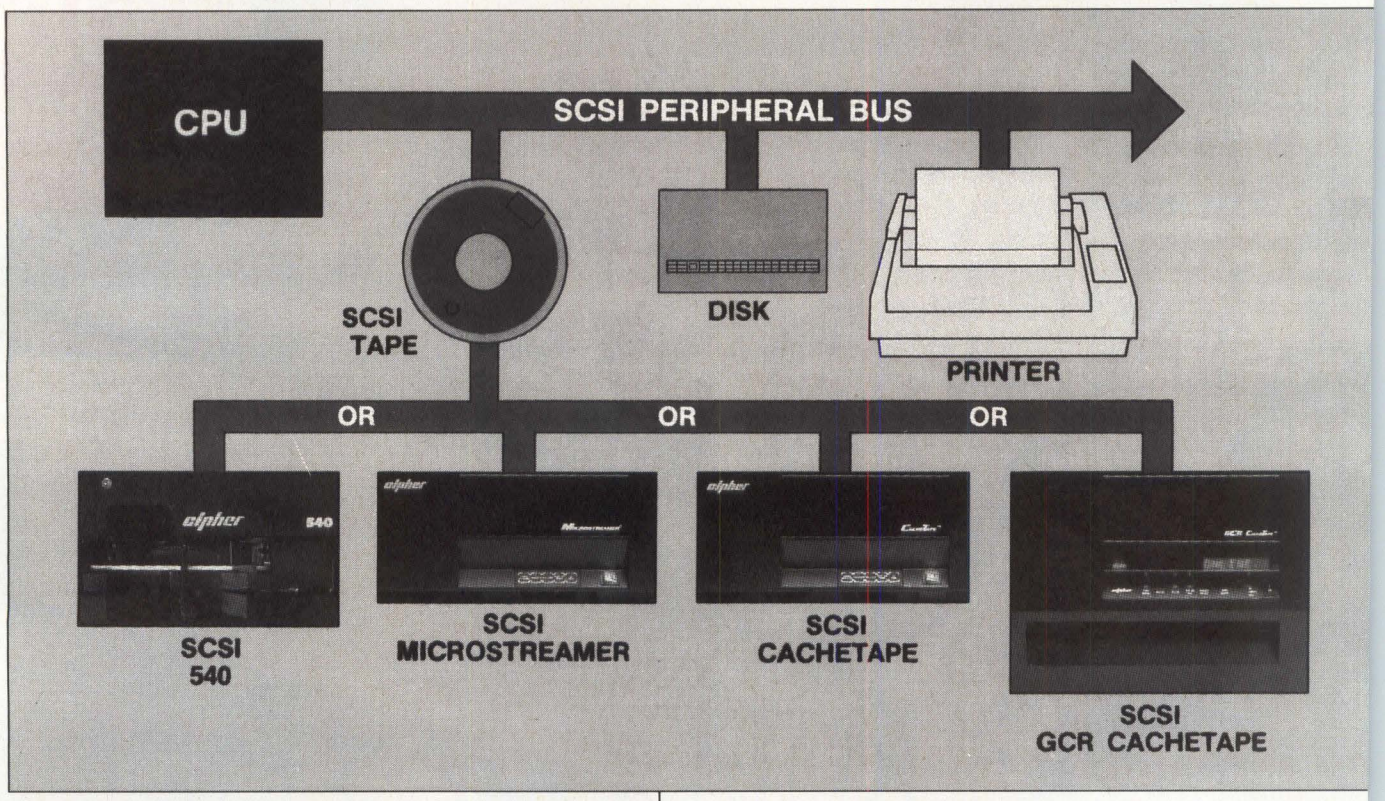
High Technology from Control Data delivers a 5-1/4" Winchester with truly outstanding performance and reliability. Compare for yourself. Call our Information Hotline 1-800-828-8001 or write OEM Product Marketing, HQN08H, Control Data Corporation, P.O. Box 0, Minneapolis, MN 55440. Also available through your Arrow or Kierulff distributor.

CONTROL DATA

Toll Free Hotline 1-800-828-8001 Ext. 82
In Mn. 612-921-4400

CIRCLE NO. 24 ON INQUIRY CARD

The Cipher



Cipher announces SCSI-compatible ½-inch tape peripherals.

SCSI, known as the new standard interface for small, low-end computer systems, is also gaining ground in the high-performance market. With the continuing delay in the development of the Intelligent Peripherals Interface (IPI) for disks, SCSI has found its way into larger systems as well.

Cipher has taken the lead in bringing a full line of easy-to-integrate tape drives to this emerging marketplace. In addition to the 540S ¼-inch streamer, three ½-inch products, the Microstreamer,® CacheTape® and GCR CacheTape,® are also available in SCSI-compatible versions.

SCSI enables integrators to use a single hardware interface, regardless of which drives are being used.

Cipher's SCSI option is a full implementation of the interface specifications being reviewed by ANSI. It offers all of the standard features found with most intelligent interfaces, plus ANSI-supported bus arbitration, disconnect/reconnect and copy command. Multiple initiator and multiple target features to improve tape management and backup efficiency are also included.

Cipher engineers can provide expertise to help you integrate tape drives into SCSI systems. For more information call 1-800-4-CIPHER, ext. 9.

Nixdorf cuts tape integration costs with CacheTape.

When Nixdorf Computer AG needed a new tape drive for their System 8850,™ their first choice was Cipher's Microstreamer. "It offered both streaming and 25 ips

For a copy of Cipher's annual report, call 1-800-4-CIPHER, ext. 9.

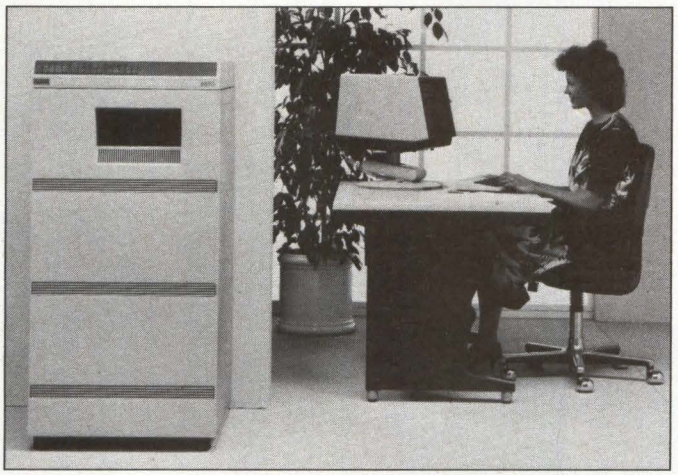
CIRCLE NO. 22 ON INQUIRY CARD

Files.

Number 1 in a series for OEMs and System Integrators.

cipher data products, inc.

10101 Old Grove Road
P.O. Box 85170
San Diego, CA 92138



start-stop capability at a lower cost than the standard 25 ips drive we were using," said Rainer Muhlenweg, director of OEM product selection.

However, rather than spend time changing software to integrate the Microstreamer, Nixdorf found that Cipher's CacheTape could be integrated immediately, without modification.

"The intelligent cache memory enabled the drive's performance to be matched to that of the computer by managing the differences internally," said Muhlenweg. "And the additional cost of the cache memory was insignificant, compared to what the integration costs would have been without it."

As for the Microstreamer, Nixdorf will be using it in three other systems whose software already allows streaming.

Cipher introduces mainframe-to-PC connection.

If you have an IBM PC,® XT® or AT® you can now access 9-track tape. Just insert the tape into any Cipher Series 9000 ½-inch Tape Subsystem.™ From there, you can upload and download data directly with your PC.

These subsystems act as low-cost, transportable links to large computers and tape libraries. They allow you to freely access and manipulate data, without accessing the mainframe.

Because they are tape devices, there are no expensive data communication costs, or the physical restrictions of micro-to-mainframe networking.

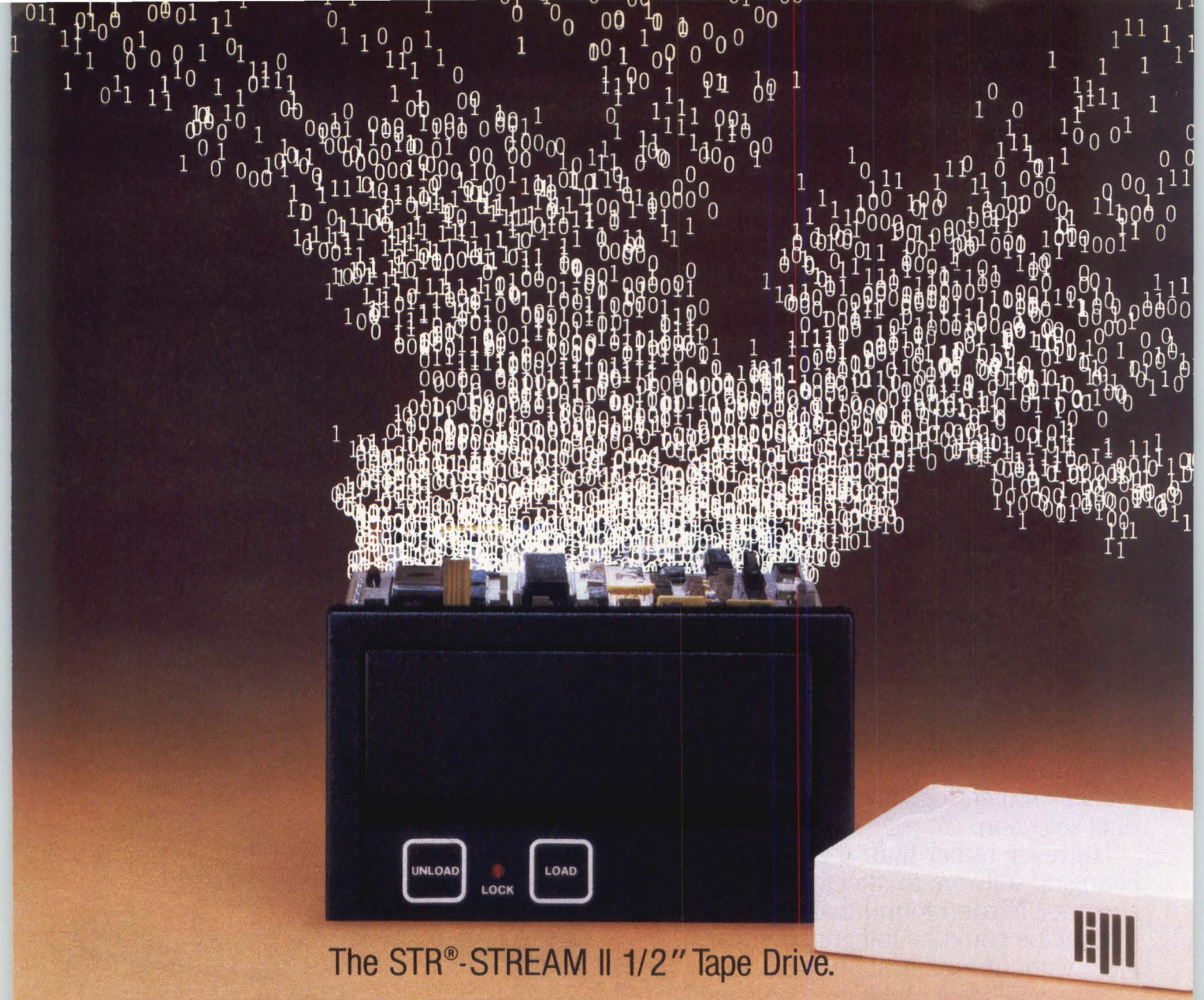
If you'd like to access 9-track tape with your PC, call 1-800-4-CIPHER, ext. 9.

CacheTape: The streamer for systems that can't stream.

Adding a streamer to systems that can't stream leaves integrators with a difficult choice. They can modify the software to fit the streamer. Or they can keep the software the same and sacrifice streaming performance.

Cipher's CacheTape® solves both problems. It gives you three to four times the performance of traditional streamers, and it works with existing start-stop software. And it's only 40% of the price of traditional start-stop drives.

To learn why CacheTape is the streamer that makes sense in systems that can't stream, call 1-800-4-CIPHER, ext. 9.



The STR®-STREAM II 1/2″ Tape Drive.

130 million bytes can't be wrong.

If you've got a lot of data to backup off your system hard disk (up to 130 Mbytes) and can't afford a lot of time to make sure it's done accurately, then you should take note of the new EPI STR-STREAM II 1/2″ cartridge tape drive. It features 130 Mbyte capacity in a single 1/2″ tape cartridge, one of the lowest cost-per-megabyte figures of any competing mass storage device, and the proven accuracy of reel-to-reel technology.

The screamin' streamer.

You get an almost unbelievable 225 kbytes/sec transfer rate. That coupled with an EPI controller means it can operate continuously in streaming mode to backup a full 130 Mbytes in under 12 minutes. And deliver a guaranteed bit error rate of less than one hard error in 10^{11} bits.

Compatibility, innovation, and reliability complete the story.

Tape guide accuracy of ±.001 inch means that tapes can be freely interchanged between any STR-STREAM II drives. And our proprietary multi-bump, constant-curvature head assures accurate and repeatable head-to-tape contact. The drive fits in the same space as a standard 5 1/4″ disk drive, operates off the same supply voltages, and features a superior MTBF of 15,000 power-on hours.

For more information on the STR-STREAM II 1/2″ cartridge tape drive, call us today at (303) 761-8540, or write Electronic Processors, Inc., 1265 W. Dartmouth Ave., Englewood, CO 80110.

ELECTRONIC PROCESSORS INCORPORATED

"Let EPI remember for you."

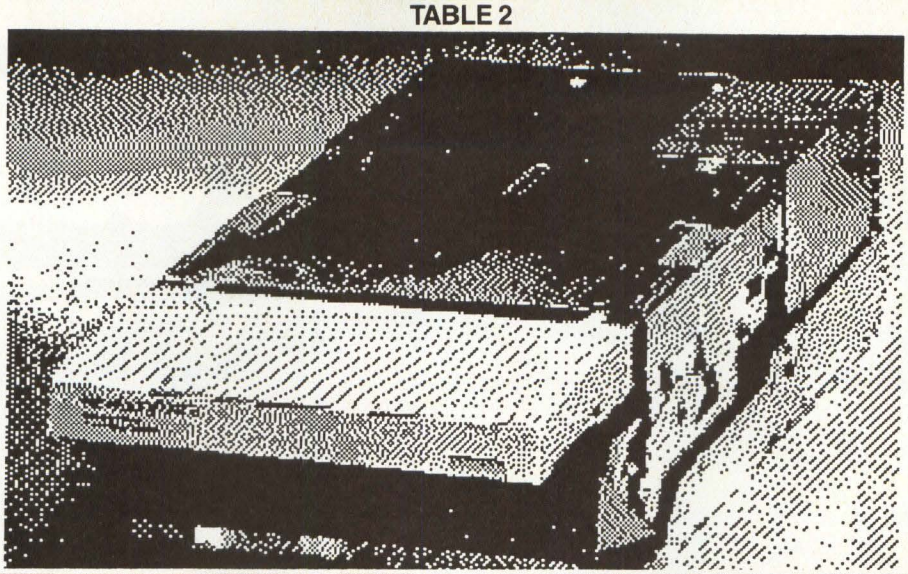
841

CIRCLE NO. 26 ON INQUIRY CARD

Please see us at Booth 1205

5¼-INCH AND SMALLER CARTRIDGE DISK DRIVES

TABLE 2



Company / Model	Disk size (inches)	Unformatted capacity (M bytes)	Average access time (msec.)	Number of data surfaces	Number of read/write heads	Actuator type	Dimensions (HxWxD/inches)	Interface	Price $ (quantity)	Notes, features, options
HEWLETT-PACKARD CO. P.O.Box 39, Boise, ID 83707, (208) 323-6000										**Circle 189**
HP 7942A	5¼	30 (fixed)	30	3	3	linear	8.4 x 12.8 x 11.2	HP-IB	8,500(Q1)	
HP 7946A	5¼	72 (fixed)	30	7	7	linear	8.4 x 12.8 x 11.2	HP-IB	10,500(Q1)	
IOMEGA CORP. 1821 W. 4000 South, Roy, UT 84067, (801) 776-7330										**Circle 190**
Beta-5	5¼	5.23, 8.24 (removable)	39			closed-loop stepper motor	3.25 x 5.75 x 8	ST506	895(Q1); 675(Q100)	
MICRO STORAGE CORP. 2986 Oakmead Village Ct., Santa Clara, CA 95051, (408) 986-0770										**Circle 191**
MS212	5¼	12.9 (removable)	95	2	2	closed-loop stepper motor	1.63 x 5.75 x 8	ST506/ 412	1,075(Q1); 685(Q500)	thin-film media
MILTOPE CORP. 1770 Walt Whitman Rd., Melville, NY 11747, (516) 420-0200										**Circle 192**
RDS 150X	5¼	21 (fixed)/ 21 (removable)	40	3	3	rotary	9.38 x 8.5 x 11.75	ST506, SCSI	22,000(Q1)	ruggedized for military environments
RDS 860X	5¼	86 (fixed)/ 86 (removable)	40	8	8	rotary	7.62 x 10.1 x 19.56	ST506, SCSI	25,000(Q1)	ruggedized for military environments
RDS 100X	3½	10 (fixed)/ 10 (removable)	35	5	5	rotary	4 x 6 x 8	ST506, SCSI	18,500(Q1)	ruggedized for military environments
NEWBURY DATA RECORDING LTD. Hawthorne Rd., Staines, Middlesex TW18 3BJ, England, 0784/61500										**Circle 193**
NDR 505	5¼	6.4 (fixed)/ 6.4 (removable)	50	4	4	closed-loop linear voice coil	3.25 x 5.75 x 10.6	ST506		embedded servo
SYQUEST TECHNOLOGY 47923 Warm Springs Blvd., Fremont, CA 94539, (415) 490-7511										**Circle 194**
SQ306RD	3.9	6.38 (fixed)/ 5 (removable)	85	2	2		1.6 x 4.8 x 8	ST506	995(Q1); 600(Q500)	thin-film media
SQ312RD	3.9	12.75 (fixed)/ 10 (removable)	85	2	2		1.6 x 4.8 x 8	ST506	1,095(Q1); 775(Q500)	thin-film media
TECMAR INC. 6225 Cochran Rd., Solon, OH 44139, (216) 349-3130										**Circle 195**
Macdrive	5¼	5 (fixed)/ 10 (removable)	90		1				1,995– 3,290(Q1)	standalone, includes power supply and cables
Internal Hard Drive	5¼	5 (removable)	90		1				1,995(Q1)	
WESTERN DYNEX CORP. 3536 W. Osborn Rd., Phoenix, AZ 85019, (602) 269-6401										**Circle 196**
WD505	5¼	6.38 (removable)	35	2	2	stepper motor	3.25 x 5.75 x 8	ST506	875(Q1); 495(Q500)	microprocessor controlled

Our brain

child.

Announcing the Q200™ intelligent disk drive.

The first half-high, 5¼-inch disk drive with the brains and the capacity (53 and 80MB, formatted) to outwit high costs now, and in generations of systems yet to come. And the first disk drive smart enough to step beyond simply enhancing peripheral functionality, to improving total system performance.

We combined the drive and controller as a fully functional mass storage unit to give you a number of advantages. Controller/drive interfacing problems are eliminated, and it takes a lot less time to test and integrate a single component.

The Q200 has its own media defect and error-handling capability, so it not only recognizes errors, but is clever enough to correct them itself. That means a major savings of time and work at your end, with no defect mapping to worry about.

With the SCSI interface, the Q200 breaks through the limits of existing drive technology, into a new way of thinking about system architecture as a whole. Your system no longer has to be designed and redesigned to accommodate a mixed bag of peripheral interfaces. System upgrades will no longer mean expensive hardware and software overhauls.

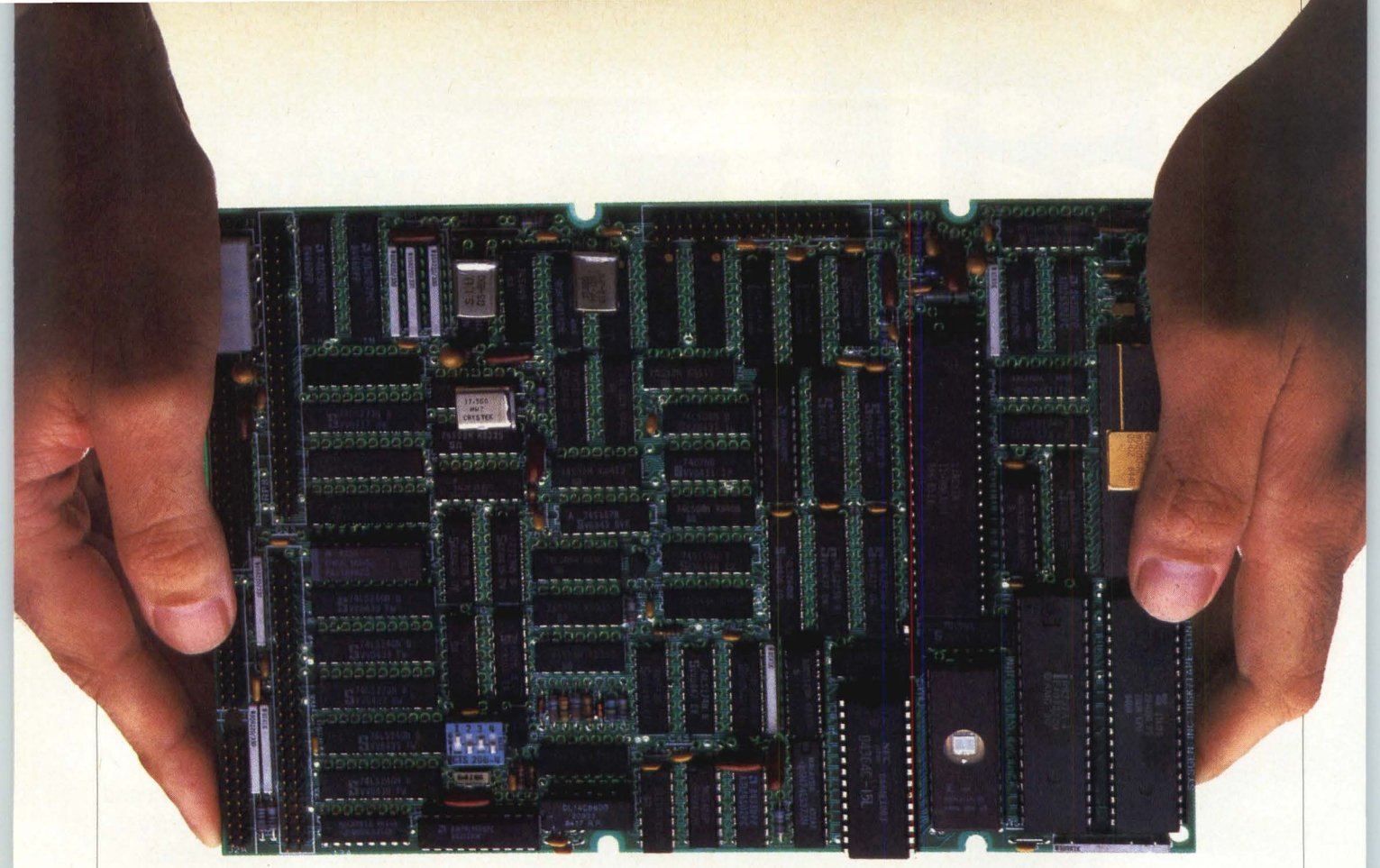
And like every Quantum drive that's come before it, our latest brain child was born to run longer, on less power, with fewer parts. This lean breeding not only delivers more in your system, but makes it possible for us to deliver the Q200 to you in very high volumes. At prices that will make this baby look very, very smart, indeed.

Please call us for more information. Quantum Corporation, 1804 McCarthy Boulevard, Milpitas, CA 95035, (408) 262-1100. TWX 910-338-2203. Eastern Regional Sales Office: Salem, NH (603) 893-2672. Western Regional Sales Office: Santa Clara, CA (408) 980-8555. European Sales Office: Frankfurt, West Germany 069-666-6167. Quantum products are distributed in the United States and Canada by Arrow Electronics.

Quantum

See us at Systems '85 Hall 7, Booth E26

CIRCLE NO. 27 ON INQUIRY CARD



NEED A GREAT SCSI DISK/TAPE CONTROLLER AT A GREAT PRICE?

Here is Sysgen's SI 536, a low cost, high performance, dual function controller on a single board.

It integrates as many as two ST506/412 Winchester hard disk drives and a QIC-36 basic streaming tape drive into an industry standard, SCSI-based system providing QIC-24 tape data format.

VLSI-based design. High performance. Low price.

The SI 536's advanced VLSI design and efficient dual-bus architecture provide full data management: host-to-disk, host-to-tape, and disk-to-tape off line transfer. That's a full-functioned disk controller, and full tape functions including Sysgen's well known fast and accurate data transfer features, with complete SCSI industry standard implementation, all on one board!

SI 536 advanced local intelligence reduces the burden on host interface software. It significantly *improves* overall system performance and reliability while supporting SCSI's advanced features. All this without compromise to your budget—the SI 536 is competitively priced at $395 in single unit quantities.

Intelligent solution for *easy* integration, *low* cost.

Because Sysgen's SI 536 provides the intelligence, you can build a less expensive "basic" drive into your system configuration. You choose the drives and host adaptor to suit your particular application. Combine it with Sysgen's SI 536, and you've got an affordable, easily integrated, reliable disk/tape subsystem for your SCSI-based system.

You can't afford not to call.

For more information on the SI 536 and the rest of the Sysgen™ family, call Sysgen at **415-490-6770**, and ask for OEM sales. **Dept. S6**

47853 Warm Springs Blvd.
Fremont, CA. 94539

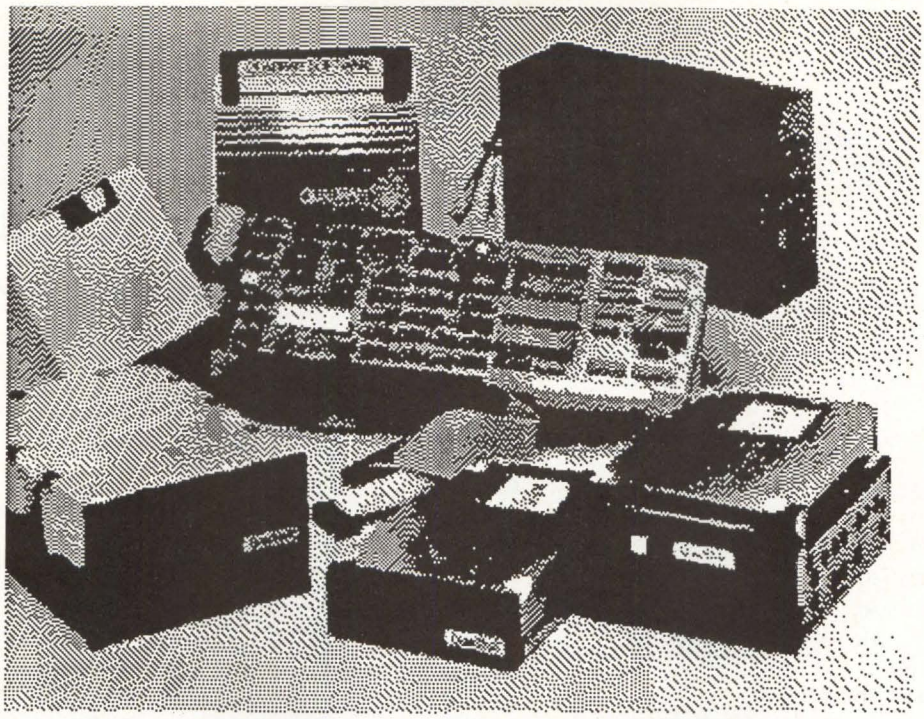
Trademarks: Sysgen—Sysgen, Inc.

SYSGEN
INCORPORATED

See us at COMDEX/FALL '85, Booth #H8724/Hilton Pavillion West

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS

TABLE 3



Company / Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
APPLE COMPUTER INC. 20525 Mariani Dr., Cupertino, CA 95014, (408) 996-1010						**Circle 197**
Profile	5¼	5, 10 (fixed)	Seagate	Apple II, III, Lisa	1,495/1,995(Q1)	includes controller and power supply
AST RESEARCH INC. 2121 Alton Ave., Irvine, CA 92714, (714) 863-1333						**Circle 198**
COL-PC/AT	5¼	74 (fixed)	Fujitsu	IBM PC	7,499(Q1)	60M-byte tape cartridge drive backup
ATASI CORP. 2075 Zanker Rd., San Jose, CA 95131, (408) 995-0335						**Circle 199**
AT Speed-Stor	5¼	42.9 (fixed)	ATASI 3051	IBM PC/AT	2,195(Q1)	includes cables and software
XT Speed-Stor	5¼	42.9 (fixed)	ATASI 3051	IBM PC/XT	2,195(Q1); 2,595(Q100)	includes cables and software
BERING INDUSTRIES INC. 1400 Fulton Ave., Fremont, CA 94539, (415) 651-3300						**Circle 200**
3000	5¼	5–60 (fixed)/ 5–60 (removable)	CMI, Miniscribe, Rodime	HP-IB, IEEE-488	4,380–5,880(Q1)	includes controller and power supply; opt. disk and file sharing
8000	5¼	10–70 (fixed)/ 10–70 (removable)	CMI, Miniscribe, Rodime	HP-IB, IEEE-488	1,790–7,790(Q1)	includes controller and power supply; opt. disk and file sharing
8010RM, 8310RM	5¼	10 (fixed)/ 10 (removable)	DMA 360	HP-IB, IEEE-488	3,890–4,190(Q1)	opt. disk and file sharing
TW-1xx Sponge and Disk	5¼	10–30 (fixed)/ 10–30 (removable)	CMI, Miniscribe, Rodime	HP-IB, IEEE-488	4,380–5,880(Q1)	includes controller and power supply
BULL PERIPHERALS CORP. 766 San Aleso, Sunnyvale, CA 94086, (408) 745-0855						**Circle 201**
DSS 5300 Easy Box	5¼	25.8, 43, 60.1, 70 (fixed)	Bull D530, D570, D550, D585	Apple IIe, TRS 80 II, Multibus, Q-bus, S-100, Unibus	2,380-2,930(Q100)	includes power supply for one disk drive and controller
CHASE TECHNOLOGIES INC. 375 Sylvan Ave., Englewood Cliffs, NJ 07632, (201) 894-5544						**Circle 202**
CTI-100	5¼	100 (fixed)	Chase	IBM PC/AT/XT and compatibles	7,595(Q1)	includes cables, controller and software
CTI-100/ ATK	5¼	100 (fixed)	Chase	IBM PC/AT/XT and compatibles	6,995(Q1)	includes cables, controller and software

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS
TABLE 3

Company / Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
CTI-100/ ATQ	5¼	100 (fixed)	Chase	IBM PC/AT/XT and compatibles	8,995(Q1)	includes cables, controller and software
CTI-100/9	5¼	100 (fixed)	Chase	IBM PC/AT/XT	13,995(Q1)	includes cables, controller and software
CHRISLIN INDUSTRIES INC. 31352 Via Colinas, No. 101, Westlake Village, CA 91362, (818) 991-2254						**Circle 203**
CI-550-10WF	5¼	10 (fixed)	NEC, Rodime	DEC, Q-bus	2,195(Q1)	
CI-550-20W	5¼	20 (fixed)	NEC, Rodime	DEC, Q-bus	2,595(Q1)	
CI-550-30W	5¼	30 (fixed)	NEC, Rodime	DEC, Q-bus	2,995(Q1)	
CI-820-10	5¼	10 (fixed)	NEC, Rodime	DEC, Q-bus	4,295(Q1)	
CI-820-20	5¼	20 (fixed)	NEC, Rodime	DEC, Q-bus	4,495(Q1)	
CI-820-40	5¼	20 (fixed)	NEC, Rodime	DEC, Q-bus	5,295(Q1)	
CI-TQK25	5¼	70 (fixed)	Control Data	DEC	2,995(Q1)	
COMPUTER DYNAMICS INC. 105 S. Main St., Greer, SC 29651, (803) 877-7471						**Circle 204**
WIN-3-HDD-10	3½	10 (fixed)	Rodime	STD	1,100(Q1)	fits entirely inside STD bus card cage
WIN-3-HDD-20	3½	20 (fixed)	Newbury Data Recording Ltd.	STD		fits entirely inside STD bus card cage
WIN-3-HDD-40	3½	40 (fixed)	Newbury Data Recording Ltd.	STD		fits entirely inside STD bus card cage
CORVUS SYSTEMS INC. 2100 Corvus Dr., San Jose, CA 95134, (408) 559-7000						**Circle 205**
Omni Drive Model 5	5¼	5.5 (fixed)		IBM PC/XT/AT, PCjr; Apple II, IIe, III, Macintosh; DEC VT100	1,495(Q1)	
Omni Drive Model 11	5¼	11.1 (fixed)		IBM PC/XT/AT, PCjr; Apple II, IIe, III, Macintosh; DEC VT100	1,995(Q1)	
Omni Drive Model 20	5¼	20.9 (fixed)		IBM PC/XT/AT, PCjr; Apple II, IIe, III, Macintosh; DEC VT100	2,795(Q1)	
Omni Drive Model 45	5¼	45.1 (fixed)		IBM PC/XT/AT, PCjr; Apple II, IIe, III, Macintosh	4,995(Q1)	
Omni Drive Model 126	5¼	126 (fixed)		IBM PC/XT/AT, PCjr; Apple II, IIe, III, Macintosh	8,995(Q1)	
TrimLine Combo	5¼	20 (fixed)		IBM PC	3,295(Q1)	built-in tape drive backup
DATREX INC. 3536 W. Osborn Rd., Phoenix, AZ 85019, (602) 272-9491						**Circle 206**
Super XT1000	5¼	10 (removable)	Western Dynex WD505	IBM PC/XT/AT	1,995(Q1); 1,495(Q100)	includes power supply and controller
Super XT1000X	5¼	10 (removable)	Western Dynex WD505	IBM PC/XT/AT	2,495(Q1); 1,995(Q100)	includes power supply and controller
Super XT1500	5¼	10 (fixed)/ 5 (removable)	Western Dynex WD505	IBM PC/XT/AT	1,995(Q1); 1,495(Q100)	includes power supply and controller
Super XT1500X	5¼	10 (fixed)/ 5 (removable)	Western Dynex WD505	IBM PC/XT/AT	2,595(Q1); 2,095(Q100)	includes power supply and controller
Super XT2500	5¼	20 (fixed)/ 5 (removable)	Western Dynex WD505	IBM PC/XT/AT	2,495(Q1); 1,995(Q100)	includes power supply and controller
Super XT2500X	5¼	20 (fixed)/ 5 (removable)	Western Dynex WD505	IBM PC/XT/AT	2,895(Q1); 2,395(Q100)	includes power supply and controller

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS
TABLE 3

Company Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
DIGITAL ELECTRONIC SYSTEMS INC. 302 S. Main St., Estill Springs, TN 37330, (615) 649-5137						**Circle 207**
APPRHE5	5¼	5 (removable)	SyQuest SQ306R	Apple II, Zenith 150	1,995(Q1)	includes cables, power supply and software
APPRHE10	5¼	10 (removable)	SyQuest SQ312R	Apple II	2,660(Q1)	includes cables, power supply and software
IPCFHI10	5¼	10 (fixed)	Tandon	IBM PC/XT/AT	1,460(Q1)	includes cables, power supply and software; internal version $1,310
IPCHI30	5¼	30 (fixed)	SyQuest SQ330	IBM PC/XT/AT	2,410(Q1)	includes cables, power supply and software; internal version $2,220
IPCRHI15	5¼	5 (removable)	SyQuest SQ306R	IBM PC/XT/AT	2,010(Q1)	includes cables, power supply and software; internal version $1,795
IPCRHE10	5¼	10 (removable)	SyQuest SQ312R	IBM PC/XT/AT	2,495(Q1)	includes cables, power supply and software; internal version $2,320
DISC TECH ONE INC. 849 Ward Dr., Santa Barbara, CA 93111, (805) 964-3535						**Circle 208**
Plato 512	5¼	10 (fixed)	Disc Tech One	IBM PC, DEC RL01/02	1,200–2,900(Q1); 1,050–2,500(Q100)	includes cables, controller and power supply
Plato 5019	5¼	15 (fixed)	Disc Tech One	IBM PC, DEC RL01/02	1,250–2,980(Q1); 1,100–2,580(Q100)	includes cables, controller and power supply
Plato 5026	5¼	20 (fixed)	Disc Tech One	IBM PC, DEC RL01/02	1,300–3,050(Q1); 1,150–2,650(Q100)	includes cables, controller and power supply
E-C DATA A/S Tornevangsvej 88, Box 116, DK-3460, Birkerod, Denmark, (02) 81 81 91						**Circle 209**
11-1010	5¼	13 (fixed)	BASF 6188	IBM PC	550(Q100)	
11-1020	5¼	20 (fixed)	BASF	IBM PC	750(Q100)	
11-1030	5¼	32 (fixed)		IBM PC		
11-1005	3.9	5 (fixed)/ 5 (removable)	SyQuest 306	IBM PC		
11-1113	5¼	113 (fixed)	Maxtor	Tandy		
11-1072	5¼	72 (fixed)	Vertex VT-180	Tandy		
FALCON TECHNOLOGY INC. 6644 S. 196th St., Suite T-101, Kent, WA 98032, (206) 251-8282						**Circle 210**
FT 10X20	5¼	21.4 (fixed)/ 10.6 (removable)	Miniscribe, DMA Systems	IBM PC/AT	3,495(Q1)	clock/calendar
PC eXTender 10I/10E	5¼	10.6 (fixed)	Miniscribe	IBM PC/AT	1,495/1,695(Q1)	external version includes power supply
PC eXTender 20I/20E	5¼	21.4 (fixed)	Miniscribe	IBM PC/AT	1,795/1,995(Q1)	external version includes power supply
PC eXTender 30I/30E	5¼	30.1 (fixed)	Tandon	IBM PC/AT	2,695/2,895(Q1)	external version includes power supply
GENIE COMPUTER CORP. 31131 Via Colinas, #402, Westlake Village, CA 91361, (818) 991-6201						**Circle 211**
5+5	5¼	6.4 (fixed)/ 6.4 (removable)			3,295(Q1)	
10+	5¼	10 (fixed)	Ricoh	Apple, IBM PC/XT	1,495(Q1)	
10+10	5¼	20 (fixed)	Ricoh	Apple, IBM PC/XT	3,695(Q1)	
11+11	5¼	13.62 (fixed)/ 13.2 (removable)			3,995(Q1)	
10-20-30	5¼	6.8, 12.75, 19.13 (fixed)	Tulin	Apple, IBM PC/XT		
HEWLETT-PACKARD CO. 3000 Hanover St., Palo Alto, CA 94304, (415) 857-1501						**Circle 212**
9153A/ 9154A	3½	10 (fixed)	HP 97501A	IEEE-488, IBM PC/XT/AT	1,940/1,690(Q1)	

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS
TABLE 3

Company / Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
9133H/ 9134H	5¼	19.9 (fixed)	Seagate ST225		2,740/2,390(Q1)	
IDEASSOCIATES INC. 35 Dunham Rd., Billerica, MA 01821, (617) 663-6878						**Circle 213**
IDEAdisk DPR-30-RF	3.9	20 (fixed)/ 10 (removable)	Rodime, SyQuest	IBM PC/XT/AT		10M to 120M bytes of storage, streaming tape drive backup
INNOVATIVE DATA TECHNOLOGY 5340 Eastgate Mall, San Diego, CA 92121, (619) 587-0555						**Circle 214**
RD2067	5¼	67 (fixed)	Maxtor	IBM PC/XT/AT	6,500(Q1)	
RD2093	5¼	93 (fixed)	Maxtor	IBM PC/XT/AT	7,200(Q1)	
RD2126	5¼	126 (fixed)	Maxtor	IBM PC/XT/AT	8,300(Q1)	
IOMEGA CORP. 1815 W. 4000 South, Roy, UT 84067, (801) 778-1000						**Circle 215**
Macintosh Bernoulli Box	5¼	5 (removable)		Apple Macintosh		includes power supply
LANCORE TECHNOLOGIES INC. 31324 Via Colinas, Westlake Village, CA 91362, (818) 991-5100						**Circle 216**
Core 45	5¼	43.35 (fixed)		IBM PC/XT/AT	5,995(Q1)	LAN file server
Core 75	5¼	71.30 (fixed)		IBM PC/XT/AT	6,995(Q1)	LAN file server
LOBO SYSTEMS INC. P.O. Box 4626, Santa Barbara, CA 93140, (805) 564-3356						**Circle 217**
RAM-5A	5¼	5.4 (fixed)	Shugart	Apple II, II+, IIe	995(Q1); 649(Q100)	includes software
RAM-10A	5¼	10.4 (fixed)	Shugart	Apple II, II+, IIe	1,395(Q1); 919(Q100)	includes software
RAM-10I	5¼	10.4 (fixed)	Shugart	IBM	1,395(Q1); 919(Q100)	includes software
NCR CORP. 3718 N. Rock Rd., Wichita, KS 67226, (316) 688-8510						**Circle 218**
6097-754	5¼	72.2 (fixed)		IBM PC/XT/AT	6,495(Q1)	includes power supply, host adapter, tape drive backup
6097-7242	5¼	30.3 (fixed)		IBM PC/XT/AT	4,995(Q1)	includes power supply, host adapter, tape drive backup
NEWBURY DATA RECORDING LTD. Hawthorne Rd., Staines TW18 3BJ, Middlesex, England, 0784/61500						**Circle 219**
NDR 5+5	5¼	5.33 (fixed)/ 5.33 (removable)	NDR 505	IBM PC/XT		power supply
PH-ASSOCIATES INC. 8720 Old Courthouse Rd., Vienna, VA 22180, (703) 281-5762						**Circle 220**
DSS-5	5¼	5 (fixed)	Seagate	Apple II, TRS-80, S-100	1,995(Q1)	includes power supply, cables and controller
DSS-10	5¼	10 (fixed)		Apple II, TRS-80, S-100	2,295(Q1)	includes power supply, cables and controller
DSS-15	5¼	15 (fixed)		Apple II, TRS-80, S-100	2,695(Q1)	includes power supply, cables and controller
Mark-46	5¼		Atasi	Apple II, TRS-80, S-100	3,916(Q1)	includes power supply, cables and controller
PLESSEY PERIPHERAL SYSTEMS INC. (COMPUTER PRODUCTS DIV.) 1674 McGaw Ave., Irvine, CA 92714, (714) 540-9945						**Circle 221**
101D	5¼	20.8 (fixed)	Rodime	DEC, Q-bus	3,590(Q1); 2,550(Q100)	opt. cartridge tape drive backup
102D	5¼	41.6 (fixed)	Rodime	DEC, Q-bus	4,435(Q1); 3,150(Q100)	opt. cartridge tape drive backup
103D	5¼	67.1 (fixed)	Rodime	DEC, Q-bus	5,420(Q1); 3,850(Q100)	opt. cartridge tape drive backup

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS
TABLE 3

Company Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
104D	5¼	112.8 (fixed)	Maxtor	DEC, Q-bus	8,240(Q1); 5,850(Q100)	opt. cartridge tape drive backup
193D	5¼	134.2 (fixed)	Maxtor	DEC, Q-bus	10,070(Q1); 7,150(Q100)	
194D	5¼	225.6 (fixed)	Maxtor	DEC, Q-bus	14,010(Q1); 9,945(Q100)	
POLYMORPHIC SYSTEMS 5330 Debbie Rd., Santa Barbara, CA 93111, (805) 967-0468						**Circle 222**
HD/18		15 (fixed)	Seagate ST519	S-100	2,995(Q1); 1,797(Q100)	includes software, controller, power supply
HD/18+		15 (fixed)/ 5 (removable)	Seagate ST519, SyQuest 306R	S-100	4,995(Q1); 2,997(Q100)	includes software, controller, power supply
HD/40		40 (fixed)	Vertex V150	S-100	3,995(Q1); 2,397(Q100)	includes software, controller, power supply
QDP COMPUTER SYSTEMS 10330 Brecksville Rd., Brecksville, OH 44141, (216) 526-0838						**Circle 223**
QDP H12	5¼	10 (fixed)	Miniscribe	IBM, S-100	995(Q1)	includes cables and controller
QDP H26	5¼	20 (fixed)	Tulin	IBM, S-100	1,795(Q1)	includes cables and controller
QDP H40T	5¼	30 (fixed)	Tulin	IBM, S-100	2,695(Q1)	includes cables and controller
QDP H40Q	5¼	32 (fixed)	Quantum	IBM, S-100	3,995(Q1)	includes cables and controller
QUADRAM CORP. 4355 International Blvd., Norcross, GA 30093, (404) 923-6666						**Circle 224**
6MB Removable QuadDisk	5¼	5 (fixed)/ 5 (removable)	Quadram QD7000	IBM PC	1,395(Q1)	includes controller, user's manual and software
12MB Half-Height QuadDisk	5¼	10 (fixed)	Quadram QD7010	IBM PC	1,450(Q1)	includes controller, cables, power supply and software
6/12 Combo QuadDisk	5¼	10 (fixed)/ 5 (removable)	Quadram QD7018	IBM PC	2,595(Q1)	includes controller, cables, power supply and software
12MB Full-Height QuadDisk	5¼	10 (fixed)	Quadram QD7012	IBM PC	1,195(Q1)	includes controller, cables, power supply and software
20MB Full-Height QuadDisk	5¼	15 (fixed)	Quadram QD7020	IBM PC	1,495(Q1)	includes controller, cables, power supply and software
27MB Full-Height QuadDisk	5¼	20 (fixed)	Quadram QD7027	IBM PC	1,695(Q1)	includes controller, cables, power supply and software
72MB Full-Height QuadDisk		60 (fixed)	Quadram QD7072	IBM PC	4,495(Q1)	includes controller, cables, power supply and software
QUALOGY INC. 2241 Lundy Ave., San Jose, CA 95131, (408) 946-5800						**Circle 225**
D914	5¼	120 (fixed)	Maxtor, Kennedy	Q-bus	10,395(Q1); 7,069(Q100)	tape drive backup
D924GT	5¼	36 (fixed)	Quantum, Kennedy	Q-bus	7,894(Q1); 5,369(Q100)	tape drive backup
D930GT	5¼	88 (fixed)	Maxtor, Kennedy	Q-bus	9,795(Q1); 6,661(Q100)	tape drive backup
D934GT	5¼	120 (fixed)	Maxtor, Kennedy	Q-bus	10,595(Q1); 7,205(Q100)	tape drive backup
D934GL	5¼	120 (fixed)	Maxtor	Q-bus	8,395(Q1); 5,709(Q100)	can support additional disks
D964GL	5¼	240 (fixed)	Maxtor	Q-bus	12,995(Q1); 8,837(Q100)	can support additional disks
D964GT	5¼	240 (fixed)	Maxtor, Kennedy	Q-bus	15,095(Q1); 10,265(Q100)	tape drive backup
D994GL	5¼	480 (fixed)	Maxtor	Q-bus	21,995(Q1); 14,957(Q100)	tape drive backup

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS
TABLE 3

Company / Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
SUMITRONICS INC. 580 N. Pastoria Ave., Sunnyvale, CA 94086, (408) 737-7683						Circle 226
STX-3000	5¼	10, 20 (fixed)	Densei RD-3000	IBM PC, DEC RL01/02	600(Q1)	
SUNOL SYSTEMS 1187 Quarry Lane, Pleasanton, CA 94566, (415) 484-3322						Circle 227
Sun*Mac Disk Server	5¼	10, 16, 25, 45, 70, 110 (fixed)			4,795–7,195(Q1)	opt. tape drive backup
SYSGEN INC. 47853 Warm Springs Blvd., Fremont, CA 94539, (415) 490-6770						Circle 228
I/O	5¼	21 (fixed)	Miniscribe	IBM PC	1,995(Q1)	includes power supply and 6 expansion slots
X/L	5¼	20 (fixed)	Miniscribe	IBM PC/XT/AT and compatibles	3,295(Q1)	includes power supply, host adapter, software and 20M-byte streaming tape drive backup
XT-EXTRA	3½	10 (fixed)	Fujitsu	IBM PC/XT	1,395(Q1)	includes host adapter and 20M-byte automatic tape drive backup
SYSTEMS PERIPHERALS CONSULTANTS 9749 Businesspark Ave., San Diego, CA 92131, (619) 693-8611						Circle 229
Diskit 10C	5¼	10.7 (fixed)	Miniscribe	IBM PCjr., Kaypro, Sanyo 550, S-100	995(Q1); 745(Q100)	
Diskit 22C	5¼	21.4 (fixed)	Tulin	IBM PCjr., Kaypro, Sanyo 550, S-100	1,295(Q1); 995(Q100)	
Diskit 34C	5¼	34.8 (fixed)	Tulin	IBM PCjr., Kaypro, Sanyo 550, S-100	1,695(Q1); 1,295(Q100)	
Diskit 5RC	3.9	5 (removable)	SyQuest	IBM PCjr., Kaypro, Sanyo 550, S-100	1,295(Q1)	
Diskit Remedy	5¼	10 (removable)	DMA Systems	IBM PCjr., Kaypro, Sanyo 550, S-100	1,895(Q1)	
Diskit Remedy 2	5¼	20 (removable)	DMA Systems	IBM PCjr., Kaypro, Sanyo 550, S-100	2,995(Q1)	
Ultrastore 60	5¼	60 (fixed)	Maxtor 1070	IBM PCjr., Kaypro, Sanyo 550, S-100	3,995(Q1)	
Ultrastore 70	5¼	70 (fixed)	proprietary	IBM PCjr., Kaypro, Sanyo 550, S-100	4,495(Q1)	
Ultrastore 120	5¼	120 (fixed)	Maxtor 1140	IBM PCjr., Kaypro, Sanyo 550, S-100	4,995(Q1)	
TALLGRASS TECHNOLOGIES CORP. 11100 W. 82nd St., Overland Park, KS 66214, (913) 492-6002						Circle 230
TG-5025	5¼	25 (fixed)	Miniscribe	IBM PC/XT/AT	3,495(Q1)	includes 60M-byte cartridge tape drive backup
TG-6135	5¼	35 (fixed)	Miniscribe	IBM PC/XT/AT	4,495(Q1)	includes 60M-byte cartridge tape drive backup
TG-6180	5¼	80 (fixed)	Miniscribe	IBM PC/XT/AT	7,495(Q1)	includes 60M-byte cartridge tape drive backup
XIDEX CO. 5100 Patrick Henry Dr., Santa Clara, CA 95050, (408) 988-3472						Circle 231
AT-150	5¼	42.7 (fixed)	Vertex	IBM PC/AT	2,495(Q1); 1,340(Q100)	
AT-170	5¼	59.5 (fixed)	Vertex	IBM PC/AT	2,995(Q1); 1,641(Q100)	
AT-225	5¼	21.3 (fixed)	Seagate	IBM PC/AT	1,095(Q1); 544(Q100)	
AT-703	5¼	30 (fixed)	Tandon	IBM PC/AT	1,799(Q1); 970(Q100)	
AT-725	5¼	21.3 (fixed)	Microscience	IBM PC/AT	1,095(Q1); 638(Q100)	
AT-4038	5¼	32 (fixed)	Seagate	IBM PC/AT	1,799(Q1); 970(Q100)	
PC-212	5¼	10.5 (fixed)	Seagate	IBM PC/AT	849(Q1); 452(Q100)	
PC-225	5¼	21.3 (fixed)	Seagate	IBM PC/AT	1,099(Q1); 546(Q100)	

5¼-INCH AND SMALLER DISK DRIVE SUBSYSTEMS
TABLE 3

Company Model	Disk size (inches)	Capacity (M bytes)	Disk drive manufacturer/ model	Computer/bus compatibility	Price $ (quantity)	Notes, features, options
XT-150	5¼	42 (fixed)	Vertex	IBM PC/AT	2,695(Q1); 1,435(Q100)	
XT-170	5¼	60 (fixed)	Vertex	IBM PC/AT	2,995(Q1); 1,641(Q100)	

Information was solicted but not received from the following manufacturers:

Alloy Computer Products Inc.
100 Pennsylvania Ave.
Framingham, MA 01701
(617) 875-6100

Control Data Corp.
Mini-Micro Systems
2200 Berkshire Lane
Minneapolis, MN 55441
(612) 553-4603

Cromemco Inc.
280 Bernardo Ave.
Mountain View, CA 94039
(415) 964-7400

Datapoint Corp.
9725 Datapoint Dr.
San Antonio, TX 78284
(512) 699-7542

Emulex Corp.
3545 Harbor Blvd.
P.O. Box 6725
Costa Mesa, CA 92626
(714) 662-5600

Genisco Memory Products Corp.
10874 Hope St.
Cypress, CA 90630
(714) 220-0720

IBM Corp.
900 King St.
Rye Brook, NY 10573
(914) 934-4839

Tandon Corp.
20320 Prairie St.
P.O. Box 2107
Chatsworth, CA 91311
(818) 993-6644

U.S. Design Corp.
5100 Philadelphia Way
Lanham, MD 20706
(301) 577-2880

DON'T
MISS NEC'S
NEW DISK DRIVES.
BOOTH #2756
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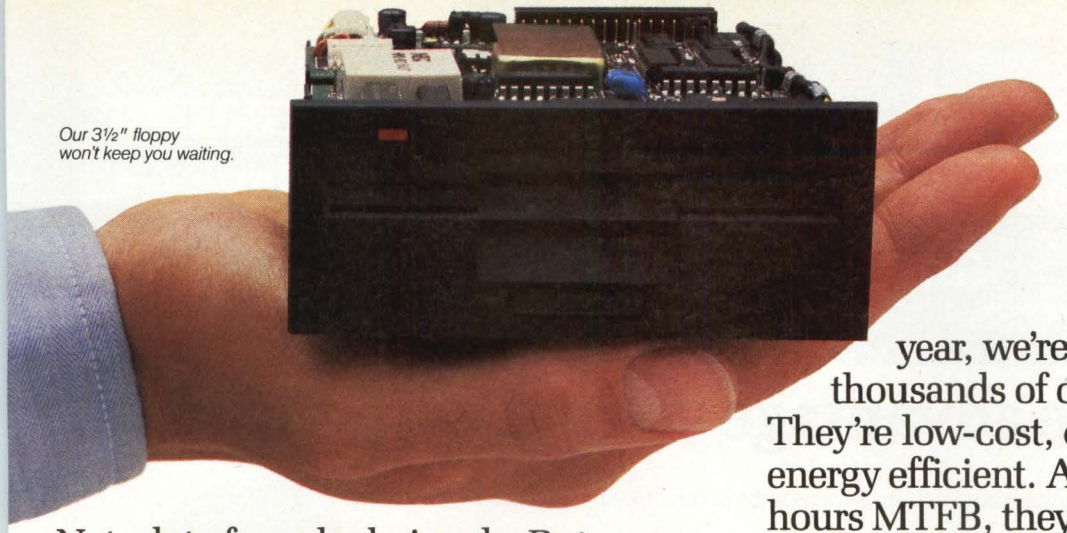
WHAT GOOD IS THE LATEST DISK DRIVE IF IT ARRIVES TOO LATE?



Our 3½" floppy won't keep you waiting.

Not a lot of good, obviously. But that's how some disk drive suppliers do business.

They announce a new drive. Everyone gets excited. Everyone places an order. And then everyone waits. And waits.

At NEC, we do things differently.

When we announce a new drive, we deliver.

It's that simple. No games. No false alarms. And very little waiting.

Just the newest disk drive in your hands. Ready to go.

Why do we do it?

Because time is precious. Yours. And ours. And there are better ways to spend that time than waiting for phantom disk drives.

That's what experience teaches you. And we've got over 25 years experience. Way back in 1959, we were one of the first to develop magnetic recording devices.

Today we're a $9 billion company. And that means we're in this business for the long run.

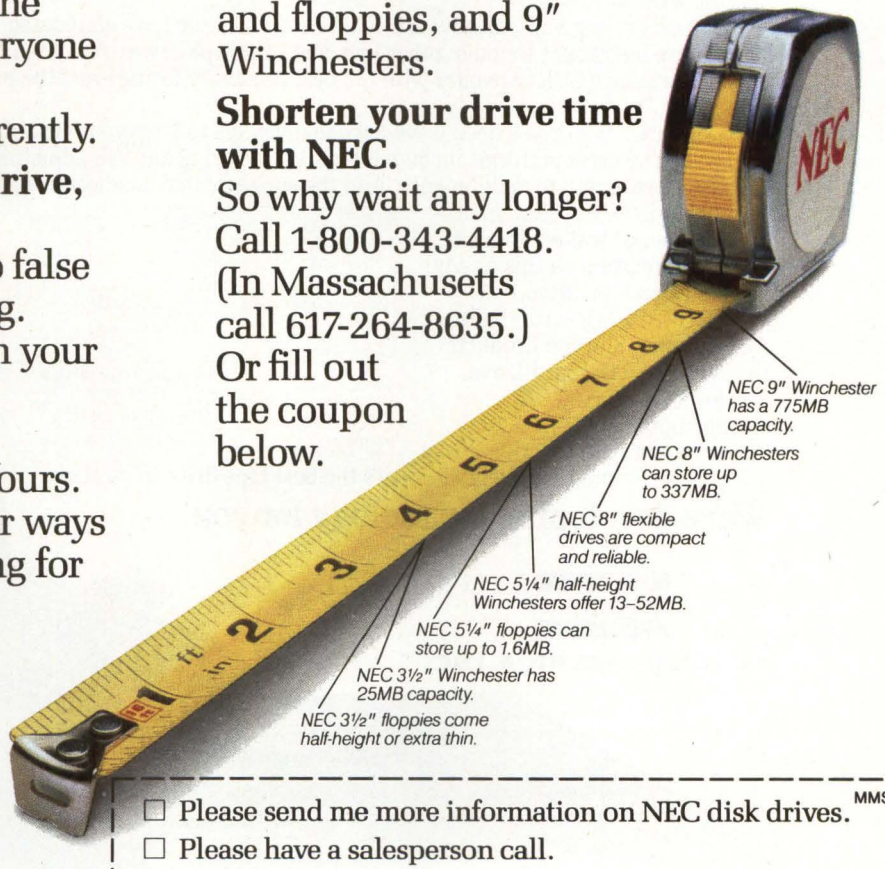
Now we're delivering our 3½" floppy.

How many do you want? This year, we're ready to deliver thousands of our new 3½" drives. They're low-cost, compact and energy efficient. And with 12,000 hours MTFB, they'll run for a long, long time.

If you need other disk drives, NEC also makes 5¼" Winchesters and floppies, 8" Winchesters and floppies, and 9" Winchesters.

Shorten your drive time with NEC.

So why wait any longer? Call 1-800-343-4418. (In Massachusetts call 617-264-8635.) Or fill out the coupon below.



MMS1115

☐ Please send me more information on NEC disk drives.

☐ Please have a salesperson call.

Name

Title

Company

Address

City

State Zip

Tel ( )

NEC Information Systems, Dept. 1610,
1414 Massachusetts Ave., Boxborough, MA 01719.

NEC

NEC Information Systems, Inc.

CIRCLE NO. 30 ON INQUIRY CARD

"With this high-performance GCR Streamer, the benefits begin with reliability and end with cache.

That's the advantage you get with a leader."

Norman B. Petersen, President Storage and Peripheral Products, Fujitsu America, Inc.

At Fujitsu America we want our back-up devices to be second-to-none in price, performance and reliability.

That's why we developed the M244X series ½" GCR tape drive with an intelligent 256KB cache buffer. The buffer means you get all the versatility of our start/stop drive, plus the speed and reliability of our streamer technology. Parameters such as transfer rate, block size and ramp times are all switch selectable so you can easily optimize the drive for your system.

But the cache buffer is just the finishing touch on a tape drive that already outperforms the competition.

By incorporating Fujitsu's advanced LSI electronics, we have eliminated the high-cost, high-failure mechanics found in other low-cost GCR tape drives. As a result, you get a high-performance GCR Streamer with the best reliability rating—and the best price—in its class.

Throughout this drive's design, we have found ways to keep your cost of ownership to a minimum. The drive performs its own internal monitoring and self-adjustment, eliminating costly preventative maintenance. And the sophisticated diagnostics make it possible to isolate system faults without special test equipment.

For information on this or any other Fujitsu tape drive, call (408) 946-8777. Or write Fujitsu America, Inc., Storage Products Division, 3055 Orchard Drive, San Jose, CA 95134-2017.

MODEL	M2442AC	M2444AC
Tape Speed (ips)		
Streaming	100	75
Start/Stop	12.5	25
Recording Density (bpi)	6250/1600	
MTBF	8,000 hours	
Cache Buffer	256 KB	
Transfer Rate	Selectable from 60 KB/sec to 1 MB/sec	
Compatibility	IBM,* ECMA and ANSI	
Interface	Cipher,* Pertec compatible	

The Fujitsu M244XAC GCR Streamer, with cache buffer. From price, to performance, to reliability—it's the best tape drive in its class.

We're developing technology for you.

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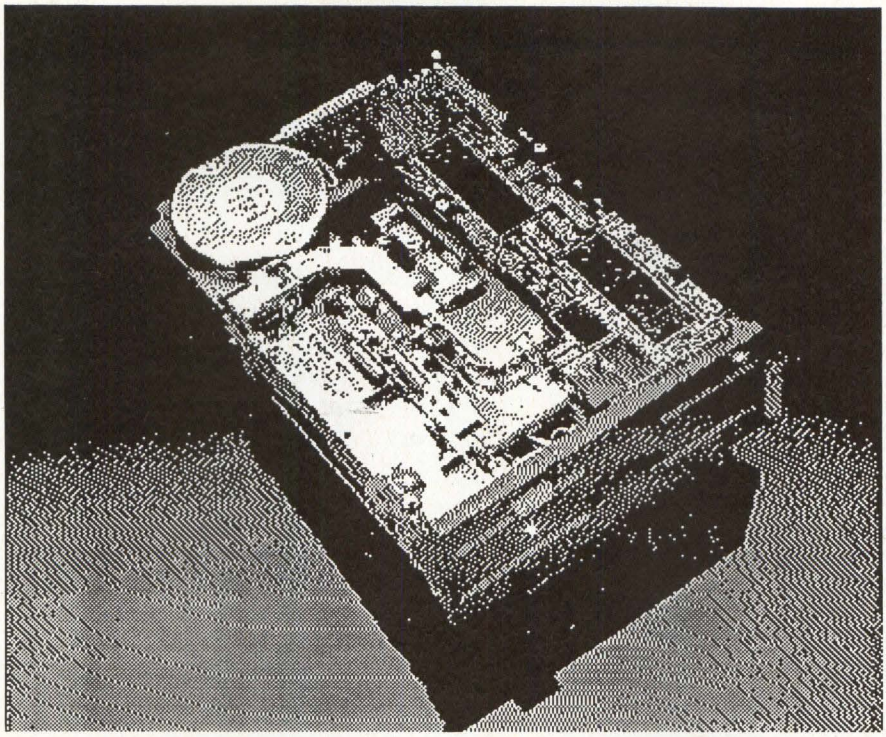
FUJITSU AMERICA, INC.

CIRCLE NO. 31 ON INQUIRY CARD

5¼-INCH FLEXIBLE DISK DRIVES AND SUBSYSTEMS

TABLE 4



Company / Model	Capacity (K bytes)	Single- or double-sided	Average access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
ALPS ELECTRIC (USA) INC. 3553 N. First St., San Jose, CA 95134, (408) 946-6000									Circle 232
DFC122	250	single-sided		250	40	48	1.64 x 5.84 x 8.12		
DFC222	500	double-sided		250	80	48	1.64 x 5.84 x 8.12		
DFC422	1000	double-sided		250	160	96	1.64 x 5.84 x 8.12		
DFC642	1600	double-sided		500	154	96			
DFC682	1000, 1600	double-sided		250, 500	154, 160	96			
ANALOG & DIGITAL PERIPHERALS INC. (ADPI) 815 Diana Dr., Troy, OH 45373, (513) 339-2241									Circle 233
ADPI RS232C Easi Disk	500, 1000	double-sided	158	19.2	40, 80		6.5 x 5.75 x 9.5	995(Q1); 795(Q500)	
IBM PC Compatible RS232C Easi Disk	360	double-sided	158	19.2	40		6.5 x 5.75 x 9.5	1,095(Q1); 825(Q500)	
APPLE COMPUTER INC. 20525 Mariani Dr., Cupertino, CA 95014, (408) 996-1010									Circle 234
Unidisk (subsystem)	143 (formatted)	single-sided	30	125	35	48	3.13 x 6.37 x 8.5	429(Q1)	Apple II, II+, IIe compatible; includes controller
BASF AG Gottlieb-Daimler-Strabe 10, 6800 Mannheim 1, West Germany, 0621/4008-1									Circle 235
BASF 6129 (subsystem)	500 (formatted)		78	250	40	48	1.65 x 5.75 x 7.95		
BASF 6139 (subsystem)	1000 (formatted)		79	250	80	96	1.65 x 5.75 x 7.95		
BASF 6149 (subsystem)	1000, 1600 (formatted)		76, 79	300, 500	77, 80	96	1.65 x 5.75 x 7.95		
BASF 6228	1000		78	250		48	8.46 x 5.75 x 2		
BASF 6238	2000		79	250		96	8.46 x 5.75 x 2		

5¼-INCH FLEXIBLE DISK DRIVES AND SUBSYSTEMS

TABLE 4

Company / Model	Capacity (K bytes)	Single- or double-sided	Average access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
CANON U.S.A. One Canon Plaza, Lake Success, NY 11042, (516) 488-6700									Circle 236
MDD 211	500	double-sided	100	250	40	48	1.34 x 5.92 x 8.8		
MDD 221	1000	double-sided	100	250	80	96	1.34 x 5.92 x 8.8		
MDD 413	1000	double-sided	100	250	40	48	2.3 x 5.92 x 8.8		
MDD 423	2000	double-sided	100	250	80	96	2.3 x 5.92 x 8.8		
MDD 530	1000	double-sided	100	250	80	96	1.68 x 5.92 x 8.28		
MDD 531	500	double-sided	100	250	40	48	1.68 x 5.92 x 8.28		
C. ITOH ELECTRONICS INC. 5301 Beethoven St., Los Angeles, CA 90066, (213) 306-6700									Circle 237
YD-380	1025	double-sided	91	500		96	1.61 x 5.75 x 8		
YD-380-1714	655–1025	double-sided	91, 95	250, 500		96	1.61 x 5.75 x 8		
DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911									Circle 238
6309	768	double-sided	93	250	96	96			half-height
EPSON AMERICA INC. 23600 Telo St., Torrance, CA 90505, (213) 534-4500									Circle 239
SD-58DD	1000, 1600	double-sided	93	250, 500	77, 80	96	1.6 x 5.7 x 7.7	110(Q1)	
SD-521	500	double-sided	97	250	40	48	1.6 x 5.7 x 7.7	95(Q1)	custom bezels
SD-540	1000	double-sided	96	250	80	96	1.6 x 5.7 x 7.7	100(Q1)	custom bezels
SD-580S	1000, 1600	double-sided	93	300, 500	77, 80	96	1.6 x 5.7 x 7.7	110(Q1)	custom bezels
GRECO SYSTEMS 392 Coogan Way, El Cajon, CA 92020, (619) 442-0205									Circle 240
DU-58 (subsystem)	800, 1600, 5400 (formatted)	double-sided	200	9.6–38.4	40, 80, 160	48, 96, 192	5.25 x 10 x 10.5	1,995–3,395(Q1); 1,695–2,885(Q500)	DEC TU58 compatible; opt. RS422, RS423 rackmount
FDS-200 MINIFILE (subsystem)	400, 800, 2700 (formatted)	double-sided	200	9.6	40, 80, 300	48, 96, 192	5.25 x 10 x 10.5	1,990–3,490(Q1); 1,490–2,440(Q500)	opt. parallel interface, dual disk drive, rackmount
HEWLETT-PACKARD CO. 3000 Hanover St., Palo Alto, CA 94304, (415) 857-1501									Circle 241
9125S (subsystem)	up to 512 (formatted)	double-sided	95	500	40	48	4.2 x 12.8 x 11.2	1,200(Q1)	IEEE-488, HP-IB
LOBO SYSTEMS INC. 318 E. Gutierrez St., P.O. Box 4626, Santa Barbara, CA 93101, (805) 564-3356									Circle 242
1500	163	single-sided	93	125	40	48	1.71 x 5.83 x 8.74	199(Q1); 99(Q500)	half-height, Apple II compatible
3101	160	single-sided	250	125	35	48	4 x 6 x 8.9	199(Q1); 109(Q500)	Apple II compatible
3400 (subsystem)	174.08	single-sided	298	125	40	48	4.25 x 13 x 12	485(Q1); 249(Q500)	Max-80-, Tandy-compatible, SASI, packaged as dual drive system with power supply
MICROSCI CORP. 1502 Brookhollow Dr., Suite B, Santa Ana, CA 92705, (714) 241-5600									Circle 243
A2	143	single-sided	18	125	35	48	3.75 x 6 x 8.75	269(Q1)	Apple IIe compatible
A.5	143	single-sided	18	125	35	48	1.88 x 6 x 8.75	269(Q1)	half-height, Apple IIe compatible
A.5c	143	single-sided	18	125	35	48	1.88 x 6 x 8.75	269(Q1)	half-height, Apple IIc compatible
A.5 duo	143 (per drive)		18 (per drive)	125	35 (per drive)	48 (per drive)	3.75 x 6 x 8.75	429(Q1)	stacked half-height drives with controller, Apple IIe compatible

5¼-INCH FLEXIBLE DISK DRIVES AND SUBSYSTEMS

TABLE 4

Company / Model	Capacity (K bytes)	Single- or double-sided	Average access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
A.5s	143 (per drive)	single-sided	18 (per drive)	125	35 (per drive)	48 (per drive)		449(Q1)	side-by-side duo half-height drives, Apple IIe compatible
A143	572	double-sided	5	250	140	96	3.75 x 6 x 8.75	549(Q1)	Apple III compatible
I.5i	250, 500	double-sided	6		40	48	3.75 x 6 x 8.75	375(Q1)	duo half-height internal drive, IBM PC compatible
MILTOPE CORP. 1770 Walt Whitman Rd., Melville, NY 11747, (516) 420-0200									**Circle 244**
BDS-5	5000		40	5000	394		9.5 x 8.5 x 11.75	12,500(Q1)	cartridge-loaded drive functions like a Winchester drive; rug-gedized; ST506, SCSI interfaces
DD-400	3200		6	250		77	6 x 10 x 18		
MITSUBISHI ELECTRONICS AMERICA INC. 991 Knox St., Torrance, CA 90502, (213) 515-3993									**Circle 245**
M4851	500	double-sided	103	250	40	48	1.63 x 5.75 x 7.68		
M4853	1000	double-sided	94	250	80	96	1.63 x 5.75 x 7.68		
M4854	1000, 1600	double-sided	94	250, 500	80	96	1.63 x 5.75 x 7.68		operates in either 1M- or 1.6 M-byte mode
M4855	2000	double-sided	94	500	80	96	1.63 x 5.75 x 7.68		
NEC INFORMATION SYSTEMS INC. 1414 Massachusetts Ave., Boxborough, MA 01719, (617) 264-8000									**Circle 246**
FD1053	500	double-sided	94	250	80	96	1.625 x 5.75 x 8		
FD1055	1000	double-sided	95	250	80	96	1.625 x 5.75 x 8		
OKIDATA CORP. 532 Fellowship Rd., Mt. Laurel, NJ 08054, (604) 235-2600									**Circle 247**
3305HU	500	double-sided	68	250	40	48	1.68 x 5.75 x 7.95		
3315BU	500	double-sided	68	250	40	48	1.12 x 5.75 x 7.95		
OPTOTECH INC. 770 Wooten Rd., Colorado Springs, CO 80915, (303) 570-7500									**Circle 248**
5984	244.3M	double-sided	131	275	18,000	10,000	3.27 x 5.75 x 8	3000(Q1); 975(10,000)	optical disk drive; opt. controller board
PANASONIC INDUSTRIAL CO. 1731 Technology Dr., Suite 650, San Jose, CA 95110, (408) 294-5888									**Circle 249**
JU-455	500	double-sided	93	250	40	48	1.66 x 5.84 x 8.08	125(Q1); 108(Q100)	half-height
JU-475	1600	double-sided	91	250, 500	80	96	1.66 x 5.84 x 8.08	187(Q1); 162(Q100)	dual speed motor, half-height
PERSONAL MICRO COMPUTERS INC. 275 Santa Ana Ct., Sunnyvale, CA 94086, (408) 737-8444									**Circle 250**
FDD-420	400	double-sided	93	250	40	48	5.75 x 1.62 x 8	155(Q1)	
FDD-421	400	double-sided	93	250	40	48	6.5 x 3.5 x 12.3	325(Q1)	includes power supply
FDD-422	800	double-sided	93	250	40	48	6.5 x 3.5 x 12.3	425(Q1)	includes power supply
TEAC CORP. OF AMERICA/ICPD 7733 Telegraph Rd., Montebello, CA 90640, (213) 726-0303									**Circle 251**
FD-55AV/FD-55BV	163.84/ 327.68	single-sided/ double-sided	93	250	40	48	1.62 x 5.75 x 8		
FD-55EV	327.68	single-sided	94	250	80	96	1.62 x 5.75 x 8		
FD-55FV	655.36	double-sided	94	250	80	96	1.62 x 5.75 x 8		
FD-55GFV	655.36, 1183	double-sided	91, 94	500	77, 80	96	1.62 x 5.75 x 8		IBM PC/AT-compatible models available
FD-55GV	1183	double-sided	91	250	77	96	1.62 x 5.75 x 8		
TECHTRAN INDUSTRIES INC. 200 Commerce Dr., Rochester, NY 14623, (716) 334-9640									**Circle 252**
990 (subsystem)	362 (for-matted)			19.2		46	5.25 x 10 x 11.75		(2) RS232C, IBM PC compatible
991 (subsystem)	1200 (for-matted)			19.2		96	5.25 x 10 x 11.75		

5¼-INCH FLEXIBLE DISK DRIVES AND SUBSYSTEMS

TABLE 4

5¼-INCH FLEXIBLE DISK DRIVES AND SUBSYSTEMS

Company / Model	Capacity (K bytes)	Single- or double-sided	Average access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
WELTEC DIGITAL INC. 2991 White Star, Anaheim, CA 92806, (714) 630-7020									Circle 253
M16	1600	double-sided	88	500	80	96		117(Q1000)	interchangeable front bezel
M48	250, 500	single- or double-sided	75	125, 250	80	48	1.61 x 5.75 x 8		interchangeable front bezel
M96	500, 1000	single- or double-sided	88	125, 250	160	96	1.61 x 5.75 x 8		interchangeable front bezel
Y-E DATA INC. 1-1, Higashi-Ikebukuro, 3-chome, Toshima-ku, Tokyo Japan 170, (03) 989-8001									Circle 254
YD-180	1604	double-sided	91	500	154	48	2.2 x 8.5 x 12.6		
YD-380	1604	double-sided	91	500	154	96	5.7 x 1.6 x 8		
YD-480	1000	double-sided	95	250	160	96	5.7 x 1.6 x 8		
YD-580	500	double-sided	148	250	80	48	5.7 x 1.6 x 8		
YD-620	500	double-sided	95	250	80	67.5	4 x 1.6 x 6		
YD-640	1000	double-sided	96	250	160	135	4 x 1.6 x 6		

Information was solicited but not received from the following manufacturers:

Alloy Computer Products Inc.
100 Pennsylvania Ave.
Framingham, MA 01701
(617) 875-6100

Burroughs Corp.
Burroughs Place
Detroit, MI 48232
(313) 972-7350

Caldisk
18600 E. 37th Terrace South
Independence, MO 64057
(816) 373-0000

CGRS Microtech Inc.
P.O. Box 102
Langhorne, PA 19047
(215) 757-0284

Control Data Corp.
P.O. Box 0
Minneapolis, MN 55440
(612) 853-8096

Digital Equipment Corp.
129 Parker St.
Maynard, MA 01754
(617) 897-5111

Genisco Memory Products Corp.
10874 Hope St.
Cypress, CA 90630
(714) 220-0720

Hitachi America Ltd.
950 Elm Ave., Suite 100
San Bruno, CA 94066
(415) 872-1902

IDEAssociates Inc.
35 Dunham Rd.
Billerica, MA 01821
(617) 663-6878

Leading Edge Products
21 Highland Circle
Needham Heights, MA 02194
(617) 828-8150

Micro Peripherals Inc.
4426 S. Century Dr.
Salt Lake City, UT 84123
(801) 263-3081

NCR Corp.
3718 N. Rock Rd.
Witchita, KS 67226
(316) 688-8511

Qualogy
2241 Lundy Ave.
San Jose, CA 95131
(408) 946-5800

Sony Corp. of America
One Sony Dr.
Park Ridge, NJ 07656
(201) 930-1000

Tallgrass Technologies Corp.
11100 W. 82nd St.
Overland Park, KS 66212
(913) 492-6002

Tandon Corp.
20320 Prairie St.
P.O. Box 2107
Chatsworth, CA 91311
(818) 993-6644

Toshiba America Inc.
2441 Michelle Dr.
Tustin, CA 92680
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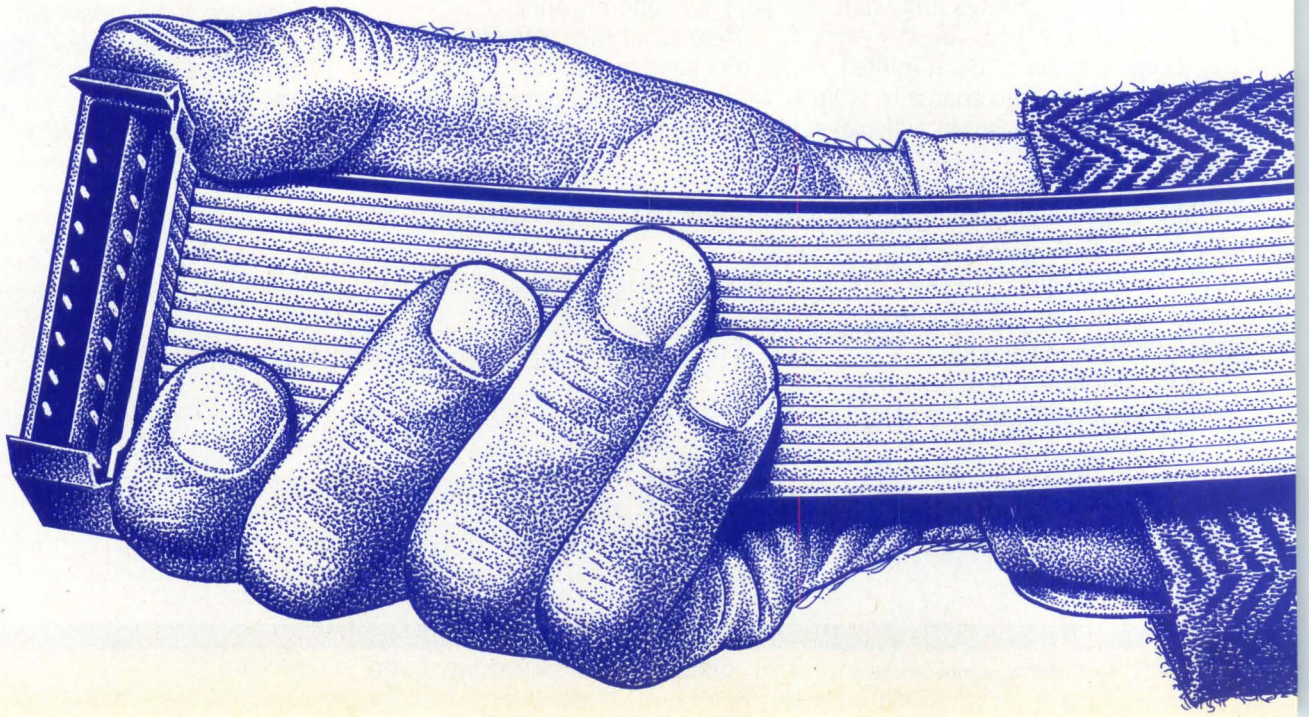

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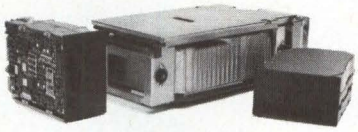

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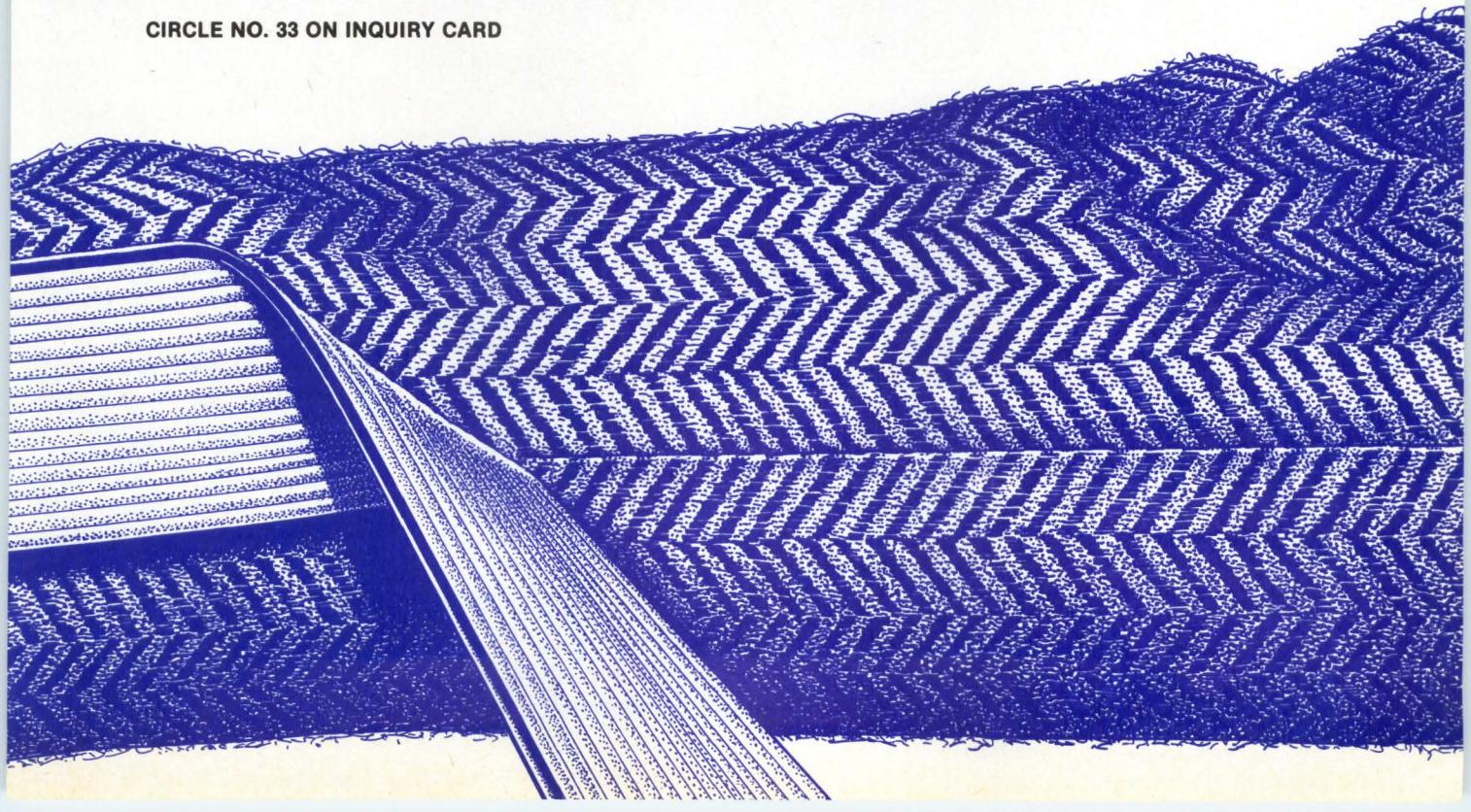

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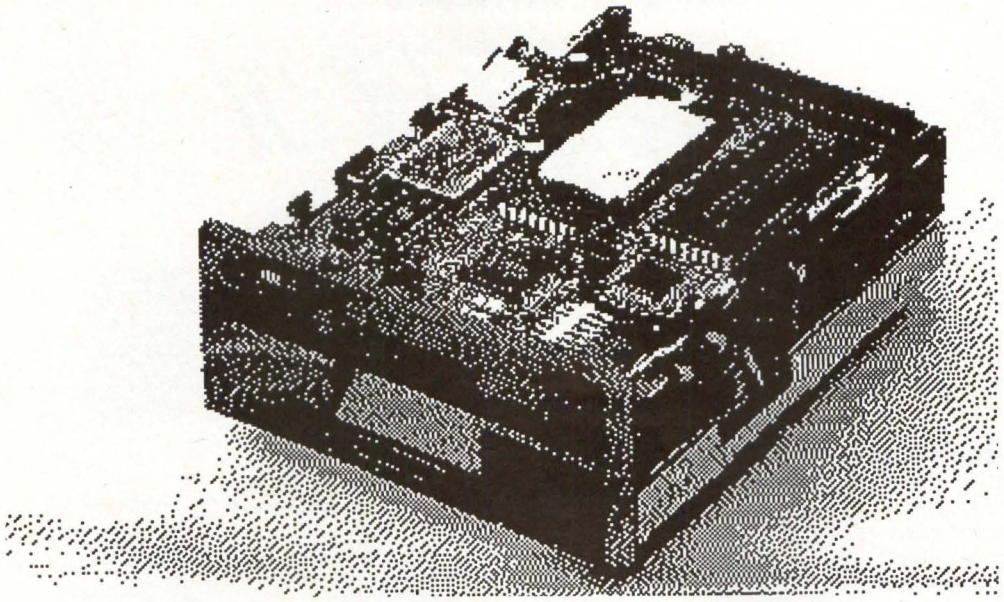
European Sales Office
Telephone: (089) 918047/48
Telex: (841) 897213

MICRO FLEXIBLE DISK DRIVES AND SUBSYSTEMS

TABLE 5



Company / Model	Disk size (inches)	Capacity (K bytes)	Single- or double-sided	Average access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
ALPS ELECTRIC (USA) INC. Circle 255 3553 N. First St., San Jose, CA 95134, (408) 946-6000										
DFL313	3½	500	single-sided		250	80	135	1.64 x 4.08 x 5.6		
DFL413	3½	1000	double-sided		250	160	135	1.64 x 4.08 x 5.6		
ANALOG & DIGITAL PERIPHERALS INC. (ADPI) Circle 256 815 Diana Dr., Troy, OH 45373, (513) 339-2241										
ADPI RS232C 3½ Easi Disk	3½	375, 750	double-sided	158	19.2	80, 160	135	6.5 x 5.15 x 9.5	995(Q1); 795(Q500)	
CANON U.S.A. Circle 257 One Canon Plaza, Lake Success, NY 11042, (516) 488-6700										
MD350	3½	1000	double-sided	100	250	80	135	1.28 x 4.2 x 6.16		
MD351	3½	500	single-sided	100	250	80	135	1.28 x 4.2 x 6.16		
MD352	3½	500	double-sided	100	250	40	67.5	1.28 x 4.2 x 6.16		
MD353	3½	250	single-sided	100	250	40	67.5	1.28 x 4.2 x 6.16		
C. ITOH ELECTRONICS INC. Circle 258 5301 Beethoven St., Los Angeles, CA 90066, (213) 306-6700										
YD-620/625	3½		double-sided	96	250		67	1.63 x 4 x 6		
YD-640/645	3½		double-sided	95	250		135	1.63 x 4 x 6		
CITIZEN AMERICA CORP. Circle 259 2425 Colorado Ave., Suite 300, Santa Monica, CA 90404, (213) 453-0614										
OMDT 00A/10A	3½	500/1000	single sided/ double-sided	331	125/250	80	135	1 x 3.9 x 5.2		
ONDT 40A/50A	3½	500/1000	single-sided/ double-sided	173	125/250	80	135	1 x 4 x 5.9		
EPSON AMERICA INC. Circle 260 23600 Telo St., Torrance, CA 90505, (213) 534-4500										
SMD-150	3½	250	single-sided	97	250	40	67.5	1.6 x 4.064 x 5.9	100(Q1)	
SMD-160/ SMD-170	3½	500	double-sided/ single-sided	97/96	250	40/80	67.5/ 135	1.6 x 4.064 x 5.9	105(Q1)	
SMD-180	3½	1000	double-sided	96	250	80	135	1.6 x 4.064 x 5.9	110(Q1)	
SMD-280H/ SMD-280L	3½	1	double-sided	100	250	80	135	1 x 4 x 5.88	95/100(Q1)	

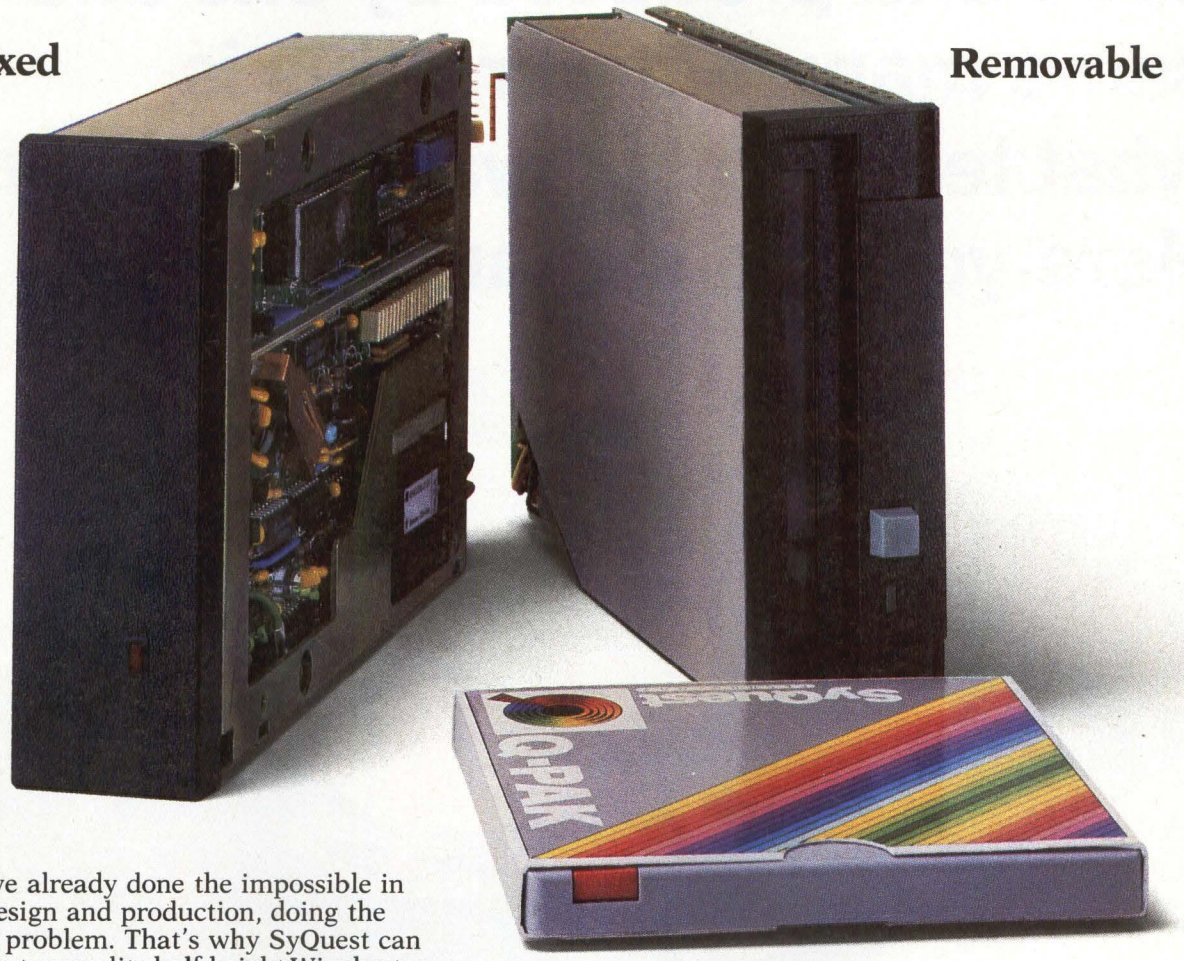
MICRO FLEXIBLE DISK DRIVES AND SUBSYSTEMS

TABLE 5

Company / Model	Disk size (inches)	Capacity (K bytes)	Single- or double-sided	Average access time (msec.)	Transfer rate (K bits/sec.)	Tracks/surface	Tracks/inch	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
FUJITSU AMERICA INC. (STORAGE PRODUCTS DIV.) 3055 Orchard Dr., San Jose, CA 95134, (408) 946-8777										Circle 261
M220A	3½	6.37M	double-sided	88	625		450	1.625 x 4 x 5.75	595(Q1); 430(Q500)	
M223A	3½	12.74M	double-sided	88	625		450	1.625 x 4 x 5.75	695(Q1); 485(Q500)	
M224A	3½	19.12M	double-sided	88	625		450	1.625 x 4 x 5.75	895(Q1); 600(Q500)	
HEWLETT-PACKARD CO. (GREELEY DIV.) 3000 Hanover St., Palo Alto, CA 94304, (415) 857-1501										Circle 262
9114A (subsystem)	3½	up to 788 (formatted)	double-sided	428	500	80	135	3.1 x 11.5 x 8	795(Q1)	HP-IL
9122D Dual Drive (subsystem)	3½	up to 788 (per drive) (formatted)	double-sided	428	500	80	135	3.2 x 128 x 11.2	1,390(Q1)	IEEE-488, HP-IB
MITSUBISHI ELECTRONICS AMERICA INC. 991 Knox St., Torrance, CA 90502, (213) 515-3993										Circle 263
MF351/M353	3½	500/1000	single-sided/ double-sided	94	250	80	135	1.63 x 4 x 5.71		
MF353A	3½	1000	double-sided	173	250	80	135	1.26 x 4 x 5.91		
MF354	3½	1600	double-sided	91	500	77	135.5	1.63 x 4 x 5.71		
MF355	3½	2000	double-sided	94	500	80	135.5	1.63 x 4 x 5.71		
NEC INFORMATION SYSTEMS INC. 1414 Massachusetts Ave., Boxborough, MA 01719, (617) 264-8000										Circle 264
FD1035	3½	1000	double-sided	95	250	80	135	1.6 x 4 x 5.9		
PANASONIC INDUSTRIAL CO. 1731 Technology Dr., Suite 650, San Jose, CA 95110, (408) 294-5888										Circle 265
JU-363/ JU-364	3½	1000	double-sided	94	250	80	135	1.28 x 4.06 x 6	138(Q1); 118(Q100)	JU-363 has CMOS interface, JU-364 has TTL interface
SANKYO SEIKI AMERICA INC. 20911 Western Ave., Torrance, CA 90501, (213) 321-0320										Circle 266
FDU-300	3	250, 500	single- or double-sided	3	125, 250	40	100	1.58 x 3.54 x 5.9	250(Q1)	
FDU-355	3½	500, 1000	single- or double-sided	3	125, 250	80	135	1.58 x 4 x 6.05	250(Q1)	
TEAC CORP. OF AMERICA/ICPD 7733 Telegraph Rd., Montebello, CA 90640, (213) 726-0303										Circle 267
FD-35A/ FD-35B	3½	163.8/327.68	single-sided/ double-sided	93	250	40	67.5	1.62 x 4 x 5.37		
FD-35E/ FD-35F	3½	327.68/655.36	single-sided/ double-sided	94	250	80	135	1.62 x 4 x 5.37		
FD-135A/ FD-135B	3½	163.84	single-sided/ double-sided	93	250	40	67.5	1 x 4 x 5.87		
FD-135E/ FD-135F	3½	327.68/655.36	single-sided/ double-sided	94	250	80	135	1 x 4 x 5.87		

SyQuest-
the best in Winchester.
Inside and Out.

Fixed **Removable**



When you've already done the impossible in Winchester design and production, doing the difficult is no problem. That's why SyQuest can lay claim to the top quality half-height Winchester disk drives—removable *and* fixed.

SyQuest 6.38 and 12.76MByte removable cartridge Winchesters, the product many said couldn't be done, are setting the standard of the industry in quality, reliability and performance. Only 4.8 inches wide and 1.625 inches high, they can be configured for a sub 5¼-inch or standard 5¼-inch half-height footprint. More than 60,000 of these drives have been delivered to date for on-line, random access storage. Combining a unique stepper motor positioner with servo control and the ultrareliability of graphite-sputtered, plated media, SyQuest half-height cartridge drives make the impossible possible.

SyQuest half-height fixed disk drives give 25.5 and 38.2MBytes of data storage with the same innovative, yet conservative, design concept. Like our cartridge drives, they are tested and qualified far beyond industry standards. What other manufacturers are finding difficult, SyQuest can deliver today.

So when you need Winchester in a 5¼-inch footprint or smaller—come to the leader. SyQuest, the best in Winchester—inside and out.

SyQuest Technology, 47923 Warm Springs Blvd., Fremont, California 94539. (415) 490-7511, TWX 910-381-7027.

Model	Fixed/Removable	Unformatted	Formatted
SQ306RD	Removable	6.38MByte	5.00MByte
SQ312RD	Removable	12.76MByte	10.00MByte
SQ325F	Fixed	25.50MByte	20.00MByte
SQ338F	Fixed	38.20MByte	30.00MByte

SyQuest
TECHNOLOGY
Winchester at its best.

See Syquest at COMDEX/FALL '85

CIRCLE NO. 35 ON INQUIRY CARD

BASF OEM

Drives and storage media developed and produced by one and the same manufacturer - this is what leads to innovative solutions. Here you can see an example.

List of authorized distributors

West Germany

FELTRON Elektronik-
ZEISSLER & CO. GmbH
D-5210 Troisdorf
Tel. 0 22 41/41 00 - 1 to 5

EMIL LÖFFELHARDT
D-7012 Fellbach
Tel. 07 11/50 07-0

Switzerland

AUMANN + Co. AG
CH-8037 Zürich
Tel. 01/44 33 00

Austria

HITRONIC
A-1130 Wien
Tel. 02 22/82 41 99

Spain

COMELTA
E-28017 Madrid
Tel. 01/7 54 30 01

COMELTA
E-08005 Barcelona
Tel. 03/3 00 77 12

Italy

DATA BASE S.P.A.
I-20147 Milano
Tel. 02/4 03 03

France

P.E.P.
F-92140 Clamart
Tel. 01/6 30 24 56

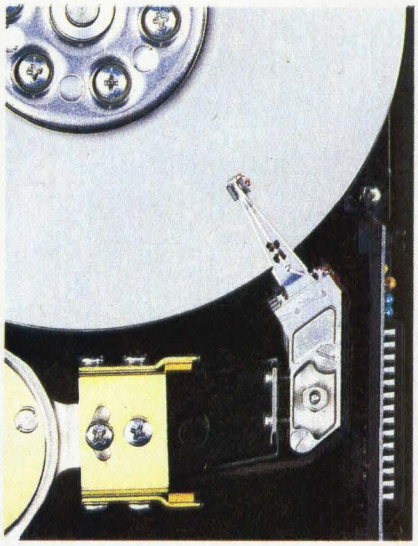
Sweden

SATTCO
Data Och Komponenter
S-17136 Solna
Tel. 08 / 7 34 00 40

Norway

ESTRONIC A/S
N-1364 Hvalstad
Tel. 02 / 78 60 10

With the BASF 6190 fixed-disk drive, we present equipment of the high-performance class.

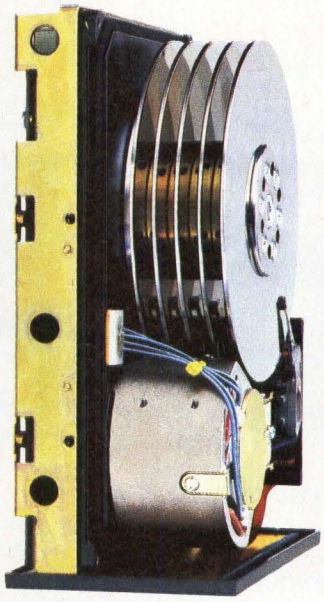


Our new 6190 fixed-disk drive can send the coolest computer pro into raptures. It is easy to see why: A thin-film metal circuit developed by BASF and mini Winchester heads combine to provide a capacity of 94 MB at highest data safety. Thanks to the rotary positioning system, also newly developed, extremely fast data access is assured, together with correspondingly high processing speed to meet severest demands in multi-user/multi-task applications.

With the same painstaking commitment, we keep striving to further increase both the reliability and the life of our systems. The new BASF 6190 fixed-disk drive, for example, uses automatic self-calibration for instant registering and correcting of even the most minimal mechanical irregularities. A microprocessor monitors the unit by self-testing, furnishes status information, and displays it by two-colour LED. These are but two special features among many others designed to ensure faultless operation.

Proof of BASF expertise: the high demand for our licences.

Not only have we been leading from the start in media technology and highly experienced in head technology as well as electronics – we are the only European manufacturer to supply both drives and media. This lead in expertise is evidenced by numerous BASF full and utility patents. It is further proved by a considerable number of licences granted by us to interested parties such as manufacturers of computers and peripherals.



And we are second to none in providing advice, training and partnership.

The high quality standard of our equipment is matched by the quality of our application service, which is a jump ahead of our competitors' services. Since we are a European company, located in West Germany, we guarantee our customers short delivery times and top delivery service. A team of qualified engineers and technicians is charged with the responsibility of being available for our customers whenever these are in need of help. The team's tasks include, beyond personal advice, the providing of technical training as necessary to familiarize the user with his equipment.

The complete disk drives program.

Floppy-Disk-Drives 8″, 5.25″, 3.5″
incl. Slimline-Versions
Fixed-Disk-Drives 5.25″ from 6.38 to 94 M Byte

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Computer Division
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GB-London W1P 6ER
Tel.: 01-388-4200

Compagnie Française BASF S.A.
140, rue Jules Guesde
F-92303 Levallois
Tel. (1) 730-5500

BASF Aktiengesellschaft
OEM Department
Gottlieb-Daimler-Straße 10
D-6800 Mannheim 1
Tel. 0621/4008-369/459

Great Britain
RDR Computer Systems Ltd
Houndmills Basingstoke
HANTS RG 212 X H
Tel. 02 56/46 45 22

Netherlands
DIODE
NL-3526 AM Utrecht
Tel. 030/88 42 14

Belgium
DIODE
B-1140 Brussels
Tel. 02/216 2100

China
CCS
Cogitate Computer Software
Tsim Sha Tsui. Kowloon
Hong Kong
Tel. 03/69 7175-6

BASF BASF

CIRCLE NO. 36 ON INQUIRY CARD

IT PUTS YOUR DATA TO BED SO YOU CAN SLEEP AT NIGHT.

Our Deputy™ cartridge tape drive subsystem ends your nightmares over lost data due to power outages, crashed disks and operator errors.

Its big, 60 MB capacity neatly tucks away the equivalent of 170 floppys (that's a 170 floppys you won't have to buy, shuffle, load or unload). The Deputy is fast too, backing up more than 4 megabytes per minute.

And talk about easy to use. Menu-driven instructions walk you through every step. So you can breeze through File-by-File backups/restores, Image backups/restores and Selective file restores. Deputy even tells you how much data you've backed up or restored.

ADD-IN OR ADD-ON FOR PC's.

The Deputy's half-high 5¼ inch form factor makes it a natural add-in or add-on to the IBM-PC, XT, AT or compatible computer. Plus, it's fully compatible with PC DOS 2.X & 3.X and features full media interchangeability—guaranteed.

As you can see, the Deputy's got a lot for you to feel good about. Including a price that won't keep you awake at night.

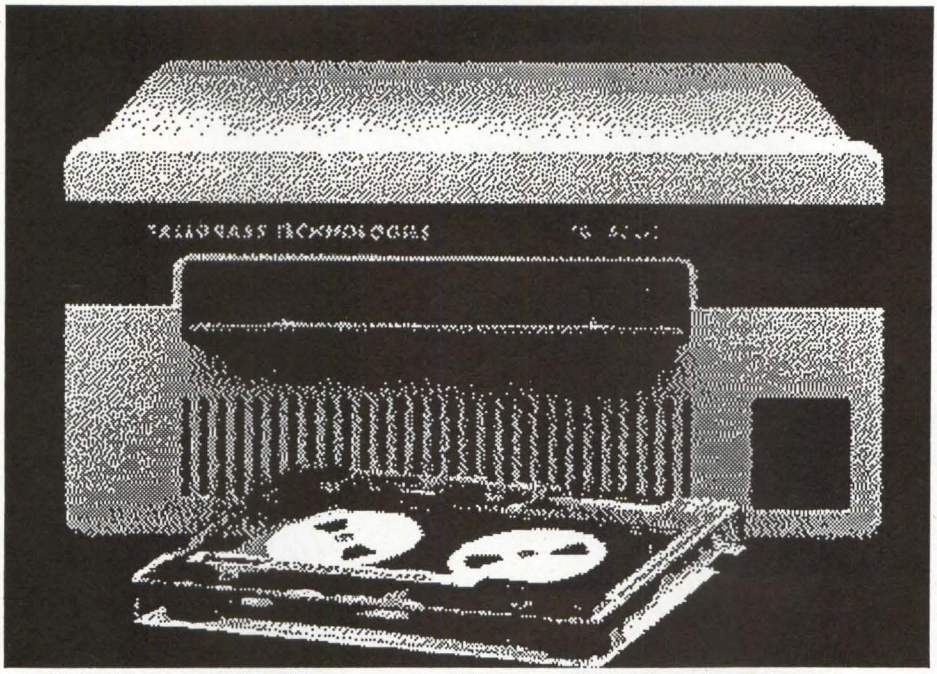
Contact Tandberg Data Inc. for more information at 1590 South Sinclair, Anaheim, California 92806. Phone (714) 978-6771.

TANDBERG DATA

CIRCLE NO. 37 ON INQUIRY CARD

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6



Company Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
3M CO. (DATA RECORDING PRODUCTS DIV.) 225-5N-04 3M Center, St. Paul, MN 55144, (612) 733-5454												**Circle 268**
DCD-1	cartridge	.15	start/stop		1	800–1600	30		serial			
DCD-3	cartridge	.25	start/stop		4	1600	30		serial, ANSI			full electronics or customer designed electronics
HCD-75/60	cartridge	.25	start/stop, streaming	60 (formatted)	16	10,000	60	35	RS232C, SCSI	4.5 x 6.8 x 8.6 (internal)	879(Q100)	
ADVANCED DIGITAL INFORMATION CORP. P.O. Box 2996, Redmond, WA 98073, (206) 881-8004												**Circle 269**
500 Series	cartridge subsystem	.25	start/stop	67 (formatted)	16	10,000	60, 90	35	8-, 16-bit parallel; RS232C; SCSI; IEEE-488	5.5 x 16.5 x 16 (standalone)	2,900–3,900(Q1)	
600 Series	cartridge subsystem	.25	start/stop	132 (formatted)	32	10,000	90, 120	52.5	8-, 16-bit parallel; RS232C; IEEE-488	5.5 x 16.5 x 16 (standalone)	3,900–4,900(Q1)	
ALGO INC. 9198-C Red Branch Rd., Columbia, MD 21045, (301) 730-7442												**Circle 270**
1200	cartridge subsystem	.25	start/stop	4 (formatted)	4	1600	30	19.2	RS232C, IEEE-488	5.5 x 7 x 13 (standalone)	2,245(Q1); 1,796 (Q500)	bidirectional recording, power fail restart
1600	cartridge subsystem	.25	start/stop	16 (formatted)	4	6400	30	19.2	RS232C, IEEE-488	5.5 x 7 x 13 (standalone)	2,995(Q1); 2,396 (Q500)	bidirectional recording, power fail restart
FT1000	cartridge subsystem	.125	start/stop, streaming	20 (formatted)	12	10,000	50	500		2.5 x 7 x 12.5 (standalone)		
ANALOG & DIGITAL PERIPHERALS INC. (ADPI) 815 Diana Dr., Troy, OH 45373, (513) 339-2241												**Circle 271**
ADPI Byte Bucket	cassette subsystem	.25	start/stop	.5	1	800	15	1.5	RS232C, IEEE-488, NCR	6 x 4.5 x 9 (standalone)	780(Q1)	custom design available
ADPI Mega-byte Bucket	cassette	.25	start/stop	1	2	1600	15	3	RS232C	6 x 4.5 x 9 (standalone)	795(Q1)	custom design available

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6

CASSETTE/CARTRIDGE TAPE DRIVES

Company / Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
DC300	cartridge	.25	start/stop	18	4	6400	30	6	TTL serial, CMOS	8 x 7 x 8 (internal)	985(Q1)	
Disklike Cassette System I/II	cassette	.25	start/stop	.5/1	2	800/ 1600	5	.5/1	RS232C, 8-bit parallel	4 x 8.5 x 9.5 (standalone)	723/ 873(Q100)	
Feedback 340	cartridge	.25	start/stop	4	4	1600	30	6	RS232C, RS422	8 x 8 x 13 (standalone)	2,195	custom design available
Feedback 344	cartridge	.25	start/stop	18	4	6400	30	24	RS232C, RS422	8 x 8 x 13 (standalone)	2,250 (Q100)	
LG1/LG2	cassette	.25	start/stop	.1/.2	1		18	.75/1.2	RS232C, 8-bit parallel	3.5 x 3 x 6 (standalone)	388/ 438(Q100)	
MDCR1/ MDCR2	cassette	.25	start/stop	.1/.2	1/2	330– 560	18	.75/1.2	TTL serial, CMOS	3 x 3.5 x 3/ 3 x 3.5 x 1.8 (standalone)	87(Q100)	
Mini DC 1/ Mini DC 2	cartridge/ cassette	.25	start/stop	.25/.5	2	800/ 1600	30	24/48	RS232C, 8-bit parallel	6 x 5.5 x 7 (standalone)	620/ 720(Q100)	
Model 1/ Model 2	cartridge	.25	start/stop	.158/.5	1/2	800/ 1600	30		TTL serial	2.5 x 4 x 6 (internal)	210/ 305(Q100)	
Portable Mini L6-P	cassette	.25	start/stop	.1	1		18	.75	RS232C, 8-bit parallel	5 x 7.75 x 9.5 (standalone)	640(Q100)	
ANRITSU AMERICA INC. 128 Bauer Dr., Oakland, NJ 07436, (201) 337-1111												**Circle 272**
DMT730JP/JG	cartridge	.25	start/stop	38 (formatted)	8	7700	30	28.9/ 250	GP-IB	4.6 x 9 x 14.4 (standalone)	1,679/ 2,159(Q1)	
DMT730KP/ KG	cartridge	.25	streaming	38 (formatted)	8	7700	90	86.7/ 250	GP-IB	4.6 x 9 x 14.4 (standalone)	1,579/ 2,159(Q1)	
ARCHIVE CORP. 3540 Cadillac Ave., Costa Mesa, CA 92626, (714) 641-0279												**Circle 273**
Fastape 20	cartridge	.25	streaming	20 (formatted)	4	8000	90	90	QIC-36	5.25 x 8.56 x 12.42 (standalone)		
Fastape 60	cartridge	.25	streaming	45, 60 (formatted)	9	8000	90	90	QIC-36	5.25 x 8.56 x 12.42 (standalone)		
Scorpion 5920	cartridge	.25	streaming	20, 27 (formatted)	4	8000	90	90	QIC-02, QIC-36	1.625 x 5.75 x 8 (internal)		
Scorpion 5945	cartridge	.25	streaming	45, 60 (formatted)	9	8000	90	90	QIC-02, QIC-36	1.625 x 5.75 x 8 (internal)		
Sidewinder	cartridge	.25	streaming	20, 27 (formatted)	4	8000	90	90	QIC-02	4.5 x 8.55 x 10 (internal)		
Super Sidewinder	cartridge	.25	streaming	45, 60 (formatted)	9	8000	90	90	QIC-02	4.5 x 8.55 x 10 (internal)		
BERING INDUSTRIES INC. 1400 Fulton Place, Fremont, CA 94539, (415) 651-3300												**Circle 274**
Sponge T-100	cartridge subsystem	.25	streaming	20 (formatted)	6	6000	78	42	IEEE-488, HP-IB	4.2 x 15.5 x 17.5 (standalone)	2,380(Q1)	backs up HP 9133XV, 91330 and Bering 3000, 8000 disk drives
BRAEMAR CORP. 11400 Rupp Dr., Burnsville, MN 55337, (612) 890-5135												**Circle 275**
CD-200	cassette	.15	start/stop	1 (unformatted)	2, 4	800	10	8000		4.65 x 4.9 x 3.5 (internal)	360(Q1); 297(Q500)	
CM-600	cassette	.15	start/stop	.145 (unformatted)	2	800	3	2400, 4800		3 x 3 x 2.5 (internal)	155(Q1); 120(Q500)	
CM-600-HD	cassette	.15	start/stop	.5 (unformatted)	4	1600	6	9600		4.5 x 3 x 2.5 (internal)	275(Q1); 220(Q500)	
CS-400	cassette	.15	start/stop	1 (unformatted)	2, 4	800	10	8000	8-bit parallel	4.65 x 4.9 x 5.3 (internal)	525(Q1); 395(Q500)	
CS-500	cassette	.15	start/stop	1 (unformatted)	2, 4	800	10	8000		4.65 x 4.9 x 5.3 (internal)	505(Q1); 395(Q500)	

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6

Company / Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
CIPHER DATA PRODUCTS INC. P.O. Box 85170, San Diego, CA 92138, (619) 578-9100												Circle 276
525	cartridge	.25	streaming	30 (unformatted)	6	6400	39, 78	250, 500	SA450	3.24 x 5.75 x 8.62 (internal)	420(Q500)	
540/ 540S	cartridge	.25	streaming	60 (unformatted)	9	10,000	90	90	QIC-02, SCSI	3.24 x 5.75 x 8.62 (internal)	1,300/ 1,450(Q1); 750/ 890(Q500)	
5210	cartridge subsystem	.25	streaming	24 (formatted)	6	6400	39	250	SA450, IBM PC/XT	5 x 8 x 15 (standalone)	1,095(Q1)	includes power supply, fan
5210-AT	cartridge subsystem	.25	streaming	24 (formatted)	6	6400	39	250	SA450, IBM PC/XT	5 x 8 x 15 (standalone)	1,195(Q1)	includes controller board
CORVUS SYSTEMS INC. 2100 Corvus Dr., San Jose, CA 95134, (408) 559-7000												Circle 277
The Bank	cartridge subsystem	.5	start/stop	103.4–207.2 (formatted)		4620		1	Apple II, IIe, III; DEC Rainbow 100; IBM PC/AT/XT, PCjr.	5.75 x 12 x 16 (standalone)	2,195(Q1)	on-line back-up device that plugs into OMNINET (LAN)
DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911												Circle 278
6231	cartridge	.25	streaming	17.3 (unformatted)	4	6400	60	48	proprietary	4.6 x 8.5 x 14.8 (internal)	5,500(Q1)	
DATA ELECTRONICS INC. 10170 Sorrento Valley Rd., San Diego, CA 92121, (619) 452-2840												Circle 279
Funnel S-2	cartridge	.25	start/stop	20.2 (unformatted)	4	6400	39–90	24	serial	4.25 x 6.95 x 7.75 (internal)	1,495(Q1); 840(Q500)	includes formatter
DIGI-DATA CORP. 8580 Dorsey Run Rd., Jessup, MD 20794, (301) 498-0200												Circle 280
6400	cartridge subsystem	.25	start/stop	18 (formatted)	4	6400	30	24	RS232C, Multibus, Q-bus, S-100	3.25 x 6.9 x 5.75 (internal)	1,190(Q1)	
8300	cartridge subsystem	.25	start/stop	24 (formatted)	4	8333	37.5	39	RS232C, Multibus, Q-bus, S-100	3.25 x 6.9 x 5.75 (internal)	1,390(Q1)	
ELECTRONIC PROCESSORS INC. 1265 W. Dartmouth Ave., Englewood, CO 80110, (303) 761-8540												Circle 281
STR-610A	cartridge	.125	start/stop, streaming	.336 (unformatted)	2	800	18, 60	1.8	8-bit parallel, RS232C	3.2 x 4.8 x 3.75 (standalone)	623(Q1); 503(Q500)	
STR-812	cartridge	.25	start/stop	4.3 (formatted)	4	1600	30, 90	6	RS422	4 x 2 x 12 (standalone)	1,340(Q1); 1,005 (Q500)	
STR-STREAM	cartridge	.25	start/stop	17.3 (unformatted)	4	6400	30, 90	24	SA1000, ST506, Priam	4.15 x 7 x 13.25 (standalone)	1,452(Q1); 1,090 (Q500)	
EMERALD SYSTEMS CORP. 4757 Morena Blvd., San Diego, CA 92117, (619) 270-4994												Circle 282
Series 2000	cartridge subsystem	.25	start/stop, streaming	60 (formatted)	9	8000	90	90		11.25 x 22 x 24.75 (internal)	2,050(Q1)	
Series 8000	cartridge subsystem	.25	start/stop, streaming	60 (formatted)	9	8000	90	90		11.25 x 22 x 24.75 (standalone)	3,150(Q1)	6 expansion slots
Series 9000	cartridge subsystem	.25	start/stop, streaming	60 (formatted)	9	8000	90	90		11.25 x 22 x 24.75 (standalone)	2,250(Q1)	

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6

Company / Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
EMULEX CORP. 3545 Harbor Blvd., Costa Mesa, CA 92626, (714) 662-5600												Circle 283
Decathlon	cartridge subsystem	.25	streaming	36, 67, 110 (formatted)	9	8000	90	86.7	Q-bus, Unibus, IBM PC and compatibles	5.5 x 19 x 23.4 (internal)	3,220–20,675(Q1)	
Javelin	cartridge subsystem	.25	streaming	36, 67, 110 (formatted)	9	8000	90	86.7	Q-bus, Unibus, Multibus, IBM PC	6 x 19 x 16 (internal)	2,750–13,950(Q1)	
Medley	cartridge subsystem	.25	streaming	36, 67 110 (formatted)	9	8000	60	62.3	Q-bus, Unibus	5.25 x 19 x 22 (internal)	3,875–10,500(Q1)	
Vault	cartridge subsystem	.25	streaming	60–70 (formatted)	9	8000	60	62.3	DEC LSI-11, Micro PDP-11, PDP-11, VAX-11	5.5 x 8.25 x 19.5 (internal)	1,205, 2,795(Q1)	
EVEREX SYSTEMS INC. 47777 Warm Springs Blvd., Fremont, CA 94539, (415) 948-1111												Circle 284
EXCEL STREAM-20	cartridge subsystem	.25	streaming	20 (formatted)	9	7000	90	90	QIC-02, IBM PC bus		607(Q1)	internal for IBM PC/XT/AT
EXCEL STREAM-60	cartridge subsystem	.25	streaming	60 (formatted)	9	7585	90	90	QIC-02, IBM PC bus	8 x 5.75 (standalone)	897(Q1)	internal for IBM PC/XT/AT
EXCEL STREAM-100	cartridge subsystem	.25	streaming	100 (formatted)	12	10,000	90	90	QIC-02, IBM PC bus	3.98 x 7.75 x 5.75 (standalone)	1,007(Q1)	
FEEDBACK DATA LTD. Bell Lane, Uckfield, E. Sussex TN22 1PT, England, (44) 0825-61411												Circle 285
340/1	cartridge subsystem	.25	start/stop	5.12 (formatted)	4	1600	30	38.4	RS232C	18 x 9 x 7 (standalone)		DC version, local control
340/2	cartridge subsystem	.25	start/stop	5.12 (formatted)	4	1600	30	38.4	RS232C	18 x 9 x 7 (standalone)		DC version
344/1	cartridge subsystem	.25	start/stop	15.4 (formatted)	4	6400	30	38.4	RS232C	18 x 9 x 7 (standalone)		DC version, local control
344/2	cartridge subsystem	.25	start/stop	15.4 (formatted)	4	6400	30	38.4	RS232C	18 x 9 x 7 (standalone)		DC version
350	cartridge subsystem	.25	start/stop	10.3 (formatted)	2, 4	1600	30	38.4	RS232C	18 x 17 x 7 (standalone)		dual drive unit
351	cartridge subsystem	.25	start/stop	5.12 (formatted)	4	1600	30	38.4	RS232C	18 x 9 x 7 (standalone)		mains or DC versions
GENOA SYSTEMS CORP. 73 E. Trimble Rd., San Jose, CA 95131, (408) 945-9720												Circle 286
3125	cassette	.25	streaming	20 (unformatted)	4	10,000	30, 90	29.15, 87.44	QIC-02	1.62 x 5.75 x 8	995(Q1)	
3160	cartridge	.25	streaming	60 (unformatted)	9		90	86.7	QIC-02	1.62 x 5.75 x 8.5 (internal)	1,395(Q1)	
3225	cassette	.25	streaming	20 (unformatted)	4	10,000	30, 90	29.15, 87.44	QIC-02	5.5 x 8.25 x 15 (standalone)	1,145(Q1)	
3260	cartridge	.25	streaming	60 (unformatted)	9		90	86.7	QIC-02	5.5 x 8.25 x 15 (standalone)	1,595(Q1)	
HEWLETT-PACKARD CO. (GREELEY DIV.) 3000 Hanover St., Palo Alto, CA 94304, (415) 857-1501												Circle 287
9142A	cartridge subsystem	.25	streaming	60 (formatted)	16	9600	62.5, 90	75	HP-IB, IBM PC/XT/AT	5.2 x 12.8 x 11.2 (standalone)	1,690(Q1)	
9144A	cartridge subsystem	.25	streaming	67.1 (formatted)	16	10,000	60, 90	75	HP-IB	5.2 x 12.8 x 11.2 (standalone)	3,500(Q1)	

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6

Company / Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
IRWIN MAGNETICS												**Circle 288**
2311 Green Rd., Ann Arbor, MI 48105, (313) 996-3300												
110	cartridge	.15	streaming	10.35 (formatted)	8	6400	39	250	SA450	.5 x 5.25	699(Q1)	connects to floppy controller, block addressable
125	cartridge	.15	streaming	21.8 (formatted)	12	10,000	55	500	SA450	.5 x 5.25	850(Q1)	connects to floppy controller, block addressable
310	cartridge subsystem	.15	streaming	10.35 (formatted)	8	6400	39	250	SA450, IBM PC/XT	4.25 x 6.75 x 12 (standalone)		connects to external floppy port, block addressable
325	cartridge subsystem	.15	streaming	21.8 (formatted)	12	10,000	55	500	SA450, IBM PC/AT	4.25 x 6.75 x 12 (standalone)	1,095(Q1)	includes card cable connector, block addressable
KENNEDY CO.												**Circle 289**
1600 S. Shamrock Ave., Monrovia, CA 91016, (818) 357-8831												
6455	cartridge	.25	start/stop	23 (formatted)	4	6400	30	24	Pico bus, Pertec	4.5 x 8.5 x 14 (internal)	1,530(Q1); 1,125 (Q500)	emulates .5-inch tape drive without software change
6470	cartridge	.25	start/stop	57.6 (formatted)	10	6400	37.5	30	Pico bus, Pertec	4.5 x 8.5 x 14 (internal)	1,700(Q1); 1,190 (Q500)	emulates .5-inch tape drive without software change
6500	cartridge	.25	start/stop	60 (formatted)	9	8000	90	90	QIC-02, QIC-36, SCSI	1.625 x 5.75 x 8, 3.25 x 5.75 x 8 (internal)	875(Q1); 580(Q500)	
MOYA CORP.												**Circle 290**
9001 Oso Ave. Unit B, Chatsworth, CA 91311, (818) 700-1200												
120-XXX	cartridge	.15	start/stop, streaming	1 (unformatted)	2	3200	30, 90	12		3 x 3.6 x 2.6 (internal)	287(Q1)	
121-XXX	cartridge	.15	start/stop, streaming	1 (unformatted)	2–4	3200	30, 90	12	RS232C, 8-bit parallel	3 x 3.6 x 2.6 (internal)	397(Q1)	
NORTHERN TELECOM INC. (MEMORY SYSTEMS DIV.)												**Circle 291**
100 Phoenix Dr., Ann Arbor, MI 48104, (313) 973-4678												
Flashback 6109-90	cartridge	.25	streaming	81 (unformatted)	9	10,000	90	90	Archive Basic, QIC-02	5.75 x 7.75 x 3.9 (internal)	810(Q1); 545(Q500)	reliable optical sensors
Flashback 6112-90	cartridge	.25	streaming	108 (unformatted)	12	10,000	90	90	Archive Basic, QIC-02	5.75 x 7.75 x 3.9 (internal)	929(Q1); 625(Q500)	reliable optical sensors
PLESSEY PERIPHERAL SYSTEMS INC. (COMPUTER PRODUCTS DIV.)												**Circle 292**
1674 McGaw Ave., Irvine, CA 92714, (714) 540-9945												
149 Q	cartridge subsystem	.125	streaming	18 (formatted)	4		90	85	DEC LSI, Q-bus	21 x 5 x 30 (standalone)		opt. integrated 5- or 8-inch Winchester drive
169 Q	cartridge subsystem	.125	streaming	50 (formatted)	9		45		DEC LSI, Q-bus	21 x 5 x 30 (standalone)		opt. integrated 5- or 8-inch Winchester drive
169 U	cartridge subsystem	125	streaming	50 (formatted)	9		45		DEC PDP, Unibus	21 x 5 x 30 (standalone)		opt. integrated 5- or 8-inch Winchester drive
PRIME COMPUTER INC.												**Circle 293**
Prime Park, Natick, MA 01760, (617) 655-8000												
4581	cartridge subsystem	.25	start/stop	15 (formatted)	4	6400	30, 90	24	Prime 50 Series except 2250		4,500(Q1)	$7,000 with controller
4651-2250	cartridge subsystem	.25	start/stop	15 (formatted)	4	6400	30, 90	24	Prime 2250	(internal)	4,500(Q1)	
QUALOGY INC.												**Circle 294**
2241 Lundy Ave., San Jose, CA 95131, (408) 946-5800												
DS-221	cartridge subsystem	.25		54.3 (formatted)	10	6400	37.5, 75	240	Q-bus	5.23 x 14 x 16.25 (standalone)	3,495(Q1)	emulates DEC TSV05, TS-11

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6

Company / Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
RAYMOND ENGINEERING INC. (RAYCORD PRODUCTS DIV.) Circle 295 217 Smith St., Middletown, CT 06457, (203) 632-1000												
6409	cassette	.15	start/stop	12 (formatted)	2	800	3, 20	.3	RS232C, IEEE-488, 8-bit parallel	3 x 3 x 1.8 (internal)	455(Q1); 365(Q500)	
6440	cassette	.15	start/stop	2 (formatted)	2	800, 1600	10, 30, 60, 90	3, 6	RS232C, IEEE-488, 8-bit parallel	4.5 x 5.5 x 5 (internal)	575(Q1); 465(Q500)	
6449	cartridge	.25	start/stop	4 (formatted)	4	1600	30, 90	6	RS232C, IEEE-488, 8-bit parallel	4.5 x 7.25 x 10.875 (internal)	995(Q1); 745(Q500)	standalone available
6490	cassette	.15	start/stop	.25 (formatted)	2	800, 1600	15, 30	1.5	RS232C, IEEE-488, 8-bit parallel	3 x 3 x 2.5 (internal)	350(Q1); 250(Q500)	
SAYLOR ELECTRONICS INTERNATIONAL Circle 296 1824 Calash Dr., Carson City, NV 89701, (702) 883-4184												
4000-500	cassette	.15	start/stop	5 (formatted)	4	3200	30, 90, 120	12	8-bit parallel, Centronics, GP-IB, RS232C	12 x 14 x 18 (standalone)	6,485(Q1)	self-contained, portable ruggedized system for airborne, shipboard and field vehicle applications
4200	cassette	.15	start/stop, streaming	2 (formatted)	2	1600	30, 90, 120	6	serial TTL	6 x 6 x 8	850(Q1)	
4240	cassette	.15	start/stop, streaming	5 (formatted)	4	3200	30, 90, 120	12	serial TTL	6 x 6 x 8	1,250(Q1)	
SECONDARY COMPUTER STORAGE Circle 297 650 N. Cannon Ave., Lansdale, PA 19446, (215) 362-7050												
6121	cartridge subsystem	.25	start/stop, streaming	67 (formatted)	16	10,000	60	35	Unibus	5.25 x 19 x 22 (standalone)	6,250(Q1); 5,500 (Q500)	
6131	cartridge subsystem	.25	start/stop, streaming	67 (formatted)	16	10,000	60	35	Q-bus	5.25 x 19 x 22 (standalone)	5,200(Q1); 4,500 (Q500)	
6331	cartridge subsystem	.25	start/stop, streaming	134 (formatted)	32	10,000	120	70	Q-bus	5.25 x 19 x 22 (standalone)	5,500(Q1); 4,750 (Q500)	
6421	cartridge	.25	start/stop, streaming	144 (unformatted)	16	10,000	60	35	SCSI	6 x 7 x 12 (standalone)	4,500(Q1); 3,500 (Q500)	
6521		.25	start/stop, streaming	288 (unformatted)	32	10,000	120	70	SCSI	6 x 7 x 12 (standalone)	5,000(Q1); 3,800 (Q500)	
SYSGEN INC. Circle 298 47853 Warm Springs Blvd., Fremont, CA 94539, (415) 490-6770												
Image	cassette subsystem	.125	streaming	10 (formatted)	4	5000	90	3	SC4510	9.25 x 7.25 x 3.87 (standalone)	995(Q1)	
QIC-FILE	cartridge subsystem	.125	streaming	45 (formatted)	9	8000	90	3.75	SC4540Q	10 x 6 x 2.125 (standalone)	1,495(Q1)	internal version $1,395
XL	cartridge subsystem	.125	streaming	60 (formatted)	9	8000	90	5	SC2111XL	11.5 x 17 x 5.5 (standalone)	3,295(Q1)	20M-bytes of hard disk storage
TALLGRASS TECHNOLOGIES CORP. Circle 299 11100 W. 82nd St., Overland Park, KS 66214, (913) 492-6002												
TG-4060	cartridge subsystem	.25		60 (formatted)	11	9600	75	60	parallel, Compaq, IBM PC/AT/XT	10 x 5.3 x 15	1,995(Q1)	
TANDBERG DATA INC. Circle 300 1590 S. Sinclair St., Anaheim, CA 92806, (714) 978-6771												
3229	cartridge	.25	streaming	60 (formatted)	9	8000	90	88	QIC-02	4.5 x 7.6 x 10 (internal)	1,212(Q1); 909(Q500)	

¼-INCH AND SMALLER TAPE CASSETTE/CARTRIDGE DRIVES & SUBSYSTEMS

TABLE 6

Company Model	Drive type	Tape size (inches)	Operating mode	Storage capacity (M bytes)	Number of tracks	Recording density (bpi)	Tape speed (ips)	Data transfer rate (K bytes/sec.)	Interfaces	Dimensions (HxWxD/inches)	Price $ (quantity)	Notes, features, options
3309	cartridge	.25	streaming	60 (formatted)	9	8000	90	88	QIC-44	1.75 x 5.8 x 8.5 (internal)	770(Q1); 500(Q500)	
3319/ 3330	cartridge	.25	streaming	60 (formatted)	9	8000	90	88	QIC-02/ SCSI	3.5 x 5.8 x 8.5 (internal)	1,276(Q1); 829(Q500)	
Deputy Add-In	cartridge subsystem	.25	streaming	60 (formatted)	9	8000	90	88	IBM PC/ AT/XT and compatibles	1.75 x 5.8 x 8.5 (internal)	640(Q500)	includes cable, controller and software
Deputy Add-On	cartridge subsystem	.25	streaming	60 (formatted)	9	8000	90	88	IBM PC/ AT/XT and compatibles	3.5 x 5.9 x 12.8 (standalone)	840(Q500)	includes cables, controller, power supply and software
TEAC CORP. OF AMERICA/ICPD 7733 Telegraph Rd., Montebello, CA 90640, (213) 726-0303												**Circle 301**
MT-2st	cassette	.15	streaming	21.6 (unformatted)	4	7670	30, 90	28.8, 86.3	QIC-02	1.625 x 5.75 x 8 (internal)		error detection
TECHTRAN INDUSTRIES INC. 200 Commerce Dr., Rochester, NY 14623, (716) 334-9640												**Circle 302**
Series 800	cassette	.25	start/stop	.145 (formatted)	2	800	20	.11–9.6	RS232C, CCITT	5 x 7.25 x 11 (standalone)		opt. rackmount, battery power, current loop interface, custom designs
822	cassette	.25	start/stop	.44 (formatted)	2	800	20	.11–9.6	RS232C, CCITT	6.25 x 11.25 x 12.25		tape editor, partial rewind, parity
9600 PRL	cassette	.25	start/stop	.220 (formatted)	2	800	20	.11–9.6	RS232C, CCITT	6.5 x 12 x 8		carry case mount, manual and remote control, auto answer
TR-4	cassette	.25	start/stop	.145 (formatted)	2	800	20	up to 1.2	RS232C, CCITT	5 x 7 x 11		compatible with 103 and 212A modems
VARIANT TECHNOLOGIES INC. 16129 Wyandotte St., Van Nuys, CA 91406, (818) 904-9780												**Circle 303**
VT-500	cartridge subsystem	.25	start/stop, streaming	26 (formatted)	6	6400	78	500	IBM PC/XT/AT	3.5 x 5.8 x 9.25 (standalone)	1,095(Q1)	includes Express software
WANGTEK INC. 41 Moreland Rd., Simi Valley, CA 93065, (805) 583-5255												**Circle 304**
PC-36	cartridge	.25	streaming	60 (formatted)	9	8000	90	90	IBM PC	1.62 x 5.75 x 8.5 (internal)	1,540(Q1); 947(Q500)	
5000E	cartridge	.25	streaming	60 (formatted)	9	8000	90	90	QIC-02	3.25 x 5.75 x 8.5 (internal)	1,520(Q1); 878(Q500)	
5000E Basic Drive	cartridge	.25	streaming	60 (formatted)	9	8000	90	90	QIC-36	1.62 x 5.75 x 8.5	1,050(Q1); 607(Q500)	

Information was solicited but not received from the following manufacturers:

Alloy Computer Products Inc.
100 Pennslyvania Ave.
Framingham, MA 01701
(617) 875-6100

Altos Computer Systems
2641 Orchard Pkwy.
San Jose, CA 95134
(408) 946-6700

Control Data Corp.
P.O. Box 0
Minneapolis, MN 55440
(612) 853-8096

Genisco Memory Products Corp.
10874 Hope St.
Cypress, CA 90630
(714) 220-0720

Miltope Corp.
1770 Walt Whitman Rd.
Melville, NY 11747
(516) 420-0200

Quadram Corp.
4355 International Blvd.
Norcross, GA 30093
(404) 923-6666

Tecmar Inc.
6225 Cochran Rd.
Cleveland, OH 44139
(216) 349-0600

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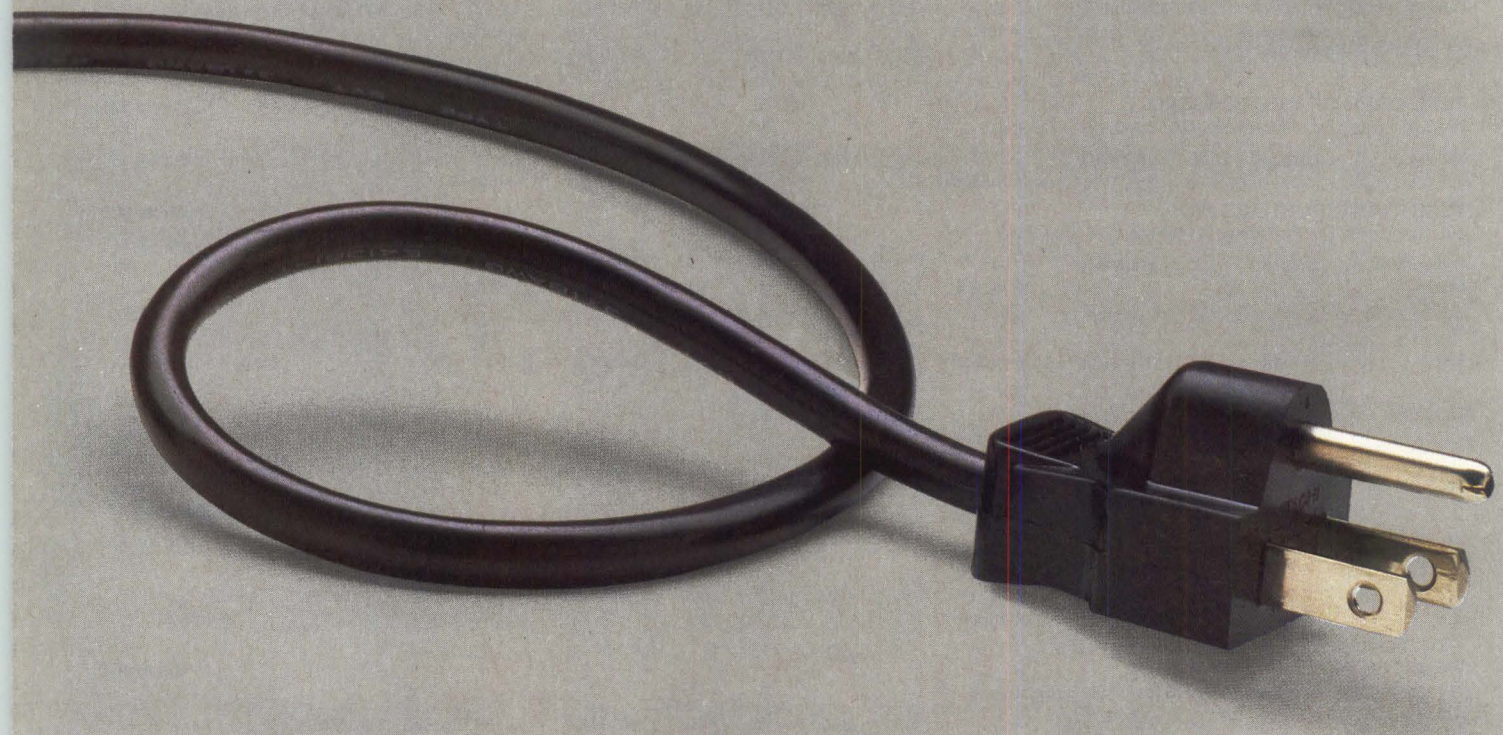

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the quietest dot matrix printer in its class. And the fastest. Plus its unique NEC 24-pin printhead gives it the finest graphics resolution.

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Pinwriter P5
dot matrix printer

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CIRCLE NO. 38 ON INQUIRY CARD

These days, computer printer technology appears to advance at a rate faster than the speed of most computer printers. And just trying to keep pace could easily keep a battalion of engineers occupied on a full-time basis.

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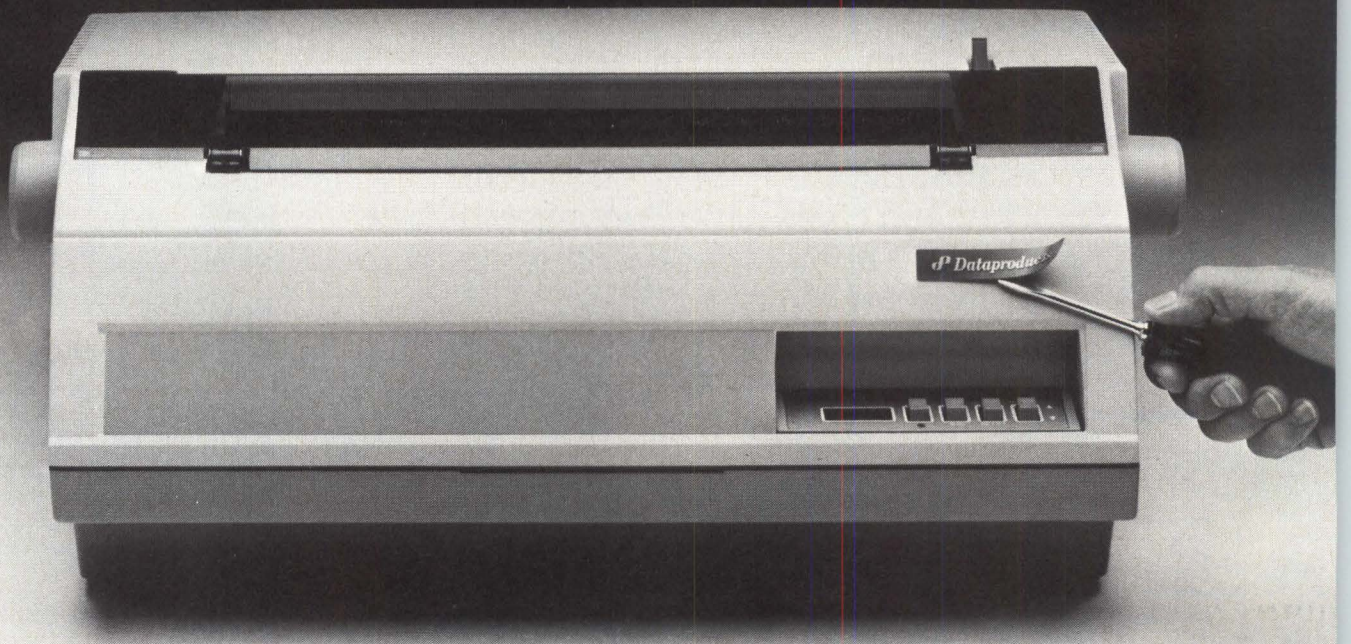
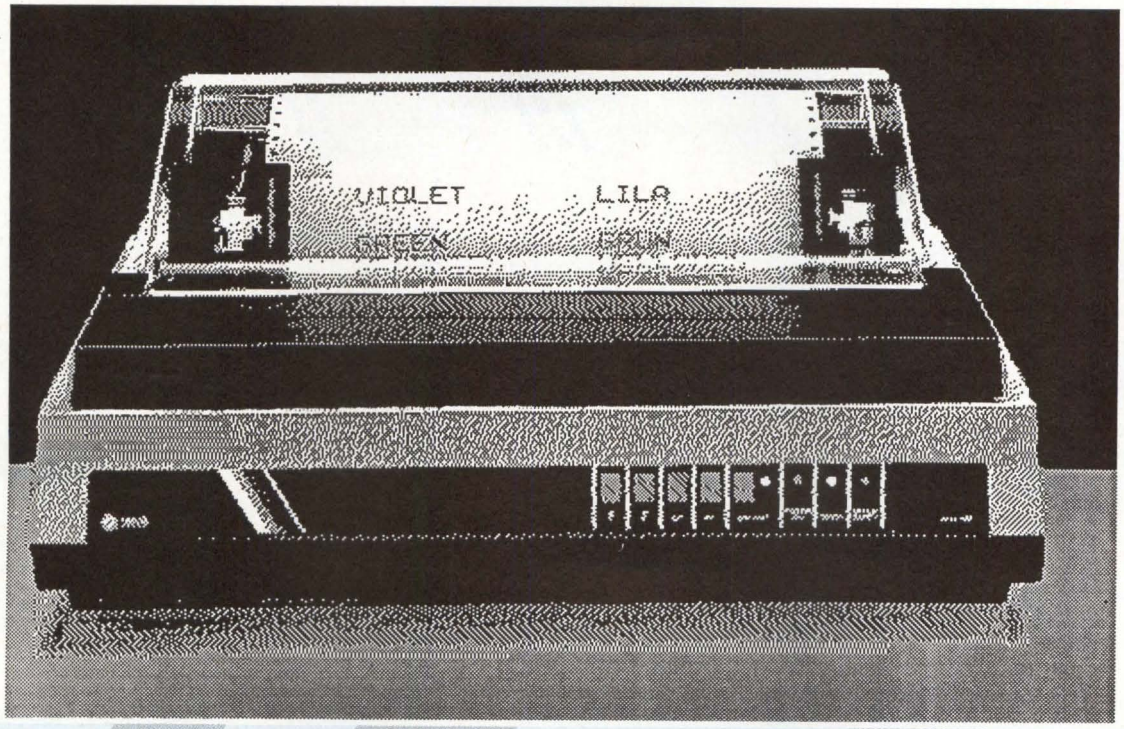


CIRCLE NO. 39 ON INQUIRY CARD

MATRIX CHARACTER PRINTERS

TABLE 7



Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
3M TELETERMINAL PROJECT						**Circle 305**
311 Turquoise St., Milpitas, CA 95035, (408) 943-1970						
1902	thermal	40	40, 80, programmable	RS232C (300 to 9.6K bps, X-on/X-off, DTR)	299(Q1); 239(Q100)	bit-image graphics, switch selectable
1904	thermal	40	40, 80, programmable	Centronics (X-on/X-off, parallel, TTL)	289(Q1); 229(Q100)	bit-image graphics, switch selectable
1912	thermal	40	80, 136, programmable	RS232C (300 to 9.6K bps, X-on/X-off)	299(Q1); 239(Q100)	bit-image graphics, switch selectable
1914	thermal	40	80, 136, programmable	Centronics (parallel, TTL)	289(Q1); 229(Q100)	bit-image graphics, switch selectable
ADVANCED COLOR TECHNOLOGY INC.						**Circle 306**
21 Alpha Rd., Chelmsford, MA 01824, (617) 256-1222						
ACT II	ink jet	80	132	RS232C, Centronics (19.2K bps, X-on/X-off, DTR)	6,150(Q1); 4,105(Q100)	bit-mapped graphics, 125 color shades
ADVANCED COMMUNICATIONS INC.						**Circle 307**
462 Oakmead Pkwy., Sunnyvale, CA 94086, (408) 773-8585						
MP8000	impact			(300 to 2.4K bps, X-on/X-off)	545(Q1)	
ADVANCED MATRIX TECHNOLOGY INC.						**Circle 308**
1157 Tourmaline Dr., Newbury Park, CA 91320, (805) 499-8741						
AMT Office Printer	impact	45, 100, 250	up to 225, programmable	RS232C, Centronics compatible, parallel (110–19.2K bps, X-on/X-off, DTR, ETX/ACK, Diablo 630	2,195(Q1)	3- to 15-inch paper width, color printing, bit-image graphics, cut sheet feeder, plotter emulation, compatible with most word processing software
ALPS ELECTRIC (USA) INC.						**Circle 309**
3553 N. First St., San Jose, CA 95134, (408) 946-6000						
ASP1000/ ASP1200/ ASP1300	impact (9 x 9)	105/140/160	80/80/136	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ETX/ACK)		bit-mapped graphics
P2000	impact	50, 125, 250	136	parallel, serial (150–19.2K bps, X-on/X-off, ETX/ACK, READY/BUSY)	995(Q1)	bit-mapped graphics

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
AMERICAN COMPUTER HARDWARE CORP.						**Circle 310**
2205 S. Wright St., Santa Ana, CA 92705, (714) 549-2688						
POS-40	impact (9 x 7)	100, 200	32, 40, 52	RS232C, Centronics (300–9.6K bps, X-on/X-off, BFB, DTR)	995(Q1)	4-inch paper roll, logic seeking
POS-80	impact (9 x 9)	75, 150	80, 96, 132	RS232C, Centronics (300–9.6K bps, X-on/X-off, BFB, DTR)	1,395(Q1)	graphics, point-of-sale printer
POS-132	impact (9 x 9)	82, 165	136, 163, 225	RS232C, Centronics (300–9.6K bps, X-on/X-off, BFB, DTR)	1,595(Q1)	2½- to 16-inch paper width, graphics, point-of-sale printer
ANDERSON-JACOBSON INC.						**Circle 311**
521 Charcot Ave., San Jose, CA 95131, (408) 263-8520						
AJ650	ink jet (7 x 9)	180	80, 132	RS232C, Centronics (2.4K bps, X-on/X-off, ETX/ACK)	1,495(Q1)	2K-byte buffer, emulates ANSI
M84	impact (9 x 9)	200	68, 81, 116, 136, 163, 231	RS232C, Centronics (9.6K bps, X-on/X-off)	1,245(Q1)	bit-mapped graphics, word processing and graphic software offered, 2K-byte buffer; opt. current loop
M92	impact (9 x 9)	160	40, 48, 68, 80, 96, 136	RS232C, Centronics, current loop (19.2K bps, X-on/X-off)	699(Q1)	bit-mapped graphics, graphic software offered, 2K-byte buffer
ANTEX DATA SYSTEMS						**Circle 312**
2630 California St., Mountain View, CA 94040, (415) 941-7914						
ADS-2000	impact (9 x 9)	40, 165	80, 137	Centronics (60–19.2K bps, X-on/X-off, DTR, ETX/ACK)	295(Q1); 265(Q100)	bit-mapped graphics, opt. RS232C interface
APPLE COMPUTER INC.						**Circle 313**
20525 Mariani Ave., Cupertino, CA 95014, (408) 996-1010						
Imagewriter	impact (7 x 8)	120, 180	38–136 proportional	RS232C (300–9.6K bps, X-on/X-off, DTR)	595(Q1)	bit-mapped graphics
Imagewriter Wide Carriage	impact (7 x 8)	120, 180	38–136 proportional	RS232C (300–9.6K bps, X-on/X-off, DTR)	749(Q1)	3- to 15-inch paper width, bit-mapped graphics
Scribe	thermal	50, 80		RS232C 1.2K, 9.6K bps, X-on/X-off, DTR)	299(Q1)	color printing
AT&T						**Circle 314**
5555 Touhy Ave., Skokie, IL 60077, (312) 982-2000						
5310	impact	200	up to 132, programmable	RS232C, current loop (110–9.6K bps, DC1, DC3, X-on/X-off)		3- to 9½-inch paper width, portable, bit-mapped graphics, 2K-byte buffer, cut sheet feeder
5320	impact	200	up to 220, programmable	RS232C, current loop (110–9.6K bps, DC1, DC3, X-on/X-off)		3- to 15-inch paper width, bit-mapped graphics, 2K-byte buffer, cut sheet feeder
AP200	impact	340	132	SCA		3- to 16-inch paper width, 1K-byte buffer
BLUE CHIP ELECTRONICS INC.						**Circle 315**
2 W. Alameda Dr., Tempe, AZ 85282, (602) 829-7217						
M120/NLQ	impact (9 x 8)	100	programmable	Commodore serial	249(Q1)	proportional, bidirectional print; 44 European characters; includes word processing software for Commodore 64, 129, C16
BROTHER INTERNATIONAL CORP.						**Circle 316**
8 Corporate Place, Piscataway, NJ 08854, (201) 981-0300						
M-1009	impact (9 x 9)	50	80	RS232C, Centronics (110–9.6K bps, IBM, Epson RX80)	245(Q1); 184(Q100)	IBM version with 48 graphic characters
M-1509	impact	180	162–181	RS232C, Centronics (Epson FX100)	799(Q1); 369(Q100)	5- to 15-inch paper width, dot-addressable graphics, compatible with Epson FX100 protocol software, cut sheet feeder
2024L	impact	up to 272	102, 136, 163	RS232C, Centronics (Diablo 630, Epson FX100)	1,295(Q1); 958(Q100)	5- to 15-inch fanfold paper width, dot-addressable graphics, compatible with word processing and graphic software, cut sheet feeder
Twinriter 5	impact (7 x 9, 24 x 24)	140	136	Centronics (110–9.6K bps, Epson FX100)	1,295(Q1); 958(Q100)	dot matrix or daisywheel capability, 16½-inch paper width, IBM extended character set, compatible with Epson FX100 software; opt. cut sheet feeder, RS232C

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
CAL-ABCO (LEGEND PRODUCTS DIV.) 6041 Variel Ave., Woodland Hills, CA 91367, (818) 704-9100						Circle 317
Legend 880	impact (7 x 8)	50, 100	80, 142	Centronics (up to 9.6K bps. DTR)	279(Q1)	bit-image graphics; opt. serial interface
Legend 1080	impact (7 x 8)	70, 140	80, 142	Centronics (up to 9.6K bps, X-on/X-off)	339(Q1)	bit-image graphics; opt. serial interface
Legend 1200	impact	60, 120	80, programmable	Centronics (up to 9.6K bps, X-on/X-off)	339(Q1)	graphics
Legend 1380	impact (9 x 9)	80, 160	80, 142	Centronics (up to 9.6K bps, X-on/X-off)	379(Q1)	bit-image graphics; opt. serial interface
Legend 1385	impact (9 x 9)	80, 160	136, programmable	Centronics (up to 9.6K bps. X-on/X-off)	449(Q1)	graphics, square dot technology
Legend CPVII	impact (13 x 17)	90, 180	136, programmable	Centronics (up to 9.6K bps, X-on/X-off)	1,195(Q1)	graphics, color printing
CENTRONICS DATA COMPUTER CORP. One Wall St., Hudson, NH 03051, (603) 883-0111						Circle 318
240	impact	80, 160	132	RS232C, Centronics (up to 9.6K bps, X-on/X-off, DTR)	1,495(Q1)	bit-mapped graphics
250	impact	40, 160	80, 136	RS232C, Centronics (X-on/X-off, DTR, Diablo 630)	1,295(Q1)	4- or 7-color printing, bit-mapped graphics, IBM PC compatible
351	impact	65, 200	132, 217	RS232C, Centronics, RS422, current loop (50–19.2K bps, X-on/X-off, DTR)	1,995(Q1)	pin-addressable graphics
353	impact	50, 200	132, 217	RS232C, RS422, Centronics, current loop (50–19.2K bps, X-on/X-off)	2,495(Q1)	pin-addressable graphics
354	impact	50, 220	132, 217	Centronics (50–19.2K bps, X-on/X-off, DTR, Diablo 630)	2,195(Q1)	pin-addressable graphics
358	impact (7 x 9)	100, 400	132, 217	RS232C, Centronics, current loop (50–19.2K bps, X-on/X-off, DTR)	2,895(Q1)	pin-addressable graphics
GLP	impact	12, 50	80, 136	RS232C, Centronics (up to 9.6K bps, X-on/X-off, DTR)	299(Q1)	bit-mapped graphics, compatible with IBM PC software
Horizon Series	impact (11 x 9, 23 x 16)	27, 160	80, 156	Centronics		pin-addressable graphics, cut sheet feeder, 7 international character sets; opt. RS232C, current loop
C. ITOH ELECTRONICS INC. 5301 Beethoven St., Los Angeles, CA 90066, (213) 306-6700						Circle 319
1550B	impact	120	136, 162, 230	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	625(Q1)	4¼- to 15½-inch paper width, logic seeking
1550S/8510S	impact	120, 180	136, 162, 230/ 80, 96, 136	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	550/770(Q1)	logic seeking
1550SC/ 8510SC	impact	120, 180	136, 162, 230/ 80, 96, 136	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	650(Q1)	7-color printing, logic seeking
1550T	impact	22, 120, 180	136, 162, 230	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	769(Q1)	4¼- to 15½-inch paper width, logic seeking
1550TC	impact	22, 120, 180	136, 162, 230	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	869(Q1)	4¼- to 15½-inch paper width, 7-color printing, logic seeking
1570	impact	66, 133, 200	136, 165, 233	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	1,300(Q1)	4- to 15½-inch paper width, 7-color printing, proportional print; opt. font sets
7500	impact	105	80, 96, 136	RS232C, Centronics (110 to 4.8K bps, Epson)	425(Q1)	4- to 10-inch paper width, proportional print, logic seeking, built-in tractor
8510B	impact	120	80, 96, 230	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	450(Q1)	4¼- to 10-inch paper width, logic seeking

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
8510T	impact	22, 120, 180	80, 96, 136	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	550(Q1)	4¼- to 10-inch paper width, logic seeking
8510TC	impact	22, 120, 180	80, 96, 136	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	650(Q1)	4¼- to 10-inch paper width, 7-color printing, logic seeking
CITIZEN AMERICA CORP. 2425 Colorado Ave., Santa Monica, CA 90404, (213) 453-0614						**Circle 320**
MSP-10	impact (9 x 9)	40, 160	80, 136	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ETX/ACK)	449(Q1)	4- to 10-inch paper width, cut sheet feeder
MSP-15	impact (9 x 9)	40, 160	163, 231	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ETX/ACK)	649(Q1)	4- to 16-inch paper width, cut sheet feeder
MSP-20	impact	50, 200	80, 160	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ETX/ACK)	649(Q1)	4- to 10-inch paper width, cut sheet feeder
MSP-25	impact (9 x 9)	50, 200	136, 272	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ETX/ACK)	849(Q1)	4- to 16-inch paper width, cut sheet feeder
COMPUTER PRINTERS INTERNATIONAL INC. (COMPRINT) P.O. Box 4639, Foster City, CA 94404, (415) 969-6161						**Circle 321**
912/912GO	electro-sensitive	225	80	RS232C, IEEE-488, Centronics	595/995(Q1)	912GO has graphics capability
CRADEN PERIPHERALS CORP. 204 Cooper Center, N. Park Dr., Pennsauken, NJ 08109, (609) 488-0700						**Circle 322**
DP4	impact (9 x 9, 17 x 17)	150	40, 48, 80, 96, programmable	RS232C, RS422 (1.2K–9.6K bps, X-on/X-off, DTR)		2½- to 8½-inch paper width, dot-addressable graphics
DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911						**Circle 323**
4433	impact (5 x 9, 9 x 9)	150	136	RS232C, current loop	2,500(Q1)	
4435/ 4531	impact	40, 80, 160	80/132	RS232C	895/1,595(Q1)	4531 is wide carriage version of 4435
4535	impact (9 x 9)	50, 200	132	RS232C, RS422, current loop (19.2K bps)	3,995(Q1)	proportional print, cut sheet feeder; opt. three bin auto sheet feeder
6215	impact	180		RS232C	2,995(Q1)	
DATAPRODUCTS CORP. 6200 Canoga Ave., Woodland, Hills, CA 91365, (818) 887-3924						**Circle 324**
8010/ 8012	impact (9 x 9)	30, 90, 180		RS232C or Centronics compatible (300–9.6K bps, X-on/X-off, DTR)	499(Q1)	raster or bit-image graphics
8020/ 8022	impact (9 x 9)	30, 90, 180		RS232C or Centronics compatible (300–9.6K bps, X-on/X-off, DTR)	749(Q1)	noise level 65 dB(a), raster or bit-image graphics
8050/ 8052	impact (18 x 9)	40, 110, 200		RS232C or Centronics compatible (300–9.6K bps, X-on/X-off, DTR)	1,499–1,599(Q1)	noise level 65 dB(a), raster or bit-image graphics, word processing and graphic software offered
8070/ 8072	impact (18 x 9)	100, 300, 400		RS232C or Centronics compatible (300–9.6K bps, X-on/X-off, DTR)	1,999–2,099(Q1)	noise level 65 dB(a), raster or bit-image graphics, word processing and graphic software offered, color printing
M-100L	impact (9 x 14)	140	40, 72, 132	Centronics compatible	4,150(Q1)	noise level 62 dB(a), bar codes, logic-seeking; opt. RS232C, current loop
DATASOUTH COMPUTER CORP. 4216 Stuart Andrew Blvd., Charlotte, NC 28210, (704) 523-8500						**Circle 325**
CX3180/ CX3220	impact	40, 90, 180, 220	132, 158, 217	Centronics (110–9.6K bps)	3,295/3,695(Q1)	3- to 15-inch paper width
DS 180	impact	180	132, 158, 217	RS232C, Centronics (110–9.6K bps, X-on/X-off, DTR, ETX/ACK)	1,395(Q1)	3- to 15-inch paper width

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
DS 220	impact	40, 90, 220	132, 158, 217	RS232C, Centronics (110–9.6K bps, X-on/X-off, DTR, ETX/ACK)	1,695(Q1)	3- to 15-inch paper width, dot-addressable graphics, cut sheet feeder
PPI/PPII	impact	27, 160		Centronics (300–9.6K bps)	545/795(Q1)	2¾- to 17-inch paper width; opt. RS232C
TX5180/ TX5220	impact	40, 90, 180, 220	132, 158, 217	Centronics (110–9.6K bps)	2,995/ 3,495(Q1)	3- to 15-inch paper width
DATEL 11 Cabot Blvd., Mansfield, MA 02048, (617) 339-9341						**Circle 326**
APP-20	thermal (5 x 7)	33	20	RS232C, current loop, parallel, IEEE-488 (300–9.6K bps, X-on/X-off, DTR)	595(Q1)	
APP-48	thermal (5 x 7)	58	48	RS232C, current loop, parallel, IEEE-488 (300–9.6K bps, X-on/X-off, DTR)	995(Q1)	
APP-48MIL	thermal	1	48	RS232C, current loop, parallel, IEEE-488 (300–9.6K bps, X-on/X-off, DTR)	1,805(Q1); 1,355(Q100)	4⅘-inch paper width, conforms to MIL-STD-202E and MIL-STD-801C specifications
MPP-20	thermal (5 x 7)		20	RS232C, parallel (300–9.6K bps, X-on/X-off, DTR)	395(Q1)	
DIGITAL EQUIPMENT CORP. 129 Parker St., Maynard, MA 01754, (800) DIGITAL						**Circle 327**
LA50	impact (7 x 9)	50, 100	132	RS232C (110–4.8K bps, X-on/X-off, READY/BUSY)	595(Q1)	3- to 9-inch paper width, bit-mapped graphics, cut sheet feeder, national character sets
LA120	impact (7 x 7)	180	132, 217	RS232C (50–9.6K bps, X-on/X-off)	2,420(Q1)	self-test diagnostics, 1K-byte buffer; opt. current loop, 4K-byte buffer, national character sets
LA210	impact (7 x 9)	40, 80, 240	programmable	RS232C, Centronics (50–9.6K bps, X-on/X-off, Epson MX80)	1,595(Q1)	3½- to 15-inch paper width, bit-mapped graphics, IBM compatible, cut sheet feeder
DYNAX INC. 6070 Rickenbacker Rd., Commerce, CA 90040, (213) 727-1227						**Circle 328**
DM5	impact (9 x 9)	50	40, 66, 80, 132	RS232C, Centronics		bit-image graphics; opt. fanfold paper
DM20	impact (9 x 8)	25, 30, 80, 160	66, 79, 110, 132, 158, 220	parallel, serial		bit-image graphics, proportional print, 32 international characters, 132 IBM PC special characters
DM40	impact	80, 96, 160	136, 163, 244	Centronics		5- to 15-inch paper width, logic seeking, noise level less than 65 dB(a), letter quality; opt. auto cut sheet feeder
Fortis DH45	impact	140	136	Centronics		dual head printer, noise level less than 60 dB(a), 3K-byte buffer, Epson FX100 compatible; opt. auto cut sheet feeder, RS232C
EATON CORP. Technical Research Park, Riverton, WY 82501, (307) 856-4821						**Circle 329**
4000	impact	30–120	40	RS232C, current loop (110–9.6K bps, DTR, ETX/ACK)	985(Q1); 647(Q100)	dot-addressable graphics, 4-inch paper width
4110	impact	30–120	40	RS232C, current loop (110–9.6K bps, DTR, ETX/ACK)	1,805(Q1); 727(Q100)	dot-addressable graphics, 4-inch paper width
7000	impact	30–120	40	RS232C, current loop (110–9.6K bps, DTR, ETX/ACK)	425(Q1); 350(Q100)	4-inch paper width
EPSON AMERICA INC. (OEM PRODUCTS DIV.) 23600 Telo St., Torrance, CA 90505, (213) 534-4500						**Circle 330**
CTM Series	impact	160	programmable	RS232C, Centronics, IEEE-488	299–389 (Q1000–2499)	bit-image graphics; opt. cut sheet feeder
J Series	impact (9 x 9)	160	programmable	RS232C, Centronics, IEEE-488 (X-on/X-off)	699(Q1); 452 (Q1000–2499)	bit-image graphics, 7-color printing; opt. cut sheet feeder
HS-80	ink jet	32, 160		Centronics	340(Q50); 233 (Q1000–2499)	bit-image graphics, portable, battery operated, 1K-byte buffer

MATRIX CHARACTER PRINTERS

TABLE 7

Company Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
LQ-1500	impact (9 x 23)	176		RS232C, Centronics, IEEE-488, GPIB (X-on/X-off)	800(Q50)	cut sheet feeder
LX-80	impact		16, 100	RS232C, Centronics, IEEE-488	299(Q1);183 (Q1000–2499)	bit-image graphics, 32 international characters
P-40	thermal	45	40–80	RS232C (75–9.6K bps)	140(Q50); 89(Q1000–2499)	bit-image graphics, portable, battery operated
P-80	thermal (9 x 9)	45	80	RS232C (75–9.6K bps)	196(Q50); 134 (Q1000–2499)	bit-image graphics, portable, battery operated, 240K-byte buffer
P-80X	thermal	45		RS232C	309(Q50); 210 (Q1000–2499)	bit-image graphics, battery operated, portable, letter quality version of Epson P-80
SQ-2000	ink jet (15 x 17)	200	programmable	RS232C, Centronics, IEEE-488	2,295(Q1)	cut sheet feeder
ERGO SYSTEMS INC. 303 Convention Way, Unit 3, Redwood City, CA 94063, (415) 363-5966						**Circle 331**
Hush 80	thermal (6 x 7)	80	80	RS232C, Centronics, Commodore, Atari	140–200(Q1)	
FACIT INC. 9 Executive Park Dr., Merrimack, NH 03054, (603) 424-8000						**Circle 332**
4509/ 4510	impact	120	80	Centronics/RS232C, Centronics, current loop (110–9.6K bps, X-on/X-off, ETX/ACK, READY/BUSY)	475/495(Q1)	4- to 11-inch paper width, bit-mapped graphics, compatible with word processing software
4511	impact	160	80	RS232C, Centronics, current loop (110–9.6K bps, X-on/X-off, ETX/ACK, READY/BUSY)	595(Q1)	4- to 11-inch paper width, bit-mapped graphics, compatible with word processing software, cut sheet feeder, 2K-byte buffer; opt. 10K-byte buffer
4512	impact	140	132	RS232C, current loop, Centronics (110–9.6K bps, X-on/X-off, ETX/ACK, READY/BUSY)	795(Q1)	4- to 15-inch paper width, bit-mapped graphics, cut sheet feeder, compatible with word processing software, 2K-byte buffer; opt. 10K-byte buffer
4528D	impact	165, 285	80, 136	RS232C, Centronics (110–9.6K bps, X-on/X-off, READY/BUSY)	1,696–1,775(Q1)	3- to 15-inch paper width, pin-addressable graphics
4528T/ 4528V	impact	165, 200, 285/2, 165	80, 136	RS232C, Centronics (110–9.6K bps, X-on/X-off, READY/BUSY)	975–1,165/ 1,545–1,595(Q1)	pin-addressable graphics
4542/ 4544	impact	250, 535/ 225, 535	150	RS232C, Centronics, IEEE-488 (110–19.2K bps, X-on/X-off, DTR, custom)	2,725–3,275(Q1)	2- to 18-inch paper width, pin-addressable graphics, PLOT-10 emulation
4542D	impact	250, 535	150	RS232C, Centronics, IEEE-488 (110–19.2K bps, X-on/X-off, DTR, custom)	2,995(Q1)	2- to 17⅘-inch paper width, 2-color printing, pin-addressable graphics, PLOT-10 emulation
4570	impact	50, 80, 250	132	RS232C, Centronics, current loop (110–19.2K bps, X-on/X-off)	2,295(Q1)	4- to 15-inch paper width, cut sheet feeder
C5500	impact	60, 250	136	RS232C, Centronics (110–9.6K bps, X-on/X-off, READY/BUSY)	1,595(Q1)	4- to 16-inch paper width, 7-color printing, graphics, simultaneous fanfold and cut sheet feeders, noise level 57 dB(a); opt. current loop
C7500	impact	100, 200, 400	136	RS232C, Centronics (50–19.2K bps, X-on/X-off, READY/BUSY, Epson RX80)	2,495(Q1)	4- to 16-inch paper width, cut sheet feeder, 15-color printing, noise level 57 dB(a), 4K-byte buffer; opt. current loop
FLORIDA DATA CORP. 600D John Rhodes Blvd., Melbourne, FL 32935, (305) 259-4700						**Circle 333**
3000	impact	150, 600	132, programmable	RS232C, Centronics (up to 19.2K bps, X-on/X-off, DTR, ETX/ACK)	3,395(Q1)	3- to 15-inch paper width, graphics, built-in cut sheet feeder
OSP 130	impact	100, 150, 600	132, programmable	RS232C, Centronics (up to 19.2K bps, X-on/X-off, DTR, ETX/ACK)	3,995(Q1)	3- to 15-inch paper width, graphics, built-in cut sheet feeder

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
FUJITSU AMERICA INC. 3055 Orchard Dr., San Jose, CA 95134, (408) 946-8777						Circle 334
DPL Series	impact (24 x 36)	80, 240	136, 163, 244	RS232C, Centronics, current loop (150–9.6K bps, X-on/X-off, ETX/ACK, DTR)	1,895–1,995(Q1)	dot-addressable graphics, color printing
DPMG9	impact	25, 180	80, 96, 137	Centronics (110–9.6K bps, X-on/X-off, DTR)	499(Q1)	dot-addressable graphics; IBM PC, Epson FX80 compatible software
GENICOM CORP. One General Electric Dr., Waynesboro, VA, (703) 949-1170						Circle 335
3014	impact	32, 160	132, 158, 172, 198, 224	RS232C, Centronics (9.6K bps, X-on/X-off, IBM PC, Okidata 84/2)	1,199(Q1)	3½- to 15½-inch paper width; bit-mapped, pin-addressable graphics; 14 national character sets; 2K-byte buffer
3024	impact	40, 200	132, 158, 172, 198, 224	RS232C, Centronics (9.6K bps, X-on/X-off)	1,499(Q1)	3½- to 15½-inch paper width; bit-mapped, pin-addressable graphics; 14 national character sets; 2K-byte buffer
3310	impact	75, 300	136, 163, 178, 204, 227, 244	RS232C, Centronics (9.6K bps, IBM PC, Diablo 630, ANSI)	1,995(Q1)	3½- to 15½-inch paper width; bit-mapped graphics, WordStar 2000, 16 national character sets; opt. cut sheet feeder, 6K-byte buffer
3310 Color	impact	75, 300	136, 163, 178, 204, 227, 244	RS232C, Centronics (9.6K bps, IBM PC, Diablo 630, ANSI)	2,295(Q1)	3½- to 15½-inch paper width; bit-mapped graphics, WordStar 2000, color printing, 16 national character sets; opt. cut sheet feeder, 6K-byte buffer
3320 Quiet	impact	150, 300	136, 163, 178, 204, 227, 244	RS232C, Centronics (9.6K bps, IBM PC, Diablo 630, ANSI)	2,395(Q1)	3½- to 15½-inch paper width, bit-mapped graphics, WordStar 2000, 55 dB(a) noise level, proportional print, 16 national character sets
3410	impact	100, 400	136, 163, 178, 204, 227, 244	RS232C, Centronics (9.6K bps, IBM PC, Diablo 630, ANSI)	2,450(Q1)	3½- to 15½-inch paper width; bit-mapped graphics, WordStar 2000; opt. cut sheet feeder, 6K-byte buffer
GENERAL BUSINESS TECHNOLOGY INC. 1891 McGaw Ave., Irvine, CA 92714, (714) 261-1891						Circle 336
5207FA	impact (9 x 9)	120	up to 132	IBM S/34, S/36, S/38	1,995(Q1)	3- to 9½-inch paper width
5207MP	impact (9 x 9)	120	up to 198	IBM S/34, S/36, S/38	2,595(Q1)	11- to 15¼-inch paper width
5210BL	impact (9 x 7)	150	up to 198	IBM S/34, S/36, S/38 (Printronix)	4,995(Q1)	3- to 15-inch paper width
5220DP	impact (9 x 18)	100, 400	up to 198	IBM S/34, S/36, S/38	5,400(Q1)	3- to 15½-inch paper width
5220MP	impact (9 x 9)	400	up to 198	IBM S/34, S/36, S/38	4,750(Q1)	3- to 15½-inch paper width
5222DP	impact	200		IBM S/34, S/36, S/38	2,995(Q1)	
HARRIS CORP. (COMPUTER SYSTEMS DIV.) 2101 Cypress Creek Rd., Ft. Lauderdale, FL 33309, (305) 974-1700						Circle 337
Harris 4416	impact (7 x 8)	200	132	RS232C	2,475(Q1)	4- to 17-inch paper width, built-in diagnostics
HERMES PRECISA INTERNATIONAL SA Rue des Pecheurs 8, Yverdon Switzerland 1400, (+41) 24 23 41 11						Circle 338
612	impact	100, 400	132–237, programmable	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	2,495(Q1); 1,375(Q100)	1¾- to 15-inch paper width; bit-mapped, mosaic graphics; cut sheet feeder; roll feed; compatible with word processing and graphic software
615	impact	100, 400	132–237, programmable	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	2,595(Q1); 1,430(Q100)	1¾- to 15-inch paper width; cut sheet feeder; roll feed; 7-color printing; bit-mapped, mosaic graphics; compatible with word processing and graphic software
616	impact	100, 400	132–237, programmable	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	2,770(Q1); 1,520(Q100)	1¾- to 15-inch paper width; cut sheet feeder; roll feed; battery backup; bit-mapped, mosaic graphics; compatible with word processing and graphic software

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
PC-PRINTER 1	impact	100, 200	132–237, programmable	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	1,995(Q1); 1,095(Q100)	1¾- to 15-inch paper width, cut sheet feeder, bit-mapped graphics
PC-PRINTER 2	impact	100, 200	132–237, programmable	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	2,095(Q1); 1,155(Q100)	1¾- to 15-inch paper width, cut sheet feeder, bit-mapped graphics, 7-color printing
PC-PRINTER 3	impact	100, 400	132–237	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	2,095(Q1); 1,155(Q100)	1¾- to 15-inch paper width, cut sheet feeder, bit-mapped graphics
PC-PRINTER 4	impact	100, 400	132–237, programmable	RS232C, RS422, current loop, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)	2,195(Q1); 1,210(Q100)	1¾- to 15-inch paper width, cut sheet feeder, 7-color capability, bit-mapped graphics
HEWLETT-PACKARD CO. P.O. Box C-006, Vancouver, WA 98668, (206) 254-8110						**Circle 339**
HP2932A	impact (9 x 12)	200	68, 136, 223	RS232C, RS422, Centronics, IEEE-488 (X-on/X-off, ENQ/ACK)	2,595(Q1)	raster graphics
HP2934A	impact (9 x 12)	40, 67, 200	68, 136, 223	RS232C, RS422, Centronics, IEEE-488 (X-on/X-off, ENQ/ACK)	2,995(Q1)	letter quality, bar codes
HP ThinkJet	impact (11 x 12)	150	96, 142	HP-IB, HP-IL, RS232C, Centronics (X-on/X-off, ENQ/ACK)	495(Q1)	dot-addressable graphics, compatible with Epson printers and most major PCs
HONEYWELL INFORMATION SYSTEMS INC. 200 Smith St., Waltham, MA 02154, (617) 895-6000						**Circle 340**
Model 10 PRU7070/ 7071/7072	impact (9 x 7)	50, 100	40, 66, 80, 132, programmable	RS232C, RS422A (up to 9.6K bps, ASPI)	1,195(Q1)	3- to 10-inch paper width
Model 30 PRU7075/ 7076/7077	impact (9 x 7)	50, 100	66, 110, 132, 220	RS232C, RS422A (up to 9.6K bps, ASPI)	1,495(Q1)	3- to 15-inch paper width
Model 32 PRU7170/ 7171/7172	impact (9 x 11)	150	66, 79, 110, 132, 158, 220	RS232C, RS422A (up to 9.6K bps, ASPI)	1,795(Q1)	3- to 15-inch paper width; macro, line, dot graphics
Model 34 PRU7175/ 7176/7177	impact (9 x 9)	45, 200	66, 132, 158, 220	RS232C, RS422A (up to 9.6K bps, ASPI)	2,450(Q1)	3- to 15-inch paper width; macro, line, dot graphics; dual sheet feeder; letter quality mode
Model 38 PRU7270/ 7271/7272	impact (7 x 7)	200, 400	66, 132	RS232C, RS422A (up to 9.6K bps, ASPI)	3,450(Q1)	3- to 15-inch paper width
IBM CORP. 900 King St., Rye Brook, NY 10573, (914) 934-4822						**Circle 341**
3852 Color Jetprinter	ink jet	20, 30, 33, 50	132	current loop, Centronics	745(Q1)	7-color printing, all-points-addressable graphics, supports most major software packages
4201 Proprinter	impact	40, 100, 200	80, 132	RS232C, current loop, Centronics (X-on/X-off)	549(Q1)	3- to 11-inch paper width; cut sheet feeder; all-points-addressable, block, character graphics; supports most major software packages
5182/001 5182/002	impact	30, 40, 110, 150, 200	80, 132	IBM PC parallel, Centronics	1,195(Q1)	8-color printing, compatible with all IBM PC word processing software, cut sheet feeder
INFOSCRIBE INC. 1808 Michael Faraday Ct., Reston, VA 22090, (703) 689-2805						**Circle 342**
800	impact (7 x 9, 14 x 9)	40, 100, 200	136, 163, 224	RS232C, current loop, parallel (110–9.6K bps, X-on/X-off, DTR, Diablo 630)	1,895(Q1); 1,160(Q100)	1½- to 16-inch paper width, noise level less than 56 dB(a), Epson-compatible graphics
1000	impact (7 x 9, 14 x 9)	100, 200	136, 163, 224	RS232C, current loop, parallel (110–9.6K bps, X-on/X-off, DTR)	1,645(Q1); 985(Q100)	1½- to 16-inch paper width, noise level less than 54 dB(a)

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
1100	impact (7 x 9, 14 x 9)	40, 100, 200	136, 163, 224	RS232C, current loop, parallel (110–9.6K bps, X-on/X-off, DTR, Diablo 630)	1,795(Q1); 1,061(Q100)	1½- to 16-inch paper width, noise level less than 54 dB(a), Epson-compatible graphics
1200	impact (7 x 9, 14 x 9)	40, 100, 200	136, 163, 224	RS232C, current loop, parallel (110–9.6K bps, X-on/X-off, DTR, Diablo 630)	1,995(Q1); 1,200(Q100)	noise level less than 54 dB(a), 8-color printing, Epson-compatible graphics
INTEC INC. P.O. Box 529, Chester, VT 05143, (802) 875-2115						**Circle 343**
7000	impact	up to 390	up to 237	RS232C, Centronics (110–9.6K bps, X-on/X-off, ETX/ACK, DTR, Diablo 630)		dot-addressable, mosaic, and Epson-compatible graphics, multifont capability
JDL INC. 2801 Townsgate Rd., Suite 104, Westlake Village, CA 91361, (805) 495-3451						**Circle 344**
JDL-750	impact	100, 180	136, 163, 232	Centronics, Diablo 630 (150–19.2K bps, X-on/X-off, DTR)	1,990(Q1)	proportional print, 3- to 17-inch paper width, 4-color printing, bit-mapped graphics, HP 7400 series plotter emulation
LEXICON CORP. 1541 N.W. 65th Ave., Ft. Lauderdale, FL 33313, (305) 792-4400						**Circle 345**
LEX-40	thermal	32	40	Centronics (300 bps, ASCII)	210(Q1)	4-inch paper width, portable
MANNESMANN TALLY 8301 S. 180th St., Kent, WA 98032, (206) 251-5524						**Circle 346**
MT85	impact	45, 180	40, 48, 68, 80, 96, 137, programmable	RS232C, CX parallel, Apple serial (up to 19.2K bps)	499(Q1)	3- to 16-inch paper width, cut sheet feeder, IBM- or Epson FX series-compatible graphics, noise level 55 dB(a)
MT86	impact	45, 180	68, 81, 116, 136, 163, 233	RS232C, CX parallel, Apple serial (up to 19.2K bps)	599(Q1)	3- to 16-inch paper width, cut sheet feeder, IBM- or Epson FX series-compatible graphics, noise level 55 dB(a)
MT290	impact	50, 200	132, 154, 218, 264, programmable	parallel STD (up to 9.6K bps)	895(Q1)	3- to 16-inch paper width, cut sheet feeder, IBM PC- or Epson FX-compatible graphics, noise level 60 dB(a); opt. RS232C, current loop
MT460L	impact	50, 200	132, 158, 198, 255, programmable	RS232C, current loop, Centronics (up to 9.6K bps)	1,995(Q1)	3- to 16-inch paper width, cut sheet feeder, IBM PC- or Epson FX-compatible graphics, noise level 57 dB(a), color printing
MT490L	impact	150, 400	132, 158, 198, 255, programmable	RS232C, current loop, Centronics (up to 9.6K bps)	2,395(Q1)	3- to 16-inch paper width, cut sheet feeder, IBM PC- or Epson FX-compatible graphics, noise level 57 dB(a), color printing
MEMODYNE CORP. 220 Reservoir St., Needham Heights, MA 02194, (617) 444-7000						**Circle 347**
MP401	thermal (5 x 7)	200	48	RS232C, Centronics (110–9.6K bps)		Epson-, DEC VT100-compatible graphics; opt. IEEE-488, RS449
MICRO PERIPHERALS INC. 4426 S. Century Dr., Salt Lake City, UT 84123, (801) 263-3081						**Circle 348**
FX	impact	300	80	Centronics	895(Q1)	bit-mapped graphics; opt. portability, RS232C
PrintMate 350	impact	300	136		1,495(Q1)	bit-mapped graphics, wide carriage
MISSHOEY IWAI AMERICAN CORP. 3838 Carson St., Suite 105, Torrance, CA 90503, (213) 543-1885						**Circle 349**
NP910	impact	350		RS232C, Centronics, IEEE-488	1,495(Q1)	noise level less than 59 dB(a); IBM, Epson FX100 emulation
NP2410	impact	150, 300		RS232C, Centronics, IEEE-488	1,745(Q1)	noise level less than 59 dB(a), IBM PC compatible, Epson LQ1500 emulation
NCR CORP. 1700 S. Patterson Blvd., Dayton, OH 45479, (513) 445-5000						**Circle 350**
6411-NNNN	impact	30, 120, 180	80, 136	RS232C, Centronics, IBM parallel (9.6K bps, X-on/X-off, ETX/ACK, READY/BUSY)		4¼- to 15-inch paper width

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
NEC HOME ELECTRONICS (USA) INC. 1401 Estes Ave., Elk Grove Village, Il 60007, (312) 228-5900						Circle 351
PC-8025	impact	120	80, 230	parallel	895(Q1)	bit-mapped graphics, teletype installation; opt. serial interface
PC-8027	impact	105	80, 136	parallel	499(Q1)	bit-mapped graphics, teletype installation
PC-PR103	impact	46, 92	60, 137	parallel	499(Q1)	bit-mapped graphics, teletype installation
NEC INFORMATION SYSTEMS 1414 Massachusetts Ave., Boxborough, MA 01606, (617) 264-8000						Circle 352
P560/ P565	impact	100, 240, 290	136, 272	Centronics, RS232C, (9.6K bps, X-on/X-off, ETX/ACK)	1,395/1,545(Q1)	noise level 48/53 dB(a)
NEWBURY DATA RECORDING LTD. Hawthorne Rd., Staines, Middlesex TW18 3BJ, England, 0784/61500						Circle 353
8926	impact (12 x 8, 12 x 20)	120, 240	132–226, programmable	RS232C, Centronics, current loop (9.6K bps, X-on/X-off, DTR, BUSY, ETX/ACK, ENQ/ACK)		4- to 15¼-inch paper width, noise level 45 dB(a), proportional print
8935	impact (8 x 9)	90, 120, 200	132–226, programmable	RS232C, Centronics, current loop (9.6K bps, X-on/X-off, ETX/ACK, ENQ/ACK, Diablo)		4- to 15¼-inch paper width, proportional print, Diablo 630- and WordStar-compatible, 4 resident font styles, 9 languages
Office System Printer	impact (12 x 10)	100, 200	80, 113, 136	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ETX/ACK, ENQ/ACK)		4- to 13-inch paper width, proportional print, 3-color printing, bit-image graphics, Epson FX80- compatible, auto cut sheet feeder, noise level 55 dB(a)
NORTH ATLANTIC INDUSTRIES INC. 60 Plant Ave., New York, NY 11788, (516) 582-6060						Circle 354
7035	impact	37.5, 75, 150, 180	136–231	RS232C, current loop, Centronics (110–19.2K bps, X-on/X-off, DTR, ETX/ACK)	1,795(Q1)	15-inch paper width
7065	impact	65, 125, 250, 300	136–231	RS232C, current loop, Centronics (110–19.2K bps, X-on/X-off, DTR, ETX/ACK)	2,395(Q1)	15-inch paper width
7075	impact	50, 90, 180, 215	136–231	RS232C, current loop, Centronics (110–19.2K bps, X-on/X-off, DTR, ETX/ACK)	1,795(Q1)	15-inch paper width
7085	impact	65, 125, 250, 300	136–231	RS232C, current loop, Centronics (110–19.2K bps, X-on/X-off, DTR, ETX/ACK)	2,395(Q1)	15-inch paper width
7020 Tempest	impact	75, 150, 180	136–231	RS232C, current loop, Centronics (110–19.2K bps, X-on/X-off, DTR, ETX/ACK)	3,590(Q1)	15-inch paper width
7035 Tempest	impact	37.5, 75, 150, 180	136–231	RS232C, current loop, Centronics (110–19.2K bps, X-on/X-off, DTR, ETX/ACK)	3,990(Q1)	15-inch paper width
OLYMPIA U.S.A. INC. P.O. Box 22, Somerville, NJ 08876, (201) 722-7000						Circle 355
Electronic Compact NP	impact	83, 165	80–136	Centronics (50–9.6K bps, X-on/X-off, DTR, ETX/ACK)	429(Q1)	4- to 10-inch paper width; opt. RS232C
OKIDATA CORP. 532 Fellowship Rd., Mt. Laurel, NJ 08054, (609) 235-2600						Circle 356
Microline 182	impact	120	40, 48, 68, 80, 96, 137	parallel, serial	299(Q1)	graphics
Microline 192	impact	160	40, 48, 66, 80, 96, 132	Centronics compatible	499(Q1)	cut sheet feeder; graphics; compatible with IBM, Okifont software; 8K-byte buffer
Microline 193	impact	160	68, 81, 116, 136, 163, 233		699(Q1)	cut sheet feeder; graphics; compatible with IBM, Okifont software; 8K-byte buffer
Okimate 10	thermal	60			139(Q1)	40 shade color printing, graphics, 8K-byte buffer
Okimate 20	thermal	40, 80	40, 48, 66, 80, 96, 132	IBM PC parallel, serial; Apple IIc, IIe	169(Q1)	100 shade color printing, graphics
Pacemark 2410	impact	87.5, 175, 350	68, 81, 116, 136, 163, 233	parallel, serial		14- to 16-inch paper width, graphics, 4K-byte buffer

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
OUTPUT TECHNOLOGY CORP. E9922 Montgomery, Spokane, WA 99206, (509) 926-3855						Circle 357
OT-700	impact	300, 700	68, 116, 136, 163, 226	RS232C, Centronics (up to 9.6K bps, X-on/X-off, DTR, Epson)	1,795(Q1)	3⅜- to 16-inch paper width
OT-777	impact	350, 700	68, 116, 136, 163, 226	RS232C, Centronics (up to 9.6K bps, X-on/X-off, DTR, Epson)	3,195(Q1)	3⅜- to 16-inch paper width
PANASONIC INDUSTRIAL CO. One Panasonic Way, Secaucus, NJ 07094, (201) 348-7292						Circle 358
KX-P1090	impact	80, 96	80, 96, programmable	RS232C	299(Q1)	4- to 10-inch paper width, bit-mapped graphics, compatible with word processing and graphic software
KX-P1091	impact	22, 73, 120	80, 96, 132, programmable	RS232C (X-on/X-off, ETX/ACK)	399(Q1)	4- to 10-inch paper width, bit-mapped graphics, compatible with word processing and graphic software
KX-P1092	impact	33, 112, 180	80, 96, 132, programmable	RS232C (X-on/X-off, DTR, ETX/ACK)	599(Q1)	4- to 10-inch paper width, bit-mapped graphics, compatible with word processing and graphic software
KX-P1093	impact	25, 30, 160	132, 158, 220, programmable	RS232C (X-on/X-off, DTR, ETX/ACK)	699(Q1)	4- to 15-inch paper width, bit-mapped graphics, compatible with word processing and graphic software
PARADYNE CORP. 8550 Ulmerton Rd., Largo, FL 33540, (813) 530-2000						Circle 359
9488-01	impact	200	40, 80, 132, 255	Centronics, Paradyne PDS loop	3,600(Q1)	3- to 15-inch paper width, battery backup, bit-mapped graphics, cut sheet feeder
PERRY DATA SYSTEMS INC. 3401 Spring Forest Rd., Raleigh, NC 27604, (919) 876-8100						Circle 360
2014	impact	120	40	RS232C, RS422 (110–19.2K bps, X-on/X-off, RTS)		3½-inch paper width, 1K-byte buffer
2042	impact	120	40	RS232C, RS422 (110–19.2K bps, X-on/X-off, RTS)	1,175(Q1); 975(Q100)	3- to 11-inch paper width, 1K-byte buffer
PERSONAL MICRO COMPUTERS INC. 275 Santa Ana Ct., Sunnyvale, CA 94086, (408) 737-8444						Circle 361
DMP-85	impact	120	80, 96, 137, programmable	Centronics	395(Q1); 315(Q100)	proportional print, bit-mapped graphics
PRINTER PRODUCTS (DIV. OF CAPITAL CIRCUITS CORP.) 25 Denby Rd., Boston, MA 02134, (617) 254-1200						Circle 362
S-400/ S-400G/ S-400T	impact (5 x 7)	180	40	RS232C, RS422, Centronics, current loop (110–9.6K bps, STX/ETX, X-on/X-off)	917/ 1,017/ 875(Q1); 688/763/ 656(Q100)	
PRINTER SYSTEMS CORP. 9055 Comprint Ct., P.O. Box 6020, Gaithersburg, MD 20877, (301) 258-5060						Circle 363
PSC 3184	impact	50, 200	132	RS232C, Centronics	2,230(Q1)	5- to 15½-inch paper width, compatible with word processing software
PSC 3404	impact	100, 400	132	RS232C, Centronics	2,795(Q1)	5- to 15½-inch paper width, compatible with word processing software
PSC 6221	impact	50, 200	198	IBM twin-ax	3,480(Q1)	5- to 15½-inch paper width, compatible with word processing software
PSC 6240	impact	100, 400	198	IBM twin-ax	4,490(Q1)	5- to 15½-inch paper width, compatible with word processing software
PSC 7221	impact	50, 200	198	IBM coax	3,480(Q1)	5- to 15½-inch paper width, compatible with word processing software
PSC 7240	impact	100, 400	198	IBM coax	4,490	5- to 15½-inch paper width, compatible with word processing software
QUADRAM CORP. 4355 International Blvd., Norcross, GA 30093, (404) 923-6666						Circle 364
Quadjet	ink jet	40	80	Centronics (BUSY)	495(Q1)	7-color printing, includes IBM PC and PCjr. software

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
QWINT SYSTEMS INC. 625 Barclay Blvd., Lincolnshire, IL 60069, (312) 634-6700						Circle 365
RO-743/ RO-743-6	impact	60	80–137, programmable	RS232C, current loop (1.2K bps, X-on/X-off, DC2/DC4)	795/845(Q1)	bit-mapped graphics/6K-byte input buffer
RO-744	impact	30	80–137, programmable	RJ-11 (300 bps, DC2/DC4, EOT)	945(Q1)	built-in auto answer modem; opt. acoustic coupler
RAMTEK CORP. 2211 Lawson Lane, Santa Clara, CA 94086, (408) 988-2211						Circle 366
4111	thermal	43	80		6,000(Q1); 5,000(Q100)	bit-mapped graphics, 8-color printing, compatible with proprietary graphic software
SAMLECO LTD. 9 Fairacres Industrial Estate, Dedworth Rd., Windsor, Berks SL4 4LE, England, 07535/54717						Circle 367
DT-80	thermal	30, 40	80	RS232C, Centronics, current loop, Commodore, IBM (9.6K bps, X-on/X-off, DTR, ETX/ACK)	160(Q1); 110(Q100)	cut sheet feeder, plug-in interface cartridges, graphics
DX-85	impact	120	80–136	RS232C, Centronics, current loop, Commodore, IBM (9.6K bps, X-on/X-off, DTR, ETX/ACK)	260(Q1); 175(Q100)	2¼- to 9½-inch paper width, cut sheet feeder, plug-in interface cartridges, 11 languages, switch selectable
DX-135	impact	120	132–224	RS232C, Centronics, current loop, Commodore (9.6K bps, X-on/X-off, DTR, ETX/ACK)	420(Q1); 285(Q100)	2- to 14¾-inch paper width, cut sheet feeder, plug-in interface cartridges, 11 languages
SCI SYSTEMS INC. P.O. Box 1000, Hunstville, AL 35807, (205) 882-4613						Circle 368
1080/ 1180	non-impact electro-sensitive	2200	up to 256	RS232C, Centronics (300–19.2K bps)	400–1,160(Q1); 310–1,045(Q100)	
1100/ 1110	non-impact electro-sensitive	1100	up to 256	RS232C, Centronics (300–19.2K bps)	400–1,160(Q1); 310–1,045(Q100)	
1900	non-impact electro-sensitive	6600	80, 132	RS232C, Centronics (300–19.2K bps)	1,890(Q1); 1,790(Q100)	
SIEMENS COMMUNICATION SYSTEMS INC. 5500 Broken Sound Blvd., Boca Raton, FL 33431, (305) 994-8800						Circle 369
PT88	ink jet	150	programmable	RS232C, Centronics, TTY (up to 9.6K bps, ASCII, IBM, Epson)	745(Q1)	4- to 9⅞-inch paper width; cut sheet feeder; bit-mapped, raster graphics; noise level less than 45 dB(a)
PT89	ink jet	150	programmable	RS232C, Centronics, TTY (up to 9.6K bps, ASCII, IBM, Epson)	895(Q1)	4- to 15¾-inch paper width; cut sheet feeder; bit-mapped, raster graphics; noise level less than 45 dB(a)
STAR MICRONICS INC. 200 Park Ave., New York, NY 10766, (212) 986-6770						Circle 370
SD10/ SD15	impact	40, 160		RS232C, Centronics (300–19.2K bps, X-on/X-off, DTR)	449/599(Q1)	10- to 15-inch paper width, graphics
SG10/ SG15	impact	30, 120		RS232C, Centronics (300–19.2K bps, X-on/X-off, DTR)	299/499(Q1)	10- to 15-inch paper width, graphics
SR10/ SR15	impact	50, 200		RS232C, Centronics (300–19.2K bps, X-on/X-off, DTR)	649/799(Q1)	10- to 15-inch paper width, graphics, cut sheet feeder
SYNTEST CORP. 40 Locke Dr., Marlboro, MA 01752, (617) 481-7827						Circle 371
SP-309	impact	120	40	RS232C, current loop, Centronics (50–9.6K bps, X-on/X-off, DTR)	790(Q1)	3-inch paper width
SP-310	impact	50	40	RS232C, current loop (110–9.6K bps, DTR)	660(Q1)	3⅞-inch paper width
SP-314	impact	80	40	RS232C, TIL parallel (110–4.8K bps, DTR)	605(Q1)	4¼-inch paper width
SP-400	thermal	24	40	RS232C, current loop, Centronics (50–9.6K bps, DTR)	365(Q1); 285(Q100)	3⅛-inch paper width
SP-700	impact	72	40	RS232C, current loop (150–9.6K bps, DTR)	385(Q1); 299(Q100)	2¾-inch paper width
SP-2010	impact	130	40, 80	RS232C, current loop, Centronics (110–9.6K bps, X-on/X-off, DTR)	985(Q1)	

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MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
TANDY CORP./RADIO SHACK						Circle 372
1800 One Tandy Center, Fort Worth, TX 76102, (817) 390-3011						
CPP220	ink jet	37	91	parallel, serial (600, 2.4K bps)	599(Q1)	7-color printing
DMP105	impact	80	80, 96, 133	Centronics (600, 2.4K bps)	199(Q1)	9½-inch paper width
DMP130	impact	25, 100	80, 96, 133	Centronics (600, 2.4K bps)	349(Q1)	bit-image graphics, 9½-inch paper width
DMP430		108, 123, 184	132, 158, 220	Centronics (600, 2.4K bps)	899(Q1)	15-inch paper width
DMP2100P	impact	100, 160	136, 163, 226	Centronics	1,495(Q1)	15-inch paper width, bit-image graphics, downloadable fonts; opt. cut sheet feeder
DMP2200	impact	90, 380	136, 163, 233	parallel	1,695(Q1)	16-inch paper width
TRP100	thermal	50	80	parallel, serial (600 bps)	299(Q1)	
TELEX COMPUTER PRODUCTS INC.						Circle 373
6422 E. 41st St., Tulsa, OK 74135, (918) 627-1111						
TC 281B	impact	120	136	RS232C, IBM 3274, 3276	900(Q1)	
TC 287D	impact	150	132	RS232C, IBM 3274, 3276	5,000(Q1)	international character set
TC 887	impact	400	132	RS232C, IBM 3274, 3276 (IBM 3270)	7,200(Q1)	international character set
TEXAS INSTRUMENTS INC.						Circle 374
12501 Research Blvd., Austin, TX 78769, (512) 250-7111						
810	impact (9 x 7)	150	75, 90, 120, 150, 180, 240	RS232C (110–9.6K bps, READY/BUSY)	1,645(Q1)	3- to 15-inch paper width, raster graphics; opt. parallel interface, X-on/X-off
820 RO	impact	150	132	RS232C (110–9.6K bps, READY/BUSY)	2,165(Q1)	3- to 15-inch paper width; opt. current loop, X-on/X-off
855	impact	35, 150	40, 48, 66, 80, 96, 120, 134, 160, programmable	Centronics (300 to 9.6K bps, X-on/X-off, ETX/ACK)	935(Q1)	3- to 10-inch paper width; raster, mosaic graphics; cut sheet feeder; compatible with most software packages
850XL	impact (9 x 9)	35, 150	40, 48, 66, 80, 96, 134, programmable	Centronics (200 to 9.6K bps, X-on/X-off)	599(Q1)	3- to 10-inch paper width; raster, mosaic graphics; compatible with all major software packages; cut sheet feeder
860XL	impact	35, 150	68, 82, 113, 136, 163, 227, programmable	Centronics (200 to 9.6K bps, X-on/X-off)	899(Q1)	3- to 16-inch paper width; raster, mosaic graphics; compatible with all major software packages; cut sheet feeder
865	impact	35, 150	68, 82, 113, 136, 163, 204, 227, 272, programmable	Centronics (300 to 9.6K bps, X-on/X-off, ETX/ACK)	1,299(Q1)	3- to 16-inch paper width; raster, mosaic graphics; cut sheet feeder; compatible with most major software packages
880	impact	75, 300	80, 96, 133, 160, 192, 267	RS232C, parallel (110–19.2K bps, X-on/X-off, READY/BUSY)	2,195(Q1)	3- to 16-inch paper width; raster graphics; menu-driven setup; opt. RS422, current loop
880 AT	impact	75, 300	80, 96, 133, 160, 192, 267	RS232C, parallel (110–19.2K bps, X-on/X-off, READY/BUSY)	2,195(Q1)	3- to 16-inch paper width; raster graphics; menu-driven setup; compatible with most major software packages; opt. character fonts; RS422, current loop
TOSHIBA AMERICA INC.						Circle 375
2441 Michelle Dr., Tustin, CA 92680, (714) 730-5000						
P351	impact	100, 240, 288	136, 163, 226	RS232C, Centronics, parallel (19.2K bps, X-on/X-off, DTR, ETX/ACK, Qume Sprint11)	1,895–1,945(Q1)	17⅜-inch paper width, bit-mapped graphics, compatible with word processing and graphic software
P1340	impact	54, 120, 144	80, 96, 132	RS232C, Centronics, parallel (9.6K bps, X-on/X-off, DTR, ETX/ACK)	799(Q1)	17⅜-inch paper width, bit-mapped graphics, compatible with word processing and graphic software
WENGER DATENTECHNIK						Circle 376
Im Kagen 23/25, 4153 Reinach, Switzerland, (061) 76 87 87						
Print Swiss Matrix	impact	80, 150	80, programmable	RS232C, Centronics (9.6K bps, X-on/X-off, ETX/ACK, ENQ/ACK)	1,100(Q1); 950(Q100)	3- to 10-inch paper width; cut sheet feeder; bit-mapped, vector graphics; opt. KSR

MATRIX CHARACTER PRINTERS

TABLE 7

Company / Model	Print method (matrix size)	Print speed (cps)	Characters/line	Interface (transmission rate/ protocols)	Price $ (quantity)	Notes, features, options
Wenger 1/1	impact	30, 160	80, programmable	RS232C, RS422, Centronics (19.2K bps, X-on/X-off, ETX/ACK, ENQ/ACK)	870(Q1); 600(Q100)	3- to 10-inch paper width, cut sheet feeder, bit-mapped graphics, noise level less than 48 dB(a)
Wenger 4/1	impact	130, 400–600	136, programmable	RS232C, RS422, Centronics, Diablo, Qume (19.2K bps, X-on/X-off, ETX/ACK, ENQ/ACK)	3,500(Q1); 2,100(Q100)	3½- to 13-inch paper width, 7-color printing, bit-mapped graphics, cut sheet feeder, 40K-byte buffer; opt. bar code
WESTREX OEM PRODUCTS 51 Penn St., Fall River, MA 02724, (617) 676-1016						**Circle 377**
Westrex One	impact	40, 145	80	RS232C, Centronics (9.6K bps, X-on/X-off)	499(Q1); 399(Q1)	
XEROX PSD/APSBU 910 Page Ave., Fremont, CA 94537, (415) 498-7786						**Circle 378**
C200	ink jet	40, 80	85–145, programmable	RS232C, Centronics (9.6K bps, X-on/X-off, DTR, ACK/NAK)	1,450(Q1); 1,100(Q100)	5- to 11-inch paper width, cut sheet feeder, 4-color printing
ZENITH DATA SYSTEMS 1000 Milwaukee Ave., Glenview, IL 60025, (312) 391-8860						**Circle 379**
Z-125	impact (9 x 9)	150	132, 158, 174, 217	RS232C, current loop	1,499(Q1)	3½- to 17¾-inch paper width, block graphics

Information was solicited but not received from the following manufacturers:

Anadex Inc.
1001 Flynn Rd.
Camarillo, CA 93010
(805) 987-9660

Axiom Corp.
1014 Griswold Ave.
San Fernando, CA 91340
(818) 365-9521

Canon USA Printer Div.
One Canon Plaza
Lake Success, NY 11042
(516) 488-6700

CIE Terminals
2505 McCabe Way
Irvine, CA 92714
(714) 660-1421

Control Data Corp.
Mini-Micro Systems
2200 Berkshire Lane
Minneapolis, MN 55441
(612) 553-4603

Corvus Systems Inc.
2100 Corvus Dr.
San Jose, CA 95124
(408) 559-7000

Cynthia Peripherals Corp.
766 San Aleso Ave.
Sunnyvale, CA 95120
(408) 745-0855

Datapoint Corp.
9725 Datapoint Dr.
San Antonio, TX 78284
(512) 699-7542

Digital Matrix Corp.
96 W. Dudleytown Rd.
Bloomfield, CT 06002
(203) 242-3048

Espirit Systems Inc.
100 Marcus Dr.
Melville, NY 11747
(516) 293-5600

Hitachi America Ltd.
950 Elm Ave., Suite 100
San Bruno, CA 94066
(415) 872-1902

Memorex Corp.
Communications Group
461 Milpitas Blvd.
Milpitas, CA 95035
(408) 987-1000

Mohawk Data Sciences
7 Century Dr.
Parsippany, NJ 07054
(201) 540-9080

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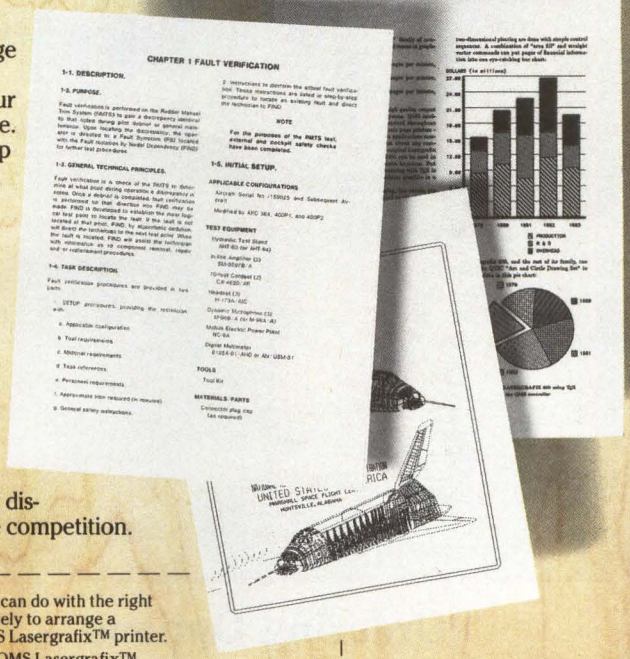
If you guessed that those tools are the capabilities of a QMS Lasergrafix printer, then you hit the nail on the head. And if you're an OEM, you can feel sorry for the competition. A QMS Lasergrafix printer system fulfills every requirement you can imagine. Flexibility–the software intelligence to handle page composition, plus many other applications with our powerful QUIC™ language. Performance–at speeds up to 8, 12 and 24 pages a minute. Reliability–with support for the widest range of applications in the industry. And serviceability–print engines from the world's best manufacturers and optional third party service. What's more, a QMS Lasergrafix printer will replicate and download standard quality fonts, interfacing with just about any system. All of which makes it the perfect replacement for multiple printers and plotters–and at OEM discounts, too. Imagine where that leaves the competition. Now, how can you resist a demonstration?



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Company _____

Address _____

City _____ State/Zip _____ Phone ( ) _____

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If VAR or VAD, what manufacturer's equipment? _____

Prime application for your product. _____

Number of printers/plotters you are considering. _____

P.O. Box 81250 Mobile, AL 36689 Telephone (205) 633-4300 Telex RCA 26 60 13

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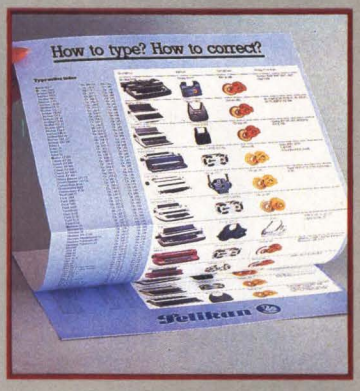
Pelikan's rack program includes a variety of support materials: complete compatibility lists, a product guide, detailed program outline and four-color display pieces.



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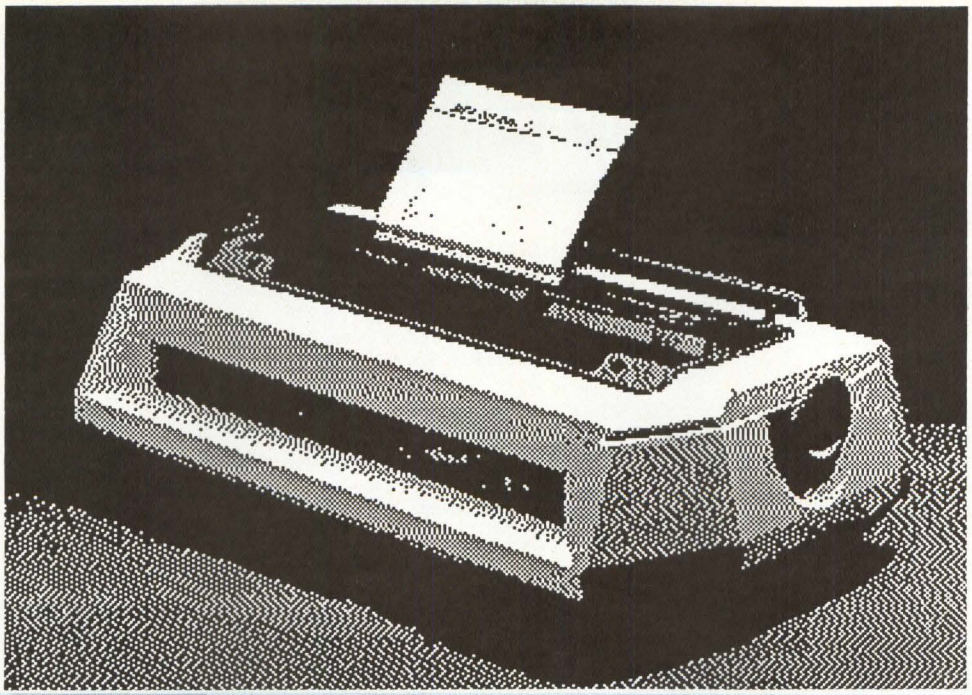
For detailed information, contact your area Pelikan representative or call any of the following toll-free numbers:

Eastern U.S.: 1-800-251-3365 In Tennessee: (615) 790-6171
Western U.S.: 1-800-874-5898 In California: 1-800-821-4271

CIRCLE NO. 43 ON INQUIRY CARD

Pelikan, Inc., Ribbon Products Division • 200 Beasley Drive • Franklin, Tennessee 37064

SOLID FONT CHARACTER PRINTERS TABLE 8



Company / Model	Print method	Print speed (cps)	Characters/line	Interface (transmission rate/ protocol)	Price $ (quantity)	Notes, features, options
ANDERSON-JACOBSON INC. 521 Charcot Ave., San Jose, CA 95131, (408) 263-8520						**Circle 380**
AJ831	Qume daisywheel	10, 15, 30	132, 158	RS232C (X-on/X-off)	295(Q1)	noise level less than 70 dB(a)
AJ833	Qume daisywheel	45	132, 158	RS232C (X-on/X-off, TTY)	3,650(Q1)	noise level less than 70 dB(a)
APPLE COMPUTER INC. 20525 Mariani Ave., Cupertino, CA 95014, (408) 996-1010						**Circle 381**
Daisywheel Printer	Apple printwheel	40	up to 198	RS232C (1.2K to 9.6K bps, X-on/X-off)	2,195(Q1)	compatible with Apple computers
BLUE CHIP ELECTRONICS INC. 2 W. Alameda Dr., Tempe, AZ 85282, (602) 829-7217						**Circle 382**
D12/10	Brother daisywheel	12	programmable	Commodore serial	249(Q1)	noise level less than 60 dB(a), proportional print, supports 8 languages, includes word processing software for Commodore 64, 128, C16
BROTHER INTERNATIONAL CORP. 8 Corporate Place, Piscataway, NJ 08854, (201) 981-0300						**Circle 383**
HR10	Brother daisywheel	12	80	RS232C, Centronics (300–2.4K bps, Diablo 630)	349(Q1); 258(Q100)	noise level less than 60 dB(a), compatible with word processing software, 2K-byte buffer, includes tractor unit
HR25	Brother daisywheel	23	132, 158, 198	RS232C, Centronics (110–9.6K bps, Diablo 630)	695(Q1)	noise level less than 65 dB(a), prints red, compatible with word processing packages, 3K-byte buffer, cut sheet feeder
HR35	Brother daisywheel	32	132, 158, 198	RS232C, Centronics (110–9.6K bps, Diablo 630)	995(Q1)	noise level less than 65 dB(a), prints red, compatible with word processing packages, 7K-byte buffer; opt. 23K-byte buffer
HR15XL	Brother daisywheel	17	110, 132, 165	RS232C, Centronics (110–9.6K bps, Diablo 630)	599(Q1)	noise level less than 65 dB(a), prints red, compatible with word processing packages, 3K-byte buffer, cut sheet feeder
TWIN-RITER 5	Brother daisywheel	36	136	Centronics (110–9.6K bps, Diablo 630)	1,295(Q1); 958(Q100)	daisywheel or dot matrix capability, noise level less than 60 dB(a), compatible with word processing software, 3K-byte buffer, tractor unit; opt. RS232C, sheet feeder
C. ITOH DIGITAL PRODUCTS INC. 19750 S. Vermont Ave., Suite 220, Torrance, CA 90502, (213) 327-2110						**Circle 384**
A-10-30	daisywheel	29	100	parallel or serial (300–4.8K bps, X-on/X-off, ETX/ACK, READY/BUSY)		noise level less than 62 dB(a)

SOLID FONT CHARACTER PRINTERS TABLE 8

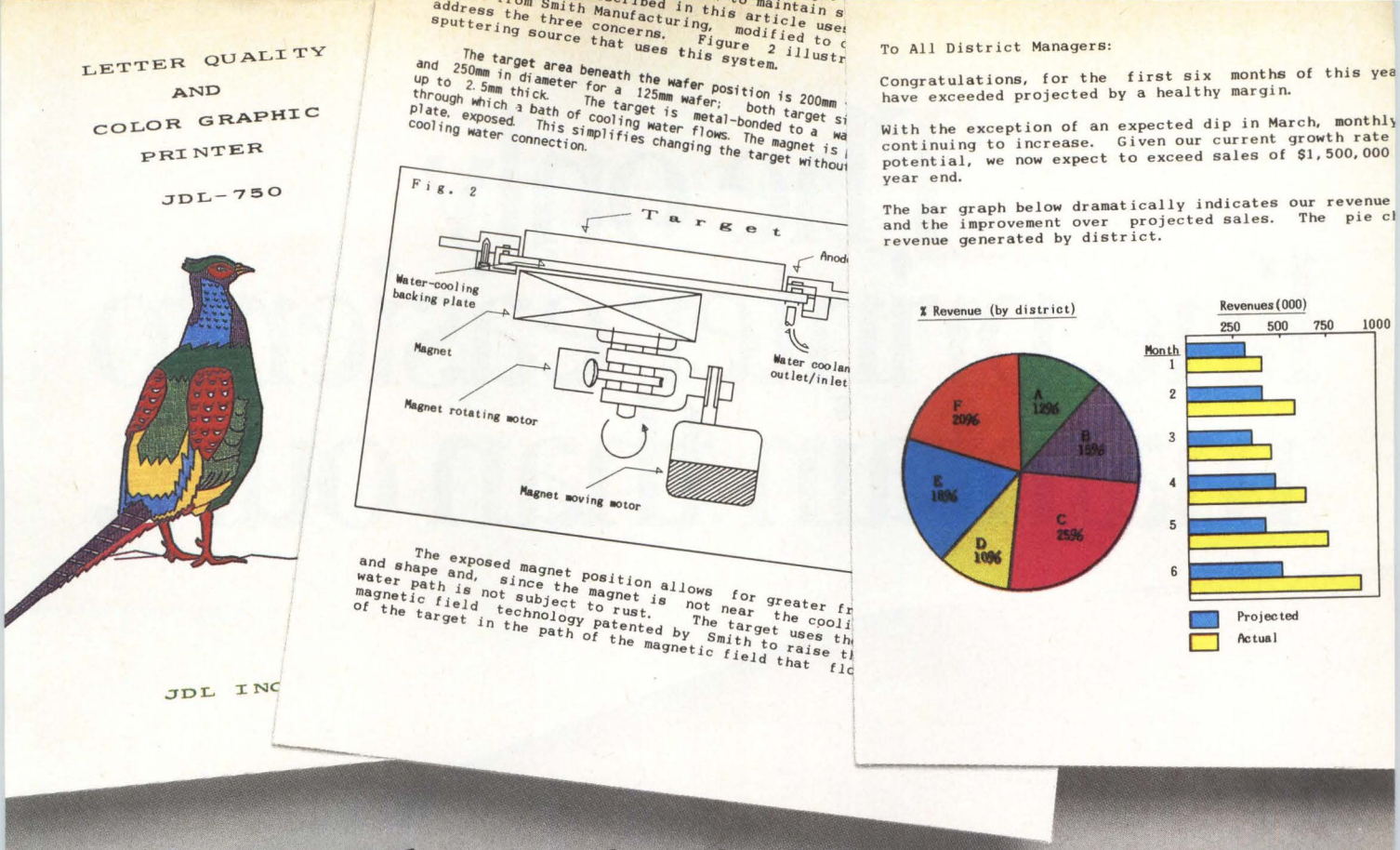
Company / Model	Print method	Print speed (cps)	Characters/line	Interface (transmission rate/ protocol)	Price $ (quantity)	Notes, features, options
C. ITOH ELECTRONICS INC. 5301 Beethoven St., Los Angeles, CA 90066, (213) 306-6700						Circle 385
A-10/30	Diablo printwheel compatible	30	115, 138	RS232C, Centronics (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	695(Q1)	proportional print, noise level 62 dB(a), graphic print mode, self-test, logic seeking
F-10/40	Diablo printwheel compatible	40	136, 163	RS232C, Centronics, Qume Sprint 5 (110 to 9.6k bps, X-on/X-off, DTR, ETX/ACK)	1,200(Q1)	proportional print, noise level less than 65 dB(a), built-in word processing functions
F-10/55	Diablo printwheel compatible	55	136, 163	RS232C, Centronics, Qume Sprint 5 (110 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	1,450(Q1)	proportional print, noise level less than 65 dB(a), built-in word processing functions
Y-10	Diablo printwheel compatible	20	80, 96	RS232C, Centronics (300 to 2.4K bps, X-on/X-off, DTR, ETX/ACK)	525(Q1)	proportional print, noise level 60 dB(a)
DAISY SYSTEMS HOLLAND BV 3731 Northcrest Rd., Atlanta, GA 30340, (404) 451-0257						Circle 386
M-20	proprietary	20	157, 192, programmable	RS232C, Centronics, Dataproducts (110–9.6K bps, X-on/X-off, ETX/ACK, Diablo 630, Qume Sprint 5)	995(Q1)	noise level 62 dB(a), switch selectable, form tractors available
M-45Q	Diablo/ Qume daisywheel	40	132, 158, programmable	RS232C, current loop, Centronics (110–9.6K bps, X-on/X-off, ETX/ACK, Diablo 630, Qume Sprint 5)	1,845(Q1)	noise level 54 dB(a), switch selectable, form tractors available
DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911						Circle 387
4518	NEC thimble	35	132	RS232C (X-on/X-off)	2,800(Q1); 2,520(Q100)	noise level 60 dB(a); opt. auto sheet feeder, tractor feed
4467	daisywheel	20	120	Data General parallel	650(Q1); 507(Q100)	noise level 55 dB(a); opt. auto sheet feeder, tractor feed
6321	daisywheel	40	132	RS232C, current loop, RS422	2,695(Q1); 2,425(Q100)	noise level 55 dB(a); opt. auto sheet feeder, tractor feed
DATAPRODUCTS CORP. 6200 Canoga Ave., Woodland Hills, CA 91365, (818) 887-3924						Circle 388
DP-20	daisywheel	20, 22	136, 163, 204	RS232C, Centronics (110–9.6K bps, X-on/X-off, DTR, ETX/ACK, ACK/NAK)	799(Q1)	noise level 58 dB(a)
DP-55Q/ DP-55SQ	daisywheel	55, 50	132, 158, 196	RS232C, Centronics (75 to 9.6K bps, X-on/X-off, ETX/ACK, ACK/NAK, RTS, DTR, BC)	2,195/ 2,495(Q1)	noise level 59 dB(a)/noise level less than 55 dB(a)
DATASOUTH COMPUTER CORP. 4216 Stuart Andrew Blvd., Charlotte, NC 28210, (704) 523-8500						Circle 389
DW36	daisywheel	36	132	RS232C, Centronics	995(Q1)	
DIGITAL EQUIPMENT CORP. 129 Parker St., Maynard, MA 01754, (617) 493-5489						Circle 390
LQP02	daisywheel	32	132, 158	RS232C (75–9.6K bps, X-on/X-off)	2,800(Q1)	cut sheet feeder, foreign language printer
DYNAX, INC. 6070 Rickenbacker Rd., Commerce, CA 90040, (213) 727-1227						Circle 391
Fortis DH45	daisywheel	30, 36	136	Centronics		dual head printer, noise level less than 60 dB(a), bit-image graphics, logic seeking; opt. cut sheet feeder
Fortis DX-15XL	daisywheel	20	110, 132, 165	RS232C, Centronics		proportional print, noise level less than 65 dB(a), logic seeking, bidirectional; opt. cut sheet feeder
HR-35	daisywheel	36		RS232C, Centronics		proportional print, noise level less than 65 dB(a), 7K-byte buffer, logic seeking, international character sets, 16½-inch paper width; opt. auto sheet feeder
EPSON AMERICA INC. (OEM PRODUCTS DIV.) 23600 Telo St., Torrance, CA 90505, (213) 534-4500						Circle 392
DX-20	daisywheel	20	110, 132, 165	RS232C, IEEE-488, parallel	495(Q1); 255(Q1000–2499)	opt. cut sheet feeder

SOLID FONT CHARACTER PRINTERS TABLE 8

Company / Model	Print method	Print speed (cps)	Characters/line	Interface (transmission rate/ protocol)	Price $ (quantity)	Notes, features, options
FACIT INC. 9 Executive Park Dr., Merrimack, NH 03054, (603) 424-8000						Circle 393
4560	Facit daisywheel	22	130	RS232C, Centronics (up to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	795(Q1)	noise level less than 60 dB(a)
4565	Diablo/Qume daisywheel	40	136	RS232C (up to 2.4K bps, X-on/X-off, DTR, ETX/ACK)	1,395(Q1)	noise level less than 65 dB(a)
FUJITSU AMERICA INC. 3055 Orchard Dr., San Jose, CA 95134, (408) 946-8777						Circle 394
SP320	Diablo/Qume-compatible daisywheel	48	136, 163	RS232C, Centronics, current loop (150–9.6K bps, X-on/X-off, ETX/ACK, DTR)	1,499(Q1)	noise level 60 dB(a), vector plotting, Diablo 630 compatible, cut sheet feeder
SP830	Diablo/Qume-compatible daisywheel	80	136, 163	RS232C, Centronics, current loop (150–9.6K bps, X-on/X-off, ETX/ACK, DTR)	2,295(Q1)	noise level 60 dB(a), vector plotting, Diablo 630 compatible, cut sheet feeder
GENERAL BUSINESS TECHNOLOGY 1891 McGaw Ave., Irvine, CA 92714, (714) 261-1891						Circle 395
5205WP	NEC-compatible print thimble	55	up to 198	IBM S/34, S/36, S/38 twin-ax	4,295(Q1)	noise level 67 dB(a)
5026WP	NEC-compatible print thimble	35	up to 198	IBM S/34, S/36, S/38 twin-ax	3,695(Q1)	noise level 67dB(a)
HONEYWELL INFORMATION SYSTEMS INC. 200 Smith St., Waltham, MA 02154, (617) 895-6000						Circle 396
23	NEC-compatible print thimble	35	132, 158, 198, programmable	RS232C, RS422A (up to 1.2K bps, ETX/ACK)	2,700(Q1)	proportional print, Honeywell OAS software, self-test, bidirectional printing
24	Qume daisywheel	40	132, 158, 198, programmable	RS232C, RS422A (up to 9.6K bps, ASPI)	3,350(Q1)	noise level less than 67 dB(a), Honeywell OAS software, dual bin sheet feeder
25	Qume daisywheel	55	132, 158, 198, programmable	RS232C, RS422A (up to 9.6K bps, ASPI)	3,350(Q1)	noise level less than 67 dB(a), Honeywell OAS software, dual bin sheet feeder
IBM CORP. 900 King St., Rye Brook, NY 10573, (914) 934-4822						Circle 397
5216 Wheel-printer	daisywheel	23–25	132–198	PC serial, parallel	1,796(Q1)	noise level 59 dB(a), compatible with major word processing packages, sheet feeder, tractor feeder
5201 Quietwriter Printer	resistive ribbon	40–60	132–198	PC parallel	1,395	noise level 50 dB(a), compatible with major word processing packages; opt. pin and sheet feeder
NEC HOME ELECTRONICS (U.S.A.) INC. 1401 Etes Ave., Elk Grove Village, IL 60007, (312) 228-5900						Circle 398
Authentic 15 LQ	Diablo daisywheel	14	101, 121, 151, programmable	parallel	695(Q1)	noise level less than 65 dB(a)
NEC INFORMATION SYSTEMS 1414 Massachusetts Ave., Boxborough, MA 01719, (617) 264-8000						Circle 399
3500 Series	thimble	35	136, 163, 203	RS232C, IBM parallel (110–9.6K bps, X-on/X-off, ETX/ACK)	1,440(Q1)	noise level less than 60 dB(a), proportional print
8810/8815	thimble	55	136, 163, 203	RS232C (110–9.6K bps, X-on/X-off, ETX/ACK)	1,990(Q1)	noise level 58 dB(a), character graphics; opt. tractors, cut sheet feeders
8830	thimble	55	136, 163, 203	Centronics	1,990(Q1)	noise level 58 dB(a), character graphics; opt. tractors, cut sheet feeders
8850	thimble	55	136, 163, 203	parallel, IBM compatible	1,990(Q1)	noise level 58 dB(a), character graphics; opt. tractors, cut sheet feeders
ELF 350	thimble	19	110, 132, 165	IBM serial, parallel (300 to 9.6K bps, X-on/X-off, ETX/ACK)		noise level 55 dB(a), proportional print
ELF 360	thimble	19	110, 132, 165	RS232C, Centronics (300 to 9.6K bps, X-on/X-off, DTR, ETX/ACK)	595(Q1)	noise level 55 dB(a), switch selectable
PANASONIC INDUSTRIAL CO. One Panasonic Way, Secaucus, NJ 07094, (201) 384-7292						Circle 400
KX-P3151	Diablo-compatible daisywheel	22	132, 158, 198, programmable	RS232C (X-on/X-off, DTR, ETX/ACK)	659(Q1)	proportional print, noise level 63 dB(a)

SOLID FONT CHARACTER PRINTERS TABLE 8

Company Model	Print method	Print speed (cps)	Characters/line	Interface (transmission rate/ protocol)	Price $ (quantity)	Notes, features, options
PRIMAGES INC. 620 Johnson Ave., Bohemia, NY 11716, (516) 567-8000						Circle 401
Primage 90	daisywheel	90	135, 162, 202	RS232C, Centronics (100–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 630)	1,492(Q1)	noise level 57 dB(a)
Primage 100	daisywheel	100	135, 162, 202	RS232C, Centronics (100–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 630)	1,895(Q1)	noise level 57 dB(a)
PRINTER SYSTEMS CORP. P.O. Box 6020, Gaithersburg, MD 20877, (301) 258-5060						Circle 402
PSC 1155	daisywheel	55		RS232C, Centronics, IEEE-488 (X-on/X-off)	2,022(Q1)	noise level 63 dB(a)
PSC 6156	daisywheel	55		IBM twin-ax (IBM 5256-3)	3,655(Q1)	noise level 63 dB(a)
PSC 7156	daisywheel	55		IBM co-ax (IBM 3287-2)	3,665(Q1)	noise level 63 dB(a)
RICOH CORP. 5 Dedrick Place, W. Caldwell, NJ 07006, (201) 882-2000						Circle 403
RP1500Q/ RP1600Q/ RP2200Q	daisywheel	40/50/22	136, 163, 204	RS232C, Centronics (X-on/X-off, DTR, ETX/ACK)		graphics
ROYAL CONSUMER BUSINESS PRODUCTS 500 Day Hill Rd., Windsor, CT 06095, (203) 683-2222						Circle 404
Letter-Master	Royal daisywheel	10	67, 80, programmable	Centronics	299(Q1)	noise level less than 60 dB(a)
Office-Master 2000	Royal daisywheel	20	programmable	RS232C, Centronics (150–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 630)	599(Q1)	noise level less than 57 dB(a)
SAMLECO LTD. 9 Fairacres Industrial Estate, Dedworth Rd., Windsor, Berks SL4 4LE, England, 07535/54717						Circle 405
DY-40	daisywheel	40–55	136, programmable	RS232C, current loop, Centronics, IEEE-488 (4.8K bps, X-on/X-off, DTR, ETX/ACK, DEC, IBM)	1,160(Q1); 577(Q100)	noise level 60 dB(a), auto sheet feeder
SANYO BUSINESS SYSTEMS CORP. 51 Joseph St., Moonachie, NJ 07074, (201) 440-9300						Circle 406
PR5500	daisywheel	16	132	Centronics (X-on/X-off)	569(Q1)	word processing software
SIEMENS COMMUNICATION SYSTEMS INC. 5500 Broken Sound Blvd., Boca Raton, FL 33431, (205) 994-8800						Circle 407
PT90	ink jet	200, 400	programmable	RS232C, Centronics, TTY (to 19.2K bps, IBM, Xerox)	2,995(Q1)	noise level less than 45 dB(a); bit-mapped, raster graphics; sheet feeders; adjustable tractors
SILVER-REED AMERICA INC. 19600 S. Vermont Ave., Torrance, CA 90502, (213) 516-7008						Circle 408
EXP 400	daisywheel	10	10, 12, 15, programmable	RS232C, Centronics (300–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 630)	349(Q1)	noise level less than 65 dB(a)
EXP 500	daisywheel	12	10, 12, 15, programmable	RS232C, Centronics (300–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 1610)	449(Q1)	noise level less than 65 dB(a)
EXP 550	daisywheel	17	10, 12, 15, programmable	RS232C, Centronics (300–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 1610)	649(Q1)	proportional print, noise level less than 65 dB(a)
EXP 770	daisywheel	31	10, 12, 15, programmable	RS232C, Centronics (300–9.6K bps, X-on/X-off, DTR, ETX/ACK, Diablo 630)	995(Q1)	proportional print, noise level less than 65 dB(a), 2K-byte buffer; opt. 48K-byte buffer
STAR MICRONICS 200 Park Ave., New York, NY 10166, (212) 986-6770						Circle 409
Powertype	Diablo/Qume-compatible daisywheel	18		RS232C, Centronics (150–9.6K bps, X-on X-off, DTR)	499(Q1)	noise level 64 dB(a)



Span the printing spectrum

The JDL-750's reliable color dot matrix technology provides everything you've been looking for on a printed page. It's a complete business and engineering workstation printer for text and graphics.

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- ☐ 180 x 180 dot per inch resolution with .01" minimum line width
- ☐ No special paper required; accepts C-size engineering media; 13.6" printable width

■ Word Processing

- ☐ Diablo™ 630 protocol for WP compatibility
- ☐ Letter quality print speed of 100 cps
- ☐ Extensive font library for business, technical, scientific and foreign applications

■ Spreadsheets

- ☐ 180 cps draft printing speed
- ☐ Color graphics and charts from 1-2-3, SuperCalc, and other spreadsheet applications

■ New!

- ☐ PC PRINT/GRAPH™ – IBM-PC software for color graphics printing with Lotus, PC Paint, Chart-Master and other graphics applications
- ☐ PC PLOT™ – IBM-PC software providing HP pen plotter emulation for high resolution, full color plotting on the JDL-750. HP-GL commands, 14 pen colors, and 2-3 times the speed of HP 74XX plotters.

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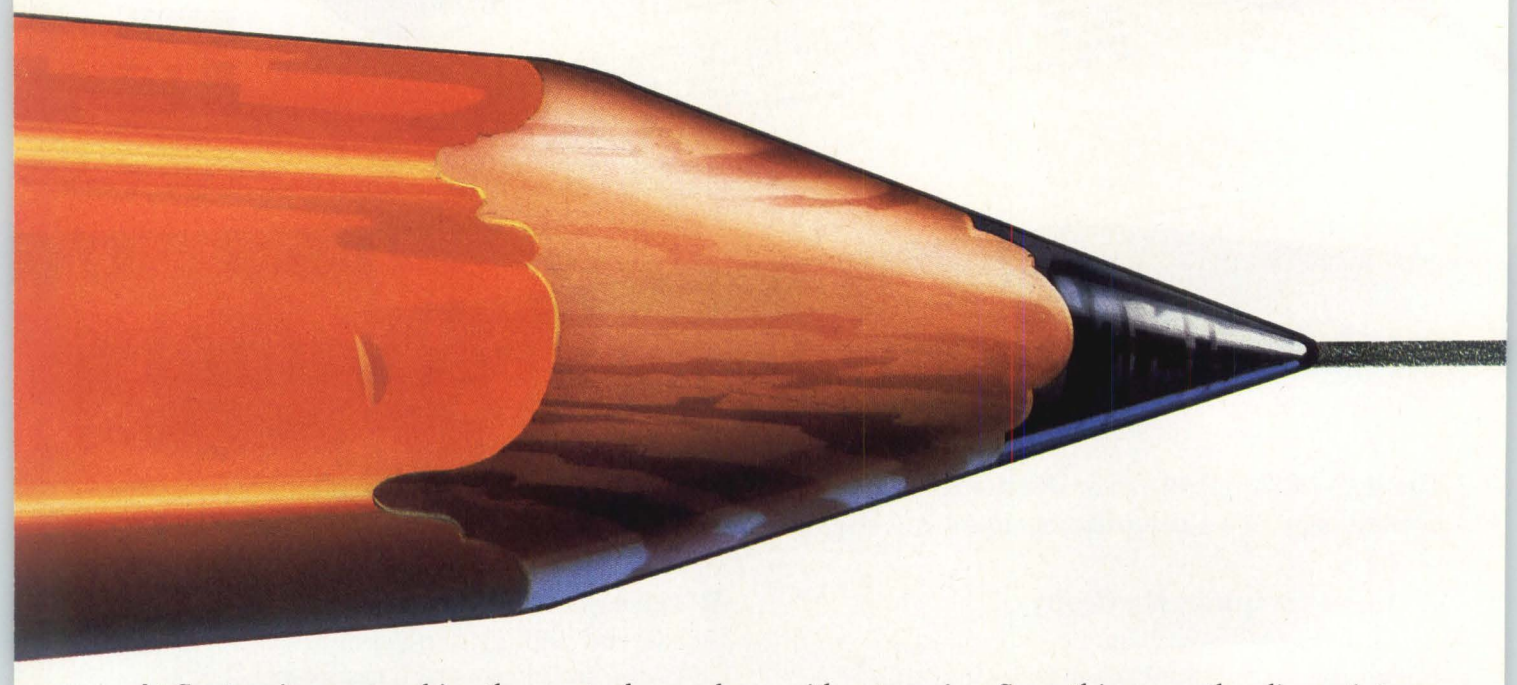
CIRCLE NO. 61 ON INQUIRY CARD

The only line printer easier to maintain than ours.



At Centronics, we combine the most advanced technology available with 20 years of experience to build the world's most reliable line printers. So that you don't have to worry about maintenance.

Take our Linewriters at 400 and 800 lpm. They deliver print quality better than any line printer on the market, at noise levels below 55 dB(A). Yet they're so reliable that with no preventive maintenance whatsoever, they run for 18 months without service. Something no other line printer can do.

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Pick up a pencil and write us. We'll show you that if you're looking for line printers, you have to look at Centronics.

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When was the last time you looked at us.

Centronics Data Computer Corp., Dept. A, One Wall Street, Hudson, NH 03051. Tel. (603) 883-0111.

CIRCLE NO. 44 ON INQUIRY CARD

SOLID FONT CHARACTER PRINTERS TABLE 8

Company / Model	Print method	Print speed (cps)	Characters/line	Interface (transmission rate/ protocol)	Price $ (quantity)	Notes, features, options
SUMITRONICS INC. 580 N. Pastoria Ave., Sunnyvale, CA 94086, (408) 737-7683						Circle 410
DWP-1120	Qume daisywheel	18	120, 144, 180, programmable	RS232C, Centronics (X-on/X-off, ETX/ACK, BUSY, Diablo 630)		proportional print, noise level 60 dB(a)
SWINTEC CORP. 23 Poplar St., East Rutherford, NJ 07073, (201) 935-0115						Circle 411
2100	Diablo 630 daisywheel	16	132, programmable	RS232C, Centronics (50–19.2K bps, X-on/X-off, DTR)	699(Q1)	noise level 60 dB(a), color printing, word processing software, built-in tractor feeder
TANDY CORP./RADIO SHACK 1800 One Tandy Center, Fort Worth, TX 76102, (817) 390-3011						Circle 412
DWP220	124-character daisywheel	20	136, 163	parallel	599(Q1)	proportional print
DWP510	124-character daisywheel	43	136, 163	Centronics	1,495(Q1)	opt. dual bin sheet feeder
TELEVIDEO SYSTEMS INC. 550 E. Brokaw Rd., San Jose, CA 95150, (408) 971-0255						Circle 413
TP 760	Silver-Reed daisywheel-compatible	48, 57	132, 158, 197, programmable	Centronics (110–9.6K bps, X-on/X-off, DTR)	1,195(Q1)	noise level less than 59 dB(a); opt. 7.5K-byte buffer
TP 790	Silver-Reed daisywheel-compatible	67, 90	132, 158, 197, programmable	Centronics (110–9.6K bps, X-on/X-off, DTR)	1,495(Q1)	noise level less than 62 dB(a); opt. 7.5K-byte buffer
TELEX COMPUTER PRODUCTS INC. 6422 E. 41st St., Tulsa, OK 74135, (918) 627-1111						Circle 414
TC 286F	daisywheel	60, 80	96, 127	IBM 3274, 3276; Telex 174, 274, 276 (IBM 3270)	5,750(Q1)	
TRENDATA CORP. 3400 W. Segerstrom Ave., Santa Ana, CA 92704, (714) 540-3605						Circle 415
8300	Diablo/Qume daisywheel	30	132, 156	RS232C (300 bps, X-on/X-off, DTR, ETX/ACK)		
8600	Diablo/Qume daisywheel	40	132, 158	RS232C (150–9.6K bps, X-on/X-off, DTR, ETX/ACK)		proportional print

Information was solicited but not received from the following manufacturers:

Datapoint Corp.
9725 Datapoint Dr.
San Antonio, TX 78284
(512) 699-7542

Juki Industries of America
412 N. Midland Ave.
Saddlebrook, NJ 07662
(201) 368-3666

Mohawk Data Sciences
7 Century Dr.
Parsippany, NJ 07054
(201) 540-9080

Qantel Business Computers
4142 Point Eden Way
Hayward, CA 94545
(415) 887-7777

Qume Corp.
2350 Qume Dr.
San Jose, CA 95131
(408) 942-4000

Triumph-Adler America
500 Day Hill Dr.
Windsor, CT 06095
(203) 683-2222

WE CHALLENGE ALL COMERS TO A LASER BATTLE.

DIGITAL'S NEW LN03 IS FAST AND AFFORDABLE.

Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than $7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it prints on virtually any cut sheet paper, including overhead transparencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

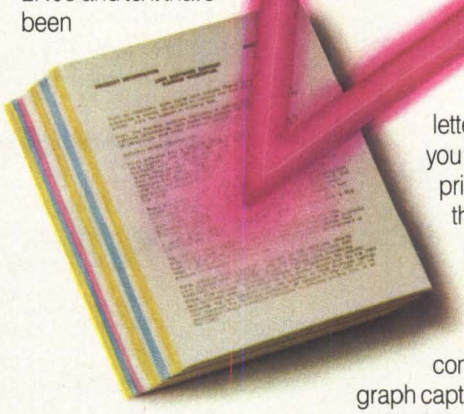
The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counter-productive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.



To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

FASTER AND MORE FLEXIBLE THAN DOT MATRIX.

The LN03 doesn't stop with better-than-letter-quality quality. It also gives you the advantages of dot matrix printing. And then some.

At 8 pages per minute, the LN03's speed approaches that of a line printer. The fact is, it's faster than both your dot matrix and daisywheel printer working together.

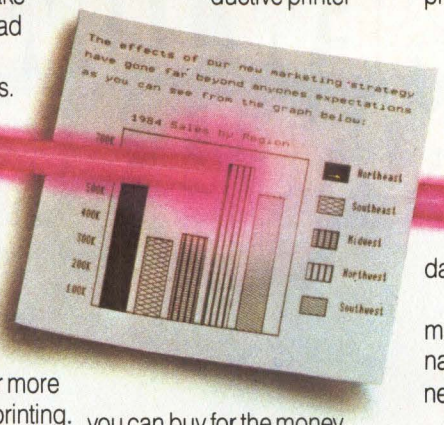
Crisp business graphics are a snap. And unlike either of your conventional printers, the LN03 can mix graphics and true letter quality on a single page. In a single pass.

Noise is a barely audible 55 dB. Far quieter than any impact printer. No louder than your copier. So the LN03 won't distract and annoy workers even in an open office.

The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.

Finally, the LN03 is one of the least expensive printers you can own, with a cost-per-page of just 3.2 cents. That's a savings of 20% or more over dot matrix printing. And substantially more compared to your daisywheel printer.

So, an LN03 really makes a lot of sense. You get better economy. More flexibility. Additional capabilities. A professional look. Which makes the LN03 the most productive printer you can buy for the money.



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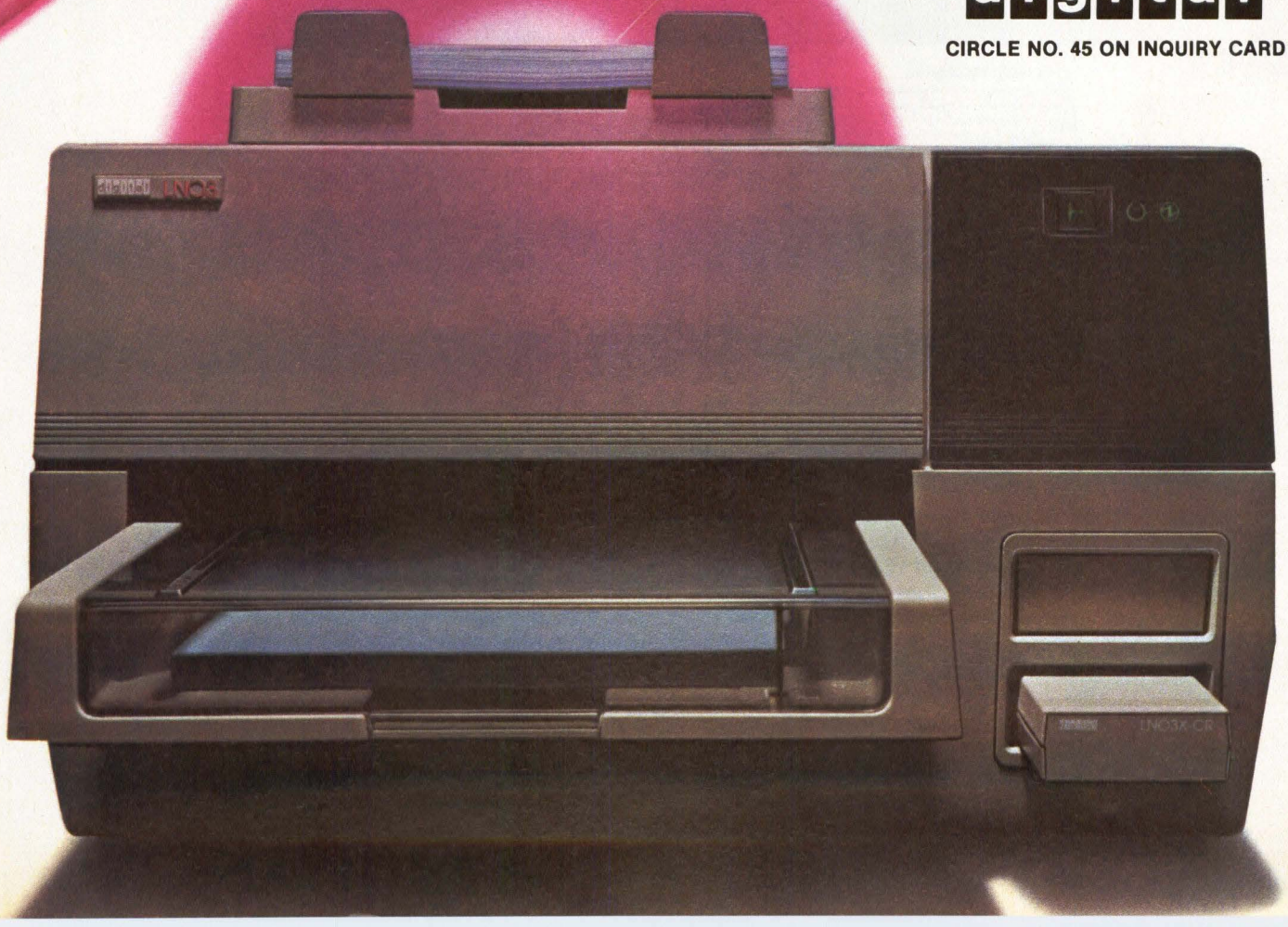
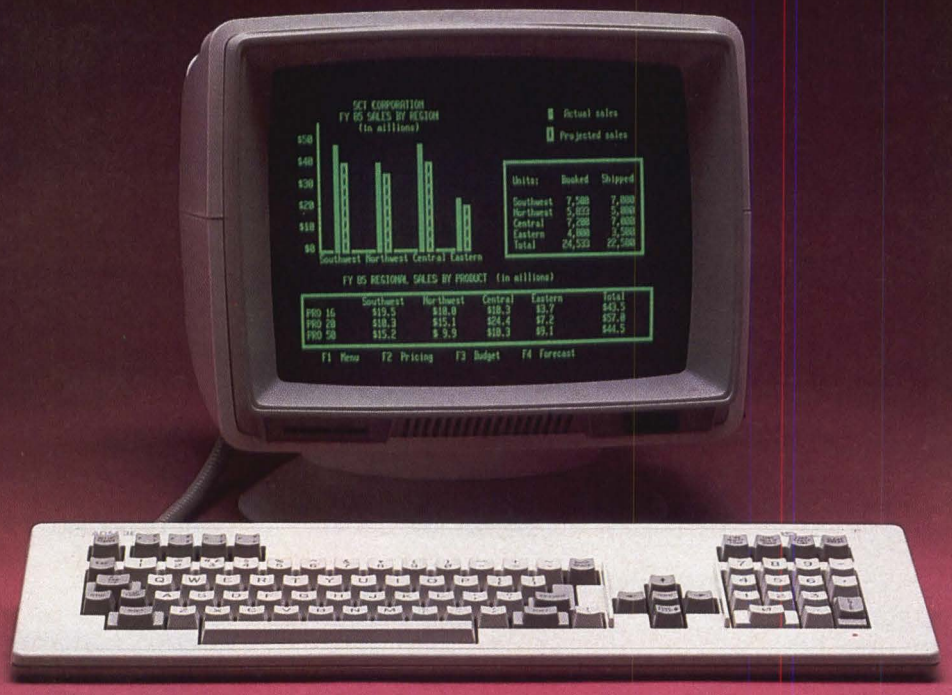


A NEW LOW FROM LEAR SIEGLER.



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So it may raise a few eyebrows when word spreads that we've reached an all-time low. It's the new ADM 3E and, at under $400, it may change forever the way you think of low-end terminals.

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Like a superior keyboard design with seven programmable keys shiftable for fourteen non-volatile functions. Dynamically allocated function key memory. Plus, a 14″ screen in your choice of green or amber—all standard.

You get compatibility with our ADM 3A and ADM 5 terminals, as well as ADDS Viewpoint. There's even a bidirectional printer port with independent baud rate available. All this with legendary Lear Siegler quality.

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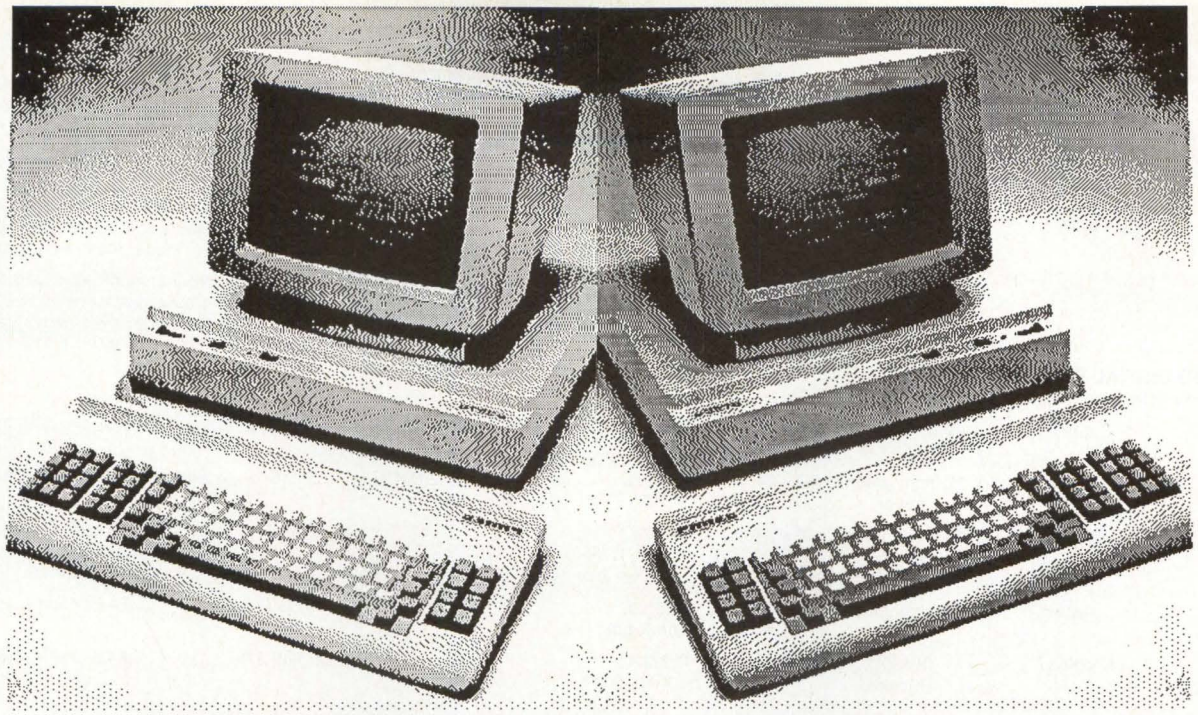
LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION
901 E. Ball Road, Anaheim, CA 92805, (714) 778-3500

CIRCLE NO. 46 ON INQUIRY CARD



Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
ADAC CORP. 70 Tower Office Park, Woburn, MA 01801, (617) 935-6668							Circle 416
2200CR1X	intelligent	7-inch, green	64 x 24	RS232C, RS422, current loop (X-on/X-off)	DEC VT100	1,475(Q1); 1,235 (Q100)	vertical and horizontal bar graphs
ALTOS COMPUTER SYSTEMS 2641 Orchard Pkwy., San Jose, CA 95134, (408) 946-6700							Circle 417
Altos II	intelligent	14-inch, green	132 x 40	RS232C (X-on/X-off, DTR)	DEC VT100, TeleVideo 910	995(Q1)	16 programmable function keys
Altos III	intelligent	14-inch, green	132 x 26	RS232C (X-on/X-off, DTR)	DEC VT100, TeleVideo 910	795(Q1)	16 programmable function keys
AMPEX CORP. (COMPUTER PRODUCTS DIV.) 401 Broadway, Redwood City, CA 94063, (415) 367-2700							Circle 418
Ampex 210	intelligent	14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)	TeleVideo 900 series, ADDS, Hazeltine, Lear Siegler ADM 3, ADM 3A, ADM 3A+, ADM 5; Qume QUT102	469(Q1)	14 programmable function keys, non-volatile setup mode, line drawing graphics
Ampex 219	intelligent	14-inch; green, amber	132 x 26	RS232C, RS422, current loop (X-on/X-off, DTR)	DEC VT52, VT100, VT131; Wyse WY-75	649(Q1)	32 programmable function keys, up to 4 pages of memory, split screen, non-volatile setup mode, line drawing graphics
Ampex 220	intelligent	14-inch; green, amber	132 x 25	RS232C, RS422, current loop (X-on/X-off, DTR)	DEC VT100, VT131, VT220		15 programmable function keys, 2 pages of memory, non-volatile setup mode, line graphics
Ampex 230	intelligent	14-inch; green, amber	132 x 26	RS232C, RS422, current loop (X-on/X-off, DTR)	Ampex 210, D175, A150E; TeleVideo 900 Series, Wyse WY-50	569(Q1)	32 programmable function keys, up to 4 pages of memory, split screen, non-volatile setup mode, block and line graphics
ANN ARBOR TERMINALS INC. 6175 Jackson Rd., Ann Arbor, MI 48103, (313) 663-8000							Circle 419
Ambassador GXL	editing/graphics	15-inch, green	80 x 60	RS232C (X-on/X-off)	ANSI	3,090 (Q1)	programmable keyboard, 2 pages of memory, split screen, non-volatile setup mode; bit-mapped and Tektronix 4010, 4014 graphics
Ambassador XL	editing	15-inch, green	80 x 30	RS232C (X-on/X-off)	ANSI	1,395(Q1)	programmable keyboard, 2 pages of memory, split screen, non-volatile setup mode, line drawing graphics, diagnostics

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
Genie XL	editing	15-inch, amber	80 x 60	RS232C (X-on/X-off)	ANSI	1,595(Q1)	programmable keyboard, 2 pages of memory, split screen, non-volatile setup mode, line drawing graphics
Guru XL	editing	15-inch, white	160 x 66	RS232C (X-on/X-off)	ANSI	2,395(Q1)	programmable keyboard, 2 pages of memory, split screen, non-volatile setup mode, line drawing graphics
APPLIED DIGITAL DATA SYSTEMS INC. 100 Marcus Blvd., Hauppauge, NY 11788, (516) 231-5400							**Circle 420**
VIEW-POINT	dumb	12-inch, green	80 x 24	RS232C (DTR)	Lear Siegler ADM 3A	549(Q1)	3 function keys, non-volatile setup mode
VIEW-POINT +	dumb	12-inch; green, amber	80 x 24	RS232C (DTR)	Lear Siegler ADM 3A	595(Q1)	3 function keys, non-volatile setup mode
VIEW-POINT 60 +	intelligent	12-inch; green, amber	80 x 24	RS232C (X-on/X-off, DTR)		749(Q1)	16 programmable function keys, split screen, 2 pages of memory, line drawing graphics
VIEW-POINT 78	editing	12-inch, green	80 x 24	RS232C (X-on/X-off)		1,095(Q1)	24 function keys
VIEW-POINT 78 COLOR	editing	13-inch, 16-color	80 x 24	RS232C (X-on/X-off, DTR)		1,595(Q1)	24 function keys
VIEW-POINT 90	intelligent	12-inch, green	80 x 24	RS232C (X-on/X-off, DTR)		1,195(Q1)	30 programmable function keys, split screen, 2 pages of memory, line drawing graphics
VIEW-POINT 122	intelligent	12-inch; green, amber	132 x 24	RS232C (X-on/X-off, DTR)		995(Q1)	22 programmable function keys, split screen
VIEW-POINT COLOR	editing	13-inch, 16-color	80 x 24	RS232C (X-on/X-off, DTR)		1,295(Q1)	16 function keys, 2 pages of memory, line drawing graphics
ASEA INDUSTRIAL SYSTEMS INC. P.O. Box 372, Milwaukee, WI 53201, (414) 785-3200							**Circle 421**
Tesselator 7800	intelligent/graphics	16-inch, 512-color palette	120 x 56	RS232C, current loop			bit-mapped and mosaic graphics
Tesselator 8010	intelligent/graphics	13-, 16-, 19-, 25-inch; 16-color	120 x 56	RS232C, RS422, current loop			bit mapped and mosaic graphics, diagnostics
AYDIN CONTROLS 414 Commerce Dr., Fort Washington, PA 19034, (215) 542-7800							**Circle 422**
5219	editing/graphics	19-inch, 8-color	80 x 48	RS232C (X-on/X-off)	ISC 8001G, Aydin 5215		69 function keys, 4 pages of memory, mosaic graphics, self-test
Aycon 15/5212A	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C, Data General, Modcomp (bisynch)			90 programmable function keys, 24 editing keys, mosaic graphics, rackmount
Aycon 17/5217A	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C (bisynch, TTY, ISC 8001G)			45 programmable function keys, 24 editing keys, 4 pages of memory, mosaic graphics, rackmount
BEEHIVE INTERNATIONAL 4910 Amelia Earhart Dr., Salt Lake City, UT 84116, (801) 355-6000							**Circle 423**
ATL-004	intelligent	14-inch; green, amber	132 x 27	RS232C (X-on/X-off)	DEC VT100	995(Q1)	8 programmable function keys, non-volatile setup mode
ATL-178	intelligent	14-inch; green, amber	80 x 24		IBM 3278	1,095(Q1)	diagnostics
ATL-220	intelligent	14-inch; green, amber	132 x 24	RS232C, current loop	DEC VT52, VT100	895(Q1)	15 programmable function keys, non-volatile setup mode
ATL-3270	intelligent	14-inch; green, amber	80 x 24	(bisynch)	IBM 3276	2,995(Q1)	24 programmable function keys, diagnostics
BRAEGEN CORP. 525 Los Coches St., Milpitas, CA 95035, (408) 945-1900							**Circle 424**
8420	intelligent	12-inch; green, amber	80 x 24	RS232C, RS422, Centronics	IBM 3178 Model 2, ADDS Viewpoint 78		54 function keys, 24 programmable function keys, diagnostics
8521	intelligent	15-inch; green, amber	80 x 24	RS232C (X-on/X-off, bisynch)	IBM 3278 Model 2		54 function keys, 24 programmable function keys, diagnostics
8522	intelligent	15-inch; green, amber	132 x 27	RS232C (X-on/X-off)	IBM 3278 Models 2, 5		40 function keys, 24 programmable function keys, diagnostics

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
8523	intelligent	15-inch; green, amber	80 x 43	RS232C (X-on/X-off)	IBM 3278 Models 2, 3, 4		54 function keys, 24 programmable function keys, diagnostics
8524	intelligent	15-inch; green, amber	132 x 43	RS232C (X-on/X-off)	IBM 3278 Models 2, 3, 4, 5		54 function keys, 24 programmable function keys, diagnostics
8539	intelligent	15-inch, 7 color	132 x 27	RS232C (X-on/X-off)			54 function keys, 24 programmable function keys, diagnostics
BURROUGHS CORP. One Burroughs Place, Detroit, MI 48232, (313) 972-7000							**Circle 425**
ET1100	editing	14-inch, green	80 x 26	RS232C (bisynch)	Burroughs MT985	1,580(Q1); 1,297 (Q100)	10 function keys, 10 pages of memory, diagnostics
ET1210	editing	14-inch, green	80 x 26	RS232C (bisynch)	Burroughs MT985	1,780(Q1); 1,459 (Q100)	10 function keys, 10 pages of memory, diagnostics
ET2100	editing/graphics	14-inch, green	80 x 26	RS232C (X-on/X-off, bisynch)	DEC VT52, VT100, VT102; IBM 3101, 3270	3,195(Q1)	10 function keys
ET2200	editing/graphics	14-inch, 256-color palette	80 x 26	RS232C (X-on/X-off, bisynch)	DEC VT52, VT100, VT102; IBM 3270	4,095(Q1)	10 function keys
CIE TERMINALS 2505 McCabe Way, Irvine, CA 92714, (714) 660-1421							**Circle 426**
CIT-101e	intelligent	14-inch; green, amber	80 x 24, 132 x 24	RS232C, current loop (X-on/X-off, EIA, RTS/CTS)	DEC VT52, VT100, VT101, VT102; ANSI X3.64	1,095(Q1)	programmable function keys, split screen
CIT-220+	intelligent	12-inch; green, amber	80 x 24, 132 x 24	RS232C, current loop	DEC VT52, VT100, VT102, VT220; ANSI X3.64		programmable function keys, split screen; opt. RS422
COLORGRAPHIC COMMUNICATIONS CORP. 2379 John Glenn Dr., P.O. Box 80448, Atlanta, GA 30366, (404) 455-3921							**Circle 427**
480	intelligent/graphics	13-inch, 8-color	80 x 24	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100; ANSI	2,750(Q1); 2,200 (Q100)	12 programmable function keys, 4 pages of memory, split screen, non-volatile setup mode, diagnostics, PLOT 10 compatible, polygon fill
489	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100; ANSI	3,250(Q1); 2,600 (Q100)	12 programmable function keys, 4 pages of memory, split screen, non-volatile setup mode, diagnostics, PLOT 10 compatible, polygon fill
820	intelligent/graphics	13-inch, 8-color	80 x 24	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100; ANSI	2,750(Q1); 2,200 (Q100)	12 programmable function keys, 4 pages of memory, mosaic graphics, rackmount
820/XL	intelligent/graphics	13-inch, 8-color	80 x 24	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100; ANSI	4,500(Q1); 3,400 (Q100)	12 programmable function keys, 4 pages of memory, mosaic and bit-mapped graphics
829	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100; ANSI	3,250(Q1); 2,600 (Q100)	12 programmable function keys, 4 pages of memory, mosaic graphics, rackmount
829 XL	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100; ANSI	5,000(Q1); 3,800 (Q100)	12 programmable function keys, 4 pages of memory, mosaic and bit-mapped graphics
XL13K	intelligent/graphics	13-inch, 8-color	80 x 24	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100	3,250(Q1); 2,600 (Q100)	12 programmable function keys, 2 pages of memory, non-volatile setup mode, bit-mapped graphics
XL19K	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C (X-on/X-off, DTR/CTS)	DEC VT52, VT100	3,750(Q1); 3,000 (Q100)	12 programmable function keys, 2 pages of memory, non-volatile setup mode, bit-mapped graphics
CONTEL CADO COMPUTER SYSTEMS 2055 W. 190th St., Torrance, CA 90510, (213) 323-8170							**Circle 428**
C-300	dumb	14-inch, green	80 x 24	RS232C, RS422		1,495(Q1)	
C-301	editing	14-inch, green	80 x 24	RS232C, RS422		1,745(Q1)	
DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911							**Circle 429**
D211	intelligent	12-inch; green, amber	80 x 24	RS232C, RS422, current loop (X-on/X-off)		1,195(Q1); 992(Q100)	15 programmable function keys

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
D460	intelligent/graphics	12-inch; green, amber	81 x 24	RS232C, RS422, current loop (X-on/X-off)		1,985(Q1); 1,648 (Q100)	15 programmable function keys, split screen, character graphics
DATAMAXX USA CORP. 1815 S. Galsden St., Tallahassee, FL 32301, (904) 224-8213							**Circle 430**
2200B	editing	14-inch; green, amber	80 x 25	RS232C, Burroughs TDI (DTR)	Burroughs MT 983	1,495(Q1)	40 function keys, 4 pages of memory, non-volatile setup mode
4300	intelligent	12-, 14-inch; green	128 x 24	RS232C (bisynch)	Burroughs MT 1100		80 programmable function keys
4300B	editing	14-inch, green	80 x 25	RS232C, Burroughs TDI	Burroughs Poll/Select ET 1100, DEC VT100, Lear Siegler ADM 31	1,895(Q1)	40 function keys, 10 pages of memory, non-volatile setup mode
4301	editing	12-inch, green	80 x 25	RS232C, current loop (DTR)	NCR 7900 Model 3, 7901; ADDS Viewpoint	1,995(Q1)	40 function keys, non-volatile setup mode, IBM PC compatible
4501	editing	12-, 14-inch; green	80 x 24	RS232C, current loop (DTR)	NCR 796-501, 7901	2,495(Q1)	40 function keys, 10 pages of memory, non-volatile setup mode, IBM PC compatible
7900/1	editing	12-inch; green, amber	80 x 24	RS232C, current loop (DTR)	NCR 7900 Model 1, 7901; ADDS Viewpoint	695(Q1); 450(Q100)	17 function keys, non-volatile setup mode
DATAMEDIA CORP. 11 Trafalger Sq., Nashua, NH 03063, (603) 886-1570							**Circle 431**
Elite 30	intelligent	12-inch, green	80 x 25	RS232C; opt. 422 (X-on/X-off)	TeleVideo 950, ADDS Viewpoint 2	375(Q100)	11 programmable function keys, non-volatile setup mode
Elite 60	intelligent	14-inch, green	80 x 25	RS232C, current loop (X-on/X-off)	DEC VT100, VT101, VT131	775(Q100)	15 programmable function keys, 1 page of memory, non-volatile setup mode
Elite 90	intelligent	14-inch, green	132 x 24	RS232C, current loop (X-on/X-off)	Lear Siegler ADM 3A, Hazeltine 1420, ADDS Regent 25	740(Q100)	17 programmable function keys, non-volatile setup mode
ColorScan 90	intelligent	12-inch, 8-color	132 x 24	RS232C, current loop (X-on/X-off)	Lear Siegler ADM 3A, Hazeltine 1420, ADDS Regent 25	1,495 (Q100)	17 programmable function keys, non-volatile setup mode
DATAPOINT CORP. 9725 Datapoint Dr., San Antonio, TX 78284, (512) 699-7000							**Circle 432**
8220 Work-station	intelligent	12-inch, amber	80 x 24	RS232C		1,395(Q1); 1,155 (Q100)	10 programmable function keys
DATASTREAM COMMUNICATIONS INC. 2520 Mission College Blvd., Santa Clara, CA 95050, (408) 986-8022							**Circle 433**
8178	intelligent/graphics	14-inch; green, amber	80 x 25	RS232C, RS422, current loop (X-on/X-off, BSC, SNA)	IBM 3278, DEC VT220	995(Q1); 796(Q100)	24 function keys, 4 programmable function keys, diagnostics
8180	intelligent/graphics	14-inch; green, amber	132 x 44	RS232C, RS422, current loop (X-on/X-off, BSC, SNA)	IBM 3180, DEC VT220	1,850(Q1); 1,480 (Q100)	24 function keys, 4 programmable function keys, diagnostics
DIGITAL EQUIPMENT CORP. 129 Parker St., Maynard, MA 01754, (800) 344-4725							**Circle 434**
VT220	intelligent	12-inch; b&w, green, amber	132 x 24	RS232C, RS423, current loop (X-on/X-off)	DEC VT52, VT100	1,095(Q1)	15 programmable function keys, non-volatile setup mode, DEC VT100 line drawing graphics, diagnostics, built-in modem
VT240	intelligent/graphics	12-inch; b&w, green, amber	132 x 24	RS232C, RS423, current loop (X-on/X-off)	DEC VT52, VT100; Tektronix 4010, 4014	2,195(Q1)	15 programmable function keys, non-volatile setup mode, bit-mapped graphics, polygon fill
VT241	intelligent/graphics	13-inch, 64-color palette	132 x 24	RS232C, RS423, current loop (X-on/X-off)	DEC VT52, VT100; Tektronix 4010, 4014	3,195(Q1)	15 programmable function keys, non-volatile setup mode, bit mapped graphics, polygon fill
ELECTRO MECHANICAL SYSTEMS INC. 801 W. Bradley Ave., Champaign, IL 61820, (217) 359-7125							**Circle 435**
Touch Information Display	dumb	12-inch, amber	80 x 24	RS232C	Lear Siegler ADM 3A	1,400(Q1); 1,265 (Q100)	rackmount

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
FACIT INC. 9 Executive Park Dr., P.O. Box 334, Merrimack, NH 03054, (603) 424-8000							**Circle 436**
4440 Twist	intelligent	15-inch; b&w, amber	80 x 72	RS232C; opt. current loop (X-on/X-off, READY/BUSY)	ANSI X3.64	1,195(Q1)	12 programmable function keys, non-volatile setup mode, split screen
FALCO DATA PRODUCTS 1286 Lawrence Station Rd., Sunnyvale, CA 94089, (408) 745-7123							**Circle 437**
Fame 50	editing/graphics	14-inch; green, amber	132 x 24	RS232C; opt. RS422 (X-on/X-off)	Wyse WY-50	595(Q1)	16 function keys, non-volatile setup mode, split screen, PLOT 10 compatible; opt. bit-mapped graphics
FAME II	editing/graphics	14-inch; green, amber	132 x 24	RS232C; opt. RS422 (X-on/X-off)	DEC VT100, TeleVideo 925	795(Q1)	13 function keys, non-volatile setup mode, split screen, line drawing graphics, PLOT 10 compatible; opt. bit-mapped graphics
GENERAL DIGITAL CORP. 700 Burnside Ave., East Hartford, CT 06108, (203) 528-9401							**Circle 438**
VuePoint II	dumb	10-inch; orange, green	40 x 12	RS232C, RS422, RS423, RS485, TTL, current loop (X-on/X-off)		2,295(Q1); 1,767 (Q100)	3 pages of memory, diagnostics, rackmount, portable
GRAPHON CORP. 1901 S. Bascom Ave., Campbell, CA 95008, (408) 371-8500							**Circle 439**
GO-100	intelligent/graphics	12-inch; b&w, green, amber	132 x 24	RS232C (X-on/X-off)	DEC VT52, VT100	995(Q1); 795(Q100)	32 programmable function keys, non-volatile setup mode, split screen
GO-140	intelligent/graphics	12-inch; b&w, green, amber	132 x 24	RS232C (X-on/X-off)	DEC VT52, VT100; Tektronix 4010, 4012, 4013	1,495(Q1); 1,295 (Q100)	32 programmable function keys, non-volatile setup mode, split screen, 4 pages of memory, bit-mapped graphics, PLOT 10 compatible
GO-160	intelligent/graphics	12-inch; b&w, green, amber	132 x 26	RS232C (X-on/X-off)	DEC VT52, VT100; Tektronix 4010, 4014	1,995(Q1); 1,695 (Q100)	32 programmable function keys, non-volatile setup mode, polygon fill, bit-mapped graphics
HARRIS CORP. (COMPUTER SYSTEMS DIV.) 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309, (305) 974-1700							**Circle 440**
Harris 8665	editing	14-inch; green	80 x 24	RS232C (X-on/X-off, DTR)		695(Q1); 599(Q100)	line drawing and character graphics
HEWLETT-PACKARD CO. 8020 Foothills Blvd., Roseville, CA 95678, (916) 786-8000							**Circle 441**
2392A	intelligent	12-inch, green	80 x 96	RS232C, RS422, Centronics, HP-IB (X-on/X-off)	DEC VT52, VT100	1,375(Q1)	8 programmable function keys
2394A	intelligent	12-inch, green	80 x 192	RS232C, RS422, Centronics, HP-IB (X-on/X-off)	DEC VT52, VT100	1,795(Q1)	8 programmable function keys
HMW ENTERPRISES INC. 604 Salem Rd., Etters, PA 17319, (717) 938-4691							**Circle 442**
9081	intelligent/graphics	19-inch, 8-color	80 x 48	RS232C, current loop (X-on/X-off)	DEC VT100, ADDS 980, ISC 8001G	5,000(Q1)	16 programmable function keys, rackmount
9083-S	intelligent/graphics	13-inch, color	80 x 48	RS232C, current loop (X-on/X-off)	DEC VT100, ADDS 9, ISC 8001G	3,995(Q1)	16 programmable function keys
9203	intelligent/graphics	13-inch, 8-color	80 x 48	RS232C, current loop (X-on/X-off)	DEC VT100, ADDS 980, ISC 8001G	5,500(Q1)	16 programmable function keys
9204	intelligent/graphics	13-inch, 8-color	80 x 48	RS232C, current loop (X-on/X-off)	DEC VT100, ADDS 980, ISC 8001G	7,000–11,000 (Q1)	16 programmable function keys
9209	intelligent/graphics	19-inch, 8 color	80 x 48	RS232C, current loop (X-on/X-off)	DEC VT100, ADDS 980, ISC 8001G	7,000(Q1)	
HONEYWELL INFORMATION SYSTEMS INC. 200 Smith St., Waltham, MA 02154, (617) 895-6000							**Circle 443**
VIP7201	editing/graphics	12-inch, green	80 x 24	RS232C, RS422		795(Q1); 636(Q100)	7 function keys, non-volatile setup mode, line drawing and mosaic graphics

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
VIP7305	editing/graphics	12-inch, green	80 x 25	RS232C, RS422A, current loop		1,900(Q1); 1,520 (Q100)	12 function keys
VIP7813/ 23	editing/graphics	12-inch, green	80 x 25	RS232C, RS422A		2,350(Q1); 1,880 (Q100)	12 function keys
VIP7813/ 24	editing/graphics	12-inch, green	80 x 25	RS232C, RS422A Honeywell VIP		2,700(Q1); 2,160 (Q100)	12 function keys
VIP7816/ 26	editing	12-inch, green	80 x 25	RS232C, RS422A Honeywell VIP	Honeywell VIP7700	2,800(Q1); 2,240 (Q100)	12 function keys
HUMAN DESIGNED SYSTEMS INC. 3440 Market St., Philadelphia, PA 19104, (215) 382-5000							**Circle 444**
HDS200	intelligent	15-inch; b&w, green, amber	132 x 24	(2) RS232C (X-on/X-off, CTS/RTS)	ANSI X3.64	995(Q1); 695(Q100)	DEC software compatible
HDS200G	intelligent/graphics	15-inch; b&w, green, amber	132 x 24	(2) RS232C (X-on/X-off, CTS/RTS)		1,295(Q1); 985(Q100)	
HDS201	intelligent	15-inch; b&w, green, amber	132 x 24	(2) RS232C (X-on/X-off, CTS/RTS)		995(Q1); 695(Q100)	
ID SYSTEMS CORP. 6175-W Shamrock Ct., Dublin, OH 43017, (614) 766-0440							**Circle 445**
ID 200	intelligent/graphics	14-, 19-inch; 8-color	132 x 24	RS232C; current loop (X-on/X-off, DTR)	DEC VT52, VT100, VT131; Tektronix 4010, 4014, 4017, 4027, 4105	4,295(Q1)	PLOT 10 compatible; opt 16-color
ID 1024	intelligent/graphics	14-, 19-inch; 16-color palette	80 x 48	RS232C, current loop (X-on/X-off)	DEC VT52, VT100, VT131; Tektronix 4010, 4014, 4027, 4107	4,995/ 6,995	PLOT 10 compatible
INTECOLOR CORP. 225 Technology Park, Norcross, GA 30092, (404) 449-5961							**Circle 446**
ColorTrend 210	intelligent/graphics	14-inch, 8-color	80 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100	1,295(Q1); 995(Q100)	12 programmable function keys, non-volatile setup mode, diagnostics, rackmount
ColorTrend 220	editing	14-inch, 8-color	132 x 24	RS232C (X-on/X-off)	DEC VT52, VT100, VT220	1,695(Q1)	
ColorTrend 427	intelligent/graphics	14-inch; 8-color, 64-color palette	80 x 24	RS232C, current loop (X-on/X-off)	DEC VT52, VT100; Tektronix 4010, 4027	2,195(Q1); 1,690 (Q100)	12 programmable function keys, non-volatile setup mode, bit-mapped graphics, diagnostics, rackmount
2405D	intelligent/graphics	13-inch, 8-color	80 x 24	RS232C, current loop (X-on/X-off)	DEC VT52, VT100	1,295(Q1); 995(Q100)	12 programmable function keys, non-volatile setup mode, diagnostics
2427D	intelligent/graphics	13-inch; 8-color, 64-color palette	80 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100; Tektronix 4010, 4027	2,695(Q1); 1,995 (Q100)	12 programmable function keys, non-volatile setup mode, bit-mapped graphics
ITT COURIER TERMINAL SYSTEMS 1515 W. 14th St., Tempe, AZ 85281, (602) 894-7000							**Circle 447**
1700	editing	12-inch; green, amber	80 x 24	RS232C (bisynch, SNA/SDLC)	IBM 3270		24 function keys
1900	editing	14-inch, 7-color	80 x 24	RS232C (bisynch)			24 function keys
9230/9232	intelligent	15-inch; green, amber	132 x 27	RS232C			24 programmable function keys, diagnostics
9236	intelligent	14-inch, 7-color	80 x 32	RS232C			24 programmable function keys, diagnostics
IXO INC. 5757 Uplander Way, Culver City, CA 90230, (800) 421-3911 (outside CA), (800) 242-1100 (inside CA)							**Circle 448**
TC200	intelligent	4-inch, monochrome	16 x 1	RS232C (X-on/X-off)		395(Q1); 350(Q100)	3 programmable function keys, split screen, portable, built-in modem

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
KEL INC. 400 W. Cummings Park, Woburn, MA 01801, (617) 933-7852							Circle 449
J1014	intelligent/graphics	14-inch, b&w	146 x 64	RS232C, current loop (X-on/X-off, DTR)	DEC VT100; Tektronix 4010, 4014	2,595(Q1)	21 function keys, 8 programmable function keys, non-volatile setup mode, bit-mapped graphics, PLOT 10 compatible
J1014C	intelligent/graphics	14-inch, 8-color	146 x 64	RS232C, current loop (X-on/X-off, DTR)	DEC VT100; Tektronix 4010, 4014	4,950(Q1)	21 function keys, 8 programmable function keys, non-volatile setup mode, bit-mapped graphics, PLOT 10 compatible
J1019	intelligent/graphics	19-inch, b&w	146 x 64	RS232C, current loop (X-on/X-off, DTR)	DEC VT100, Tektronix 4010, 4014	6,750(Q1)	21 function keys, 8 programmable function keys, non-volatile setup mode, bit-mapped graphics, PLOT 10 compatible
J1019C	intelligent/graphics	19-inch, 8-color	146 x 64	RS232C, current loop (X-on/X-off, DTR)	DEC VT100; Tektronix 4010, 4014	6,750(Q1)	21 function keys, 8 programmable function keys, non-volatile setup mode, bit-mapped graphics, PLOT 10 compatible
KIMTRON CORP. 1705 Junction Ct., Bldg. 160, San Jose, CA 95112, (408) 286-8790							Circle 450
KT-5	editing	12-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)	DEC VT52; Lear Siegler ADM 3A, ADM 5; ADDS Regent 25; Hazeltine 1500	495(Q1); 317(Q100)	20 function keys, 16 editing keys, 1 page of memory, non-volatile setup modes; opt. current loop
KT-7	intelligent	12-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)			22 programmable function keys, 1 page of memory; opt. modem, current loop
KT-7/PC	intelligent/graphics	12-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)	IBM PC/XT/AT; TeleVideo 925	895(Q1); 540(Q100)	20 programmable function keys, non-volatile setup mode; opt. modem
KT-10	editing/graphics	12-, 14-inch; green, amber	132 x 25	RS232C (X-on/X-off, DTR)	ANSI X3.64; DEC VT100, VT131	695(Q1); 450(Q100)	22 function keys, 16 editing keys; opt. modem
LANPAR TECHNOLOGIES INC. 747 Main St., Suite 207, Concord, MA 01742, (617) 371-0915							Circle 451
Vision II-3220	intelligent/graphics	14-inch; green, amber	132 x 25	(2) RS232C	DEC VT52, VT100, VT220	1,095(Q1)	15 programmable function keys, 2 pages of memory, PLOT 10 compatible
LEAR SIEGLER INC. (DATA PRODUCTS DIV.) 901 E. Ball Rd., Anaheim, CA 92805, (714) 778-3500							Circle 452
10th Anniversary ADM 3A	dumb	12-inch; b&w, green	80 x 24	RS232C (X-on/X-off, DTR)		595(Q1)	non-volatile setup mode, mosaic graphics; opt. current loop
ADM 3E	intelligent	14-inch; green, amber	80 x 25	RS232C (X-on/X-off)	Lear Siegler ADM 3A, ADM 5; ADDS Viewpoint	399(Q1)	4 programmable function keys, non-volatile setup mode, mosaic graphics; opt. RS422, current loop
ADM 11	intelligent	12-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)	Lear Siegler ADM 3A, ADM 5; ADDS Viewpoint; Regent 25; Hazeltine 1400, 1420, 1500; DEC VT52	695(Q1)	4 programmable function keys, non-volatile setup mode, mosaic graphics; opt. RS422, current loop
ADM 11plus	intelligent	12-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)	Lear Siegler ADM 3A, ADM 5, ADM 11; ADDS Viewpoint, Regent 25; Hazeltine 1400, 1420, 1500; DEC VT52	695(Q1)	16 programmable function keys, non-volatile setup mode, mosaic graphics; opt. RS422, current loop
ADM 12plus	intelligent	12-, 14-inch; green, amber	132 x 25	RS232C (X-on/X-off, DTR)	LEAR SIEGLER, ADM 12, ADM 31; TeleVideo 912, 920, 925, 950	745(Q1)	16 programmable function keys, non-volatile setup mode, 2 pages of memory, split screen, mosaic graphics; opt. RS422, current loop
ADM 220	editing	12-, 14-inch; green, amber	132 x 25	RS232C (X-on/X-off)		895(Q1)	15 function keys, non-volatile setup modes, split screen, mosaic graphics; opt. RS422, current loop
ADM 1178	intelligent	12-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off, DTR)	IBM 3278	695(Q1)	24 programmable function keys, non-volatile setup mode; opt. RS422, current loop
LEENSHIRE LTD. Moorside Rd., Winnal, Winchester, Hampshire SO23 7RX, England 0962/64175							Circle 453
VCT 6910	intelligent/graphics	14-, 20-inch; 64-color	132 x 24	RS232C (X-on/X-off, RTS/CTS)	DEC VT52, VT100	2,190(Q1); 1,750 (Q100)	20 programmable function keys, non-volatile setup mode, bit-mapped graphics, rackmount
VCT 6911	intelligent/graphics	14-, 20-inch; 64-color	80 x 32	RS232C (X-on/X-off, RTS/CTS)	DEC VT52, VT100	2,132(Q1); 1,850 (Q100)	20 programmable function keys, non-volatile setup mode, bit-mapped graphics, rackmount
VCT 6912	intelligent	14-, 20-inch; 64-color	80 x 48	RS232C (X-on/X-off, RTS/CTS)	DEC VT52, VT100	2,862(Q1); 2,290 (Q100)	20 programmable function keys, non-volatile setup mode

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
VCT 6927	intelligent/graphics	14-, 20-inch; 64-color	80 x 48	RS232C (X-on/X-off, RTS/CTS)	DEC VT52, VT100; Tektronix 4010, 4014	4,687(Q1); 3,750 (Q100)	20 programmable function keys, non-volatile setup mode, bit-mapped graphics
L/F TECHNOLOGIES (FORMERLY IMS INTERNATIONAL) 2800 Lockheed Way, Carson City, NV 89701, (702) 883-7611							**Circle 454**
Ultima V	intelligent/graphics	12-inch, green	132 x 25	RS232C, RS422 (X-on/X-off, CTS)	TeleVideo 950/920	895(Q1); 550(Q100)	27 programmable function keys, non-volatile setup mode, bit-mapped graphics, PLOT 10 compatible
LIBERTY ELECTRONICS 625 Third St., San Francisco, CA 94017, (415) 543-7000							**Circle 455**
Freedom 110	intelligent	14-inch; green, amber	80 x 25	RS232C (X-on/X-off)	TeleVideo 910; Lear Siegler ADM 3A, ADM 5; Hazeltine 1420; ADDS Regent 25	545(Q1)	10 programmable function keys, non-volatile setup mode, 1 page of memory
Freedom 200/210	intelligent	14-inch; green, amber	132 x 25	RS232C (X-on/X-off)	TeleVideo 950, Lear Siegler ADM 31	595–1,295(Q1)	47 programmable function keys, non-volatile setup mode, 2 pages of memory, mosaic graphics, Tektronix 4010, 4014 graphics
Freedom 212/222	intelligent	14-inch; green, amber	132 x 25	RS232C (X-on/X-off)	DEC VT52, VT100, VT220; TeleVideo 950, Lear Siegler ADM	945–1,295(Q1)	
Freedom 220/240	intelligent	14-inch; green, amber	132 x 25	RS232C (X-on/X-off)	DEC VT52, VT100, VT220	745–1,395(Q1)	Tektronix 4010, 4014 graphics
MEGADATA CORP. 35 Orville Dr., Bohemia, NY 11716, (516) 589-6800							**Circle 456**
8188-1	editing	15-inch; b&w, green, amber, red	80 x 25	RS232C, RS422		2,500 (Q100)	100 function keys, 16–100 pages of memory, split screen, line drawing graphics, custom programming, diagnostics
8188-2	intelligent	15-inch; b&w, green, amber, red	132 x 29	(2) RS232C (ANSI X3.64)		2,707 (Q100)	32 programmable function keys, line drawing graphics, diagnostics
8188-4	editing	15-inch; b&w, green, amber, red	132 x 24	RS232C, RS422, parallel (CCITT V.21, X.24, X.21; SDLC)		3,000 (Q100)	84 function keys, split screen, line drawing graphics, diagnostics
8188-5	editing	15-inch; b&w, green, amber, red	80 x 25	RS232C, RS422		2,800 (Q100)	100 function keys, 16–100 pages of memory, split screen, line drawing graphics, diagnostics
8188-6	intelligent	15-inch; b&w, green, amber, red	135 x 26	RS232C, RS422	Data General 410, 460		32 programmable function keys, split screen, line drawing graphics, diagnostics
8188-7	intelligent	15-inch; b&w, green, amber, red; 8-color	132 x 29	(3) RS232C, Centronics (bisynch, SDLC)	UNIVAC UTS40; IBM 3271, 3277, 3287, 3275; DEC VT100		90 function keys, 2 pages of memory, line drawing graphics
MILTOPE CORP. 1770 Walt Whitman Rd., Melville, NY 11747, (516) 420-0200							**Circle 457**
TER-100	editing/graphics	4.1 inches high x 8.3 inches wide; amber	80 x 25	RS232C, RS422, current loop, Centronics (X-on/X-off)	DEC VT100	27,000(Q1)	militarized, non-volatile setup mode, split screen, dot-addressable graphics, diagnostics
MIL-TERM-280	editing/graphics	4.1 inches high x 8.3 inches wide; amber	80 x 25	RS232C, RS422, current loop, Centronics (X-on/X-off)	DEC VT100	17,700(Q1)	militarized, non-volatile setup mode, split screen, dot-addressable graphics, diagnostics
TER-200	editing/graphics	8.2 inches high x 8.3 inches wide; amber	80 x 50	RS232C, RS422, current loop, Centronics (X-on/X-off)	DEC VT100	36,000(Q1)	function keys, split screen, dot-addressable graphics
MSI DATA CORP. 340 Fischer Ave., Costa Mesa, CA 92626, (714) 549-6000							**Circle 458**
PDT 1	intelligent	5 x 7 dot matrix, LCD	2 lines				30 programmable function keys, portable
PDT II	intelligent	5 x 7 dot matrix, LCD	2 lines	RS232C, (X-on/X-off)		540–640(Q1); 385–455 (Q100)	30 programmable function keys, built-in printer, portable
PDT III	intelligent	5 x 7 dot matrix, LCD	2 lines	RS232C (X-on/X-off)			30 programmable function keys, built-in printer, portable

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
MSI-85	editing	5 x 7 dot matrix, LCD	2 lines	RS232C			33 function keys, built-in printer, portable
NCR CORP. 1700 S. Patterson Blvd., Dayton, OH 45479, (513) 445-5000							**Circle 459**
7902	intelligent	13-inch, 8-color	80 x 25	RS232C (X-on/X-off)			16 programmable function keys, non-volatile setup mode
7910	intelligent	15-inch, amber	132 x 25	RS232C, RS422 (X-on/X-off)	NCR 7900-1/4		10 programmable function keys, 4 pages of memory, non-volatile setup mode
7930	intelligent	12-inch; green, amber, white	80 x 25	RS232C (X-on/X-off)	NCR 7900-1, 7901		24 programmable function keys, non-volatile setup mode, split screen
7958	editing	15-inch, green	80 x 25	(bisynch)	IBM 3270		24 function keys
NEWBURY DATA RECORDING LTD Hawthorne Rd., Staines, Middlesex, TW18 3BJ, England, 0784/61500							**Circle 460**
9500	editing/graphics	12-, 14-inch; green, amber	80 x 26	RS232C, current loop (X-on/X-off, DTR)	TeleVideo 910+, 925, 950	500(Q1)	11 function keys, non-volatile setup mode, diagnostics, PLOT 10 compatible
9509	editing	12-, 14-inch; green, amber	80 x 25	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100; NDR 8009	620(Q1)	12 function keys, non-volatile setup mode, split screen, diagnostics
9522	editing	14-inch; green, amber	132 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100, VT220	1,000(Q1)	15 function keys, non-volatile setup mode
PERRY DATA SYSTEMS INC. 3401 Spring Forest Rd., Raleigh, NC 27606, (919) 876-8100							**Circle 461**
9460 VRT	editing	12-inch, b&w	80 x 24	RS232C, RS422 (RTS)	ADDS Regent 25, Data General D200, Datapoint 8200, IBM 3101	3,500(Q1); 2,800 (Q100)	10 function keys, built-in printer, point-of-sale terminal
PHAZE INFORMATION MACHINES 7650 E. Redfield Rd., Scottsdale, AZ 85260, (602) 991-6855							**Circle 462**
P3278	intelligent	12-inch, green	80 x 25	Centronics	IBM 3278-2	1,545(Q1)	24 programmable function keys
P3279	intelligent	14-inch, green	80 x 25	Centronics	IBM 3279-2A	1,995(Q1)	24 programmable function keys
PLESSEY PERIPHERAL SYSTEMS INC. (COMPUTER PRODUCTS DIV.) 1674 McGaw Ave., Irvine, CA 92714, (714) 540-9945							**Circle 463**
PT 100E	editing/graphics	14-inch	132 x 24	RS232C, current loop (X-on/X-off)	DEC VT100		opt. graphics
PT 220	editing	12-inch	132 x 24	RS232C, current loop (X-on/X-off)	DEC VT100		opt. graphics
PT 221E	editing/graphics	14-inch		RS232C, current loop (X-on/X-off)	DEC VT100		opt. graphics
PRIME COMPUTER INC. Prime Park, Natick, MA 01760, (617) 655-8000							**Circle 464**
PT220	intelligent/graphics	14-inch, 8-color	160 x 48	RS232C (X-on/X-off)	IBM 3270	995(Q1)	26 programmable function keys, bit-mapped graphics
PST100	intelligent	15-inch, white	80 x 24	RS232C (X-on/X-off)		1,250(Q1)	22 programmable function keys
Prime Producer 100	dumb	15-inch, green				4,980(Q1)	split screen
QUME CORP. 2350 Qume Dr., San Jose, CA 95131, (408) 942-4000							**Circle 465**
QVT-101	intelligent	14-inch; green, amber	80 x 24	RS232C, RS422, current loop (X-on/X-off, CTS)	Lear Siegler ADM 3A, ADM 5; Hazeltine 1500; TeleVideo 910; ADDS Viewpoint A2	395(Q1)	16 programmable function keys, 1 page of memory, non-volatile setup mode
QVT-103	intelligent	14-inch; green, amber	132 x 24	RS232C, RS422, current loop (X-on/X-off, DTR, CTS)	DEC VT52, VT100, VT131	895(Q1)	12 programmable function keys, non-volatile setup mode
QVT-108	intelligent	14-inch; green, amber	132 x 24	RS232C, RS422, current loop (X-on/X-off, DTR, CTS)	TeleVideo 925	695(Q1)	22 programmable function keys, non-volatile setup mode

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
QVT-119	intelligent	14-inch; green, amber	132 x 25	RS232C, RS422, RS423, current loop (X-on/X-off, DTR, CTS)	Wyse WY-50, ADDS Viewpoint A2	595(Q1)	40 programmable function keys, 4 pages of memory
QVT-201	intelligent	14-inch; green, amber	132 x 24	RS232C, RS422, current loop (X-on/X-off, DTR)	DEC VT100, VT220		34 programmable function keys, 1 page of memory, non-volatile setup mode
QVT-202	intelligent	14-inch; green, amber	132 x 24	RS232C, RS422, RS423, current loop (X-on/X-off)	DEC VT52, VT100, VT220	795(Q1)	30 programmable function keys, 1 page of memory, non-volatile setup mode
RASTER TECHNOLOGIES INC. 9 Executive Park Dr., North Billerica, MA 01862, (617) 667-8900							**Circle 466**
One/10	intelligent/graphics	14-inch; b&w, 256-color, 16.7-million-color palette	128 x 60	RS232C (X-on/X-off)	DEC VT100 and compatibles, Tektronix 4014	6,925(Q1)	12 programmable function keys, non-volatile setup mode, bit-mapped graphics
RCA DATA COMMUNICATIONS PRODUCTS New Holland Ave., Lancaster, PA 17604, (800) 722-0094							**Circle 467**
VP4801	intelligent	12-inch, green	80 x 24	RS232C, Centronics (X-on/X-off)		498(Q1); 348(Q100)	8 programmable function keys, non-volatile setup mode, mosaic graphics, portable
VP5801	intelligent	12-inch, green	80 x 24	RS232C, Centronics (X-on/X-off)		798(Q1); 559(Q100)	8 programmable function keys, non-volatile setup mode, mosaic graphics, portable
SANYO BUSINESS SYSTEMS CORP. 51 Joseph St., Moonachie, NJ 07074, (201) 440-9300							**Circle 468**
CRX-1100	intelligent	12-inch, green	80 x 24	RS232C, current loop (X-on/X-off)	TeleVideo 910, Hazeltine 1410, ADDS Regent 25	595(Q1)	8 programmable function keys, 1 page of memory, non-volatile setup mode, block graphics
SELANAR CORP. 840 Del Rey Ave., Sunnyvale, CA 94086, (408) 735-8770							**Circle 469**
Hirez 100XL	intelligent/graphics	14-inch; green, amber	80 x 24 or 48, 132 x 24 or 48	RS232C (X-on/X-off)	DEC VT52, VT100, VT102, VT131; Tektronix 4010, 4014	2,495(Q1)	10 programmable function keys; non-volatile setup mode, arc, circle, polygon generation
SOUTHWEST TECHNICAL PRODUCTS CORP. 219 W. Rhapsody, San Antonio, TX 78216, (512) 344-0241							**Circle 470**
X-12	intelligent/graphics	12-inch; green, amber	123 x 66	RS232C (X-on/X-off)		1,495(Q1); 1,002 (Q100)	
SPERRY CORP. Township Line & Jolly Rd., Blue Bell, PA 19424, (215) 542-5860							**Circle 471**
UTS10	editing	12-inch, green	80 x 24	RS232C, current loop (TTY)	ANSI X3.64		non-volatile setup mode
UTS20	editing	12-inch, green	80 x 24	RS232C (bisynch)			22 function keys, split screen, non-volatile setup mode
UTS30	intelligent/graphics	12-inch, green	80 x 24	RS232C			22 function keys, non-volatile setup mode, split screen, bit-mapped and mosaic graphics
UTS40	editing	12-inch, green	80 x 24	RS232C	Uniscope		32 function keys, non-volatile setup mode
SUMITRONICS INC. 580 N. Pastoria, Sunnyvale, CA 94086, (408) 737-7683							**Circle 472**
STX-100	editing	12-inch; white, green, amber	132 x 24	RS232C, current loop (X-on/X-off)	DEC VT100		7 function keys
STX-3270	editing	12-inch; white, green, amber	80 x 24	RS232C (bisynch, SNA/SDLC)	IBM 3274, 3276, 3178		IBM 3270 compatible
STX-T415	editing	12-inch; green, amber, white	80 x 24	RS232C (X-on/X-off)	Tymshare 415		built-in modem

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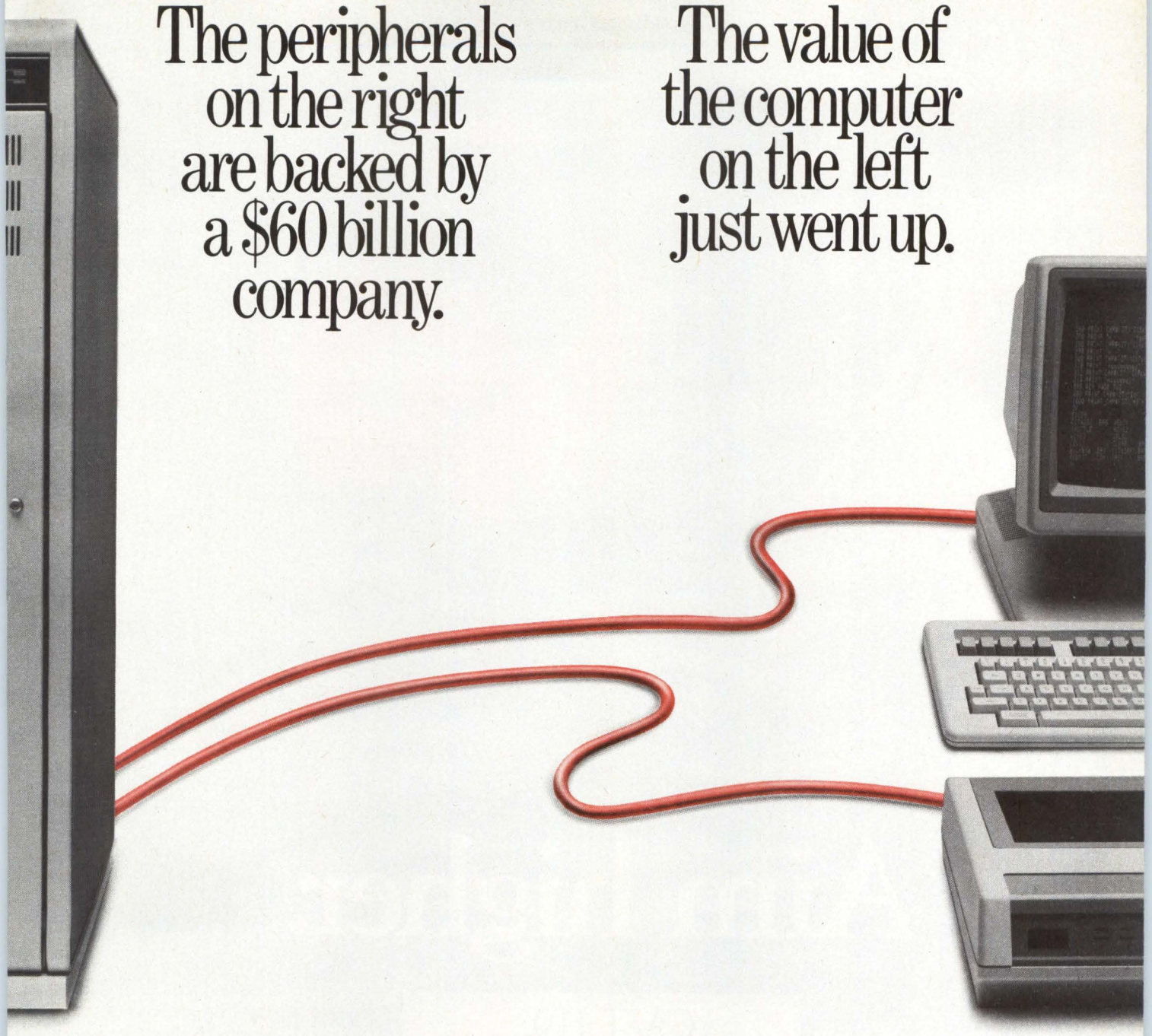

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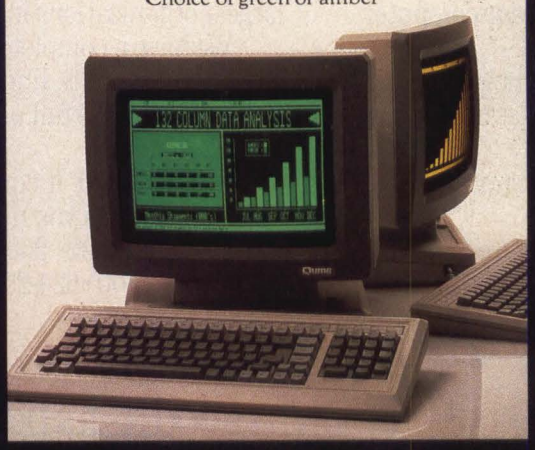

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ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
STX-CRX-1100	editing	12-inch; green, amber, white	132 x 24				
TAB PRODUCTS CO. 1400 Page Mill Rd., Palo Alto, CA 94304, (415) 852-2400							**Circle 473**
E-22	intelligent	15-inch; green, amber	132 x 27	RS232C (X-on/X-off, RTS/CTS)	DEC VT52, VT100, VT220	799(Q1)	70 programmable function keys, 2 pages of memory, split screen; opt. RS422, current loop
E-24	editing	12-inch, green	80 x 25	RS232C (X-on/X-off)	DEC VT52, Lear Siegler ADM 3A	595(Q1)	12 function keys, non-volatile setup mode
E-28	intelligent	14-inch, green	132 x 25	RS232C (X-on/X-off, DTR)	DEC VT52, VT100; TeleVideo 920, 925	795(Q1)	50 programmable function keys, split screen, 1 page of memory, re-programmable keyboard
E-32	intelligent	15-inch; green, amber	132 x 27	RS232C (X-on/X-off, RTS/CTS)	DEC VT52, VT100, VT132	1,095(Q1)	28 programmable function keys, split screen, 2 pages of memory; opt. internal modem
132/15	intelligent	15-inch; green, amber	132 x 27	RS232C, current loop (X-on/X-off, DTR, handshake)	DEC VT52, VT100, VT132; Prime	700(Q1)	22 programmable function keys, 12 function keys, 4 pages of memory, split screen; opt. integral modem
TANDBERG DATA INC. 1590 S. Sinclair, Anaheim, CA 92807, (714) 978-6771							**Circle 474**
TVD 2200 Family	intelligent/graphics	15-inch, green	132 x 25	RS232C, RS422, current loop (X-on/X-off, DTR, bisynch)	DEC VT52, VT100, VT220; Datapoint 8200, 8220; IBM 3101; Data General D200, D220	1,395(Q1); 950(Q100)	16 programmable function keys, 34 function keys, 8 pages of memory, non-volatile setup mode
TEC INC. 2727 N. Fairview Ave., Tucson, AZ 85703, (602) 792-2230							**Circle 475**
Data-Pad	editing	6 lines, LCD	132 x 24	RS232C	DEC VT52, VT100, TeleVideo 910, Hazeltine 1400, 1410	995(Q1); 795(Q100)	business graphics, portable rackmount; opt. built-in modem
TEC ET Series	editing	15-inch b&w	80 x 24	RS232C	DEC VT52, VT100; IBM 3278	1,995(Q1); 1,795 (Q100)	4 pages of memory, split screen, business graphics, line drawing graphics, rackmount; opt. current loop
TELERAY P.O. Box 24064, Minneapolis, MN 55424, (612) 941-3300							**Circle 476**
7	editing/graphics	9-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off)	Data General D200, DEC VT100	1,195(Q1)	programmable control sequence, 10 function keys, non-volatile setup mode, mosaic and line drawing graphics; opt. RS422, current loop
7-DHP	intelligent/graphics	14-inch; green, amber	80 x 26	RS232C (X-on/X-off)	DEC VT100, HP 2634	1,495(Q1)	32 programmable function keys, non-volatile setup mode, mosaic and line drawing graphics; opt. RS422, current loop
16	editing/graphics	9-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off)		1,595(Q1)	10 function keys, non-volatile setup mode, 4 pages of memory, mosaic and line drawing graphics; opt. RS422, current loop
16-APL	editing/graphics	9-, 14-inch; green, amber	80 x 25	RS232C (X-on/X-off)		1,745(Q1)	10 function keys, non-volatile setup mode, 4 pages of memory, mosaic and line drawing graphics; opt. RS422, current loop
16-7801	editing/graphics	9-, 14-inch; green, amber	80 x 25	RS232C, RS422, current loop (X-on/X-off)	Honeywell VIP 7801	1,895(Q1)	10 function keys, 2 pages of memory, non-volatile setup mode, mosaic and line drawing graphics
20-DDG	editing/graphics	14-inch; green, amber	132 x 25	RS232C (X-on/X-off, READY/BUSY)	DEC VT220, Data General D210	1,295(Q1)	20 programmable function keys, non-volatile setup mode, mosaic and line drawing graphics; opt. RS422, current loop
20-7305	intelligent/graphics	14-inch; green, amber	132 x 25	RS232C (X-on/X-off, READY/BUSY)	DEC VT100, Honeywell VIP 7305	1,695(Q1)	20 programmable function keys, non-volatile setup mode, mosaic and line drawing graphics; opt. RS422, current loop
TELEVIDEO SYSTEMS INC. 550 E. Brokaw Rd., San Jose, CA 95150, (408) 971-0255							**Circle 477**
905	intelligent	14-inch; green, amber	80 x 24	RS232C (X-on/X-off)	TeleVideo 925, ADDS A2	419(Q1)	22 programmable function keys, non-volatile setup mode

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company / Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
910	dumb	12-inch, green	80 x 24	RS232C, current loop	TeleVideo 910; Lear Siegler ADM 3A, ADM 5; Hazeltine 1410; ADDS 25	649(Q1)	
921	intelligent/graphics	12-inch; green, amber	80 x 24	RS232C, RS422, current loop (X-on/X-off, DTR)	TeleVideo 925	695(Q1)	32 programmable function keys, non-volatile setup mode, 1 page of memory
922	intelligent/graphics	12-inch; green, amber	132 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100, VT220	795(Q1)	30 programmable function keys, non-volatile setup mode
924	intelligent	12-inch, green	80 x 24	RS232C, RS422, current loop (X-on/X-off, DTR)		899(Q1)	32 programmable function keys, non-volatile setup mode
950	intelligent	12-inch, green	80 x 24	RS232C, current loop (X-on/X-off, DTR)		1,195(Q1)	22 programmable function keys
955	intelligent/graphics	14-inch; green, amber	132 x 24	RS232C (X-on/X-off, DTR)	TeleVideo 910+	699(Q1)	64 programmable function keys, non-volatile setup mode
970	intelligent/graphics	14-inch, green	132 x 24	RS232C, RS422, current loop (X-on/X-off, DTR)	DEC VT52, VT100	1,495(Q1)	32 programmable function keys, non-volatile setup mode
Personal Terminal	intelligent	9-inch, green	80 x 24	RS232C (X-on/X-off, DTR)		499(Q1)	14 programmable function keys, non-volatile setup mode, portable
TELEX COMPUTER PRODUCTS INC. 6422 E. 41st St., Tulsa, OK 74135, (918) 627-1111							**Circle 478**
TC 078	editing	12-inch; green, amber	80 x 24	RS232C	IBM 3278	1,550(Q1)	
TC 079	editing	12-inch; 4-, 7-color	80 x 24	RS232C (IBM 3270)	IBM 3279	2,195(Q1)	
TC 080	dumb	15-inch; green, amber	80 characters x 24, 32 or 43; 132 characters x 27	RS232C (IBM 3270)	IBM 3278	2,195(Q1)	
TC 179	dumb	14-inch, 7-color	80 characters x 24, 32 or 43	RS232C (IBM 3270)	IBM 3179		
TC 186	intelligent	12-inch, color	80 x 24	RS232C	IBM 3270	3,500(Q1)	opt. PC keyboard
TERMIFLEX CORP. 316 Daniel Webster Highway, Merrimack, NH 03054, (603) 424-3700							**Circle 479**
HT/40	dumb	2 x 16 characters, LCD	16 x 2	RS232C, RS422, current loop			portable
HT1000	intelligent	14 x 16 characters, LCD	16 x 4	RS232C, RS422, current loop			programmable function keys, portable, hand-held terminal
THOMAS ENGINEERING CO. 2440 Stanwell Dr., Concord, CA 94520, (415) 680-8640							**Circle 480**
TE-780X	intelligent	14-inch, green	80 x 25	RS232C, current loop (X-on/X-off)	Honeywell VIP 7800; DEC VT100	1,695(Q1)	12 programmable function keys, bar graphics
VISUAL TECHNOLOGY INC. 540 Main St., Tewksbury, MA 01876, (617) 851-5000							**Circle 481**
Visual 60	editing	12-inch; green, amber	80 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, Lear Siegler ADM 3A, ADDS Viewpoint, Hazeltine Esprit	595(Q1)	3 function keys, non-volatile setup mode, DEC VT52 line drawing graphics
Visual 65	intelligent	12-inch; green, amber	80 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, Lear Siegler ADM 3A, ADDS Viewpoint, Hazeltine Esprit	695(Q1)	12 programmable function keys, non-volatile setup mode
Visual 102	intelligent/graphics	14-inch; green, amber	132 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100, VT102; ANSI X3.64	1,095(Q1)	16 programmable function keys, non-volatile setup mode, DEC VT52 line drawing graphics; opt. Tektronix 4010, 4014 graphics

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The Micro-Term ERGO 320 is fully compatible with the DEC VT220 and emulates **all** DEC functions, including **RS423** and **Composite Video Out**.

Features

Other popular ERGO 320 features not found on a VT220: User-programmable compose key • User-programmable function keys • Function keys in VT100 mode • Flashing LEDs indicating Xoff has been enacted • Superior 132-column clarity • Bi-directional printer port • Erase or save 80/132 screen • Variable-speed smooth scroll • Choice of smooth- or jump-scroll without entering set-up mode • Addressable 25th status line • Low power consumption • Easy access to on/off and brightness controls • **A full one-year warranty.**

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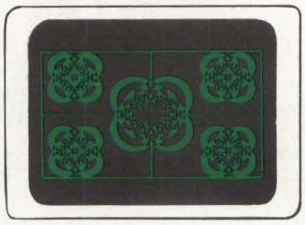
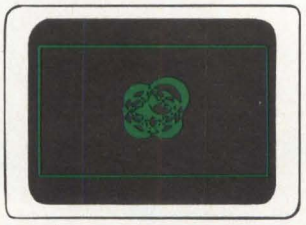
The ERGO 320 is ergonomically designed and housed in an attractive, compact case with an adjustable monitor and **smaller footprint** than the DEC VT220. The detached, low-profile keyboard, is shorter than the DEC VT220 keyboard, and has an easy-tilt adjustment to provide ease of use for **all** users.

Graphics

Upgradability. The ERGO 320 can accept an optional graphics board ($745) which will perform all Plot-10 and ReGIS functions. The graphics board, which turns an ERGO 320 into an ERGO 340, can be added to existing ERGO 320s. The small footprint is maintained when adding graphics to an ERGO 320 but must be forfeited when purchasing a VT240. The ERGO 320 is the **only** terminal on the market that can be upgraded to a VT240-compatible, high-performance graphic terminal.



ERGO 340
Elapsed Run Time: 11.0 sec.



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ALPHANUMERIC DISPLAY TERMINALS TABLE 9

Company Model	Terminal type	Display size, color (diagonal inches)	Screen format (col. x lines)	Interfaces (protocols)	Emulations	Price $ (quantity)	Notes, features, options
Visual 220	intelligent	14-inch; green, amber	132 x 24	RS232C, RS422, current loop (X-on/X-off, DTR)	DEC VT52, VT100, VT220; ANSI X3.64	795(Q1)	34 programmable function keys, non-volatile setup mode, split screen, DEC VT52 line drawing graphics
Visual 300	intelligent	12-, 14-inch; green	80 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, VT100; ANSI X3.64	995(Q1)	12 programmable function keys, split screen, non-volatile setup mode; opt. 8 pages of memory
Visual 330	intelligent	12-, 14-inch; green	80 x 24	RS232C, current loop (X-on/X-off, DTR)	DEC VT52, Lear Siegler ADM 3A, Data General D200, Hazeltine 500	995(Q1)	12 programmable function keys, split screen, non-volatile setup mode
WICAT SYSTEMS INC. 1875 S. State St., Orem, UT 84058, (801) 224-6400							**Circle 482**
MG8000	editing/graphics	12-inch, green	80 x 25	RS232C			line drawing graphics
WYSE TECHNOLOGY 3751 N. First St., San Jose, CA 95134, (408) 433-1000							**Circle 483**
WY-30	editing	14-inch, green	80 x 26	RS232C (X-on/X-off, TWX)	Wyse WY-50, TeleVideo TVI, 910, 925; ADDS Viewpoint; Lear Siegler ADM 3A, ADM 5, ADM 31	399(Q1)	16 function keys, non-volatile setup mode, split screen
WY-50	intelligent	14-inch, green	132 x 26	RS232C	Lear Siegler ADM 31; TeleVideo 910, 920, 925; ADDS Viewpoint	599(Q1)	32 programmable function keys, non-volatile setup mode, split screen
WY-50 PLUS	editing	14-inch, amber	132 x 26	RS232C (X-on/X-off, TWX)	Wyse WY-50; TeleVideo 910, 925, 950; ADDS Viewpoint; Lear Siegler ADM 3A, ADM 5, ADM-31; Hazeltine 1500	599(Q1)	16 function keys, split screen
WY-75	intelligent	14-inch, green	132 x 26	RS232C	DEC VT100	799(Q1)	32 programmable function keys, non-volatile setup mode, split screen
WY-85	intelligent	14-inch, green	132 x 26	RS232C, RS423	DEC VT220	799(Q1)	30 programmable function keys, non-volatile setup mode, split screen
WY-350	intelligent	15-inch, 64-color	132 x 26	RS232C	WY-50	1,195(Q1)	32 programmable function keys, non-volatile setup mode, split screen
ZENITH DATA SYSTEMS 950 Milwaukee Ave., Glenview, IL 60025, (312) 391-8860							**Circle 484**
Z-22	intelligent/graphics	12-inch, green	80 x 24	RS232C (X-on/X-off)	Lear Siegler ADM 3A, ADM 5, ADM 11; TeleVideo 914	356(Q1)	10 programmable function keys, graphics
Z-29A	editing/graphics	14-inch, amber	80 x 25	RS232C (X-on/X-off)	DEC VT52, VT100; Zenith Z-29; Lear Siegler ADM 3A; Hazeltine 1500	799(Q1)	9 function keys, non-volatile setup mode, graphics
Z-49	intelligent/graphics	14-inch; green, amber	80 x 25	RS232C	DEC VT52, VT100; Zenith Z-19, Z-29	1,099(Q1)	9 programmable function keys, graphics
ZENTEC CORP. 2400 Walsh Ave., Santa Clara, CA 95051, (408) 727-7662							**Circle 485**
1051/1052	intelligent	12-, 15-inch; green, amber	132 x 25	RS232C, RS422 (X-on/X-off)	DEC VT132	1,295(Q1)	32 programmable function keys, 4 pages of memory, split screen, non-volatile setup mode
DD52	editing	12-inch, green	80 x 25	RS232C, current loop (X-on/X-off)	Lear Siegler ADM 3A, Hazeltine 1500, ADDS Viewpoint, DEC VT52, ANSI X3.64	490(Q1)	4 function keys, non-volatile setup mode
WS1000	intelligent	14-inch; green, amber	80 x 25	RS232C, RS422 (X-on/X-off)	DEC VT220	995(Q1)	15 programmable function keys, non-volatile setup mode
Zephyr 100	intelligent	14-inch; green, amber	132 x 24	RS232C, RS423, current loop (X-on/X-off)	DEC VT52, VT100	650(Q1)	8 programmable function keys, split screen, non-volatile setup mode
Zephyr 220	intelligent	14-inch; green, amber	132 x 24	RS232C, RS423, current loop (X-on/X-off)	DEC VT52, VT100, VT220	850(Q1)	15 programmable function keys, split screen, non-volatile setup mode

ALPHANUMERIC DISPLAY TERMINALS TABLE 9

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(312) 982-2000

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Mini-Micro Systems
2200 Berkshire Lane
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San Jose, CA 95124
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Hitachi America Ltd.
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San Bruno, CA 94066
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IBM Corp.
900 King St.
Rye Brook, NY 10573
(914) 934-4839

Lee Data Corp.
7075 Flying Cloud Dr.
Minneapolis, MN 55344
(612) 828-0645

Memorex Corp.
Communications Group
461 S. Milpitas Blvd.
Milpitas, CA 95035
(408) 987-1000

Ramtek Corp.
2211 Lawson Lane
Santa Clara, CA 95050
(408) 988-2211

Soroc Technology Inc.
165 Freedom Ave.
Anaheim, CA 92801
(714) 992-2860

Tandem Computers Inc.
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U.S. Design Corp.
1551 Glenville Dr.
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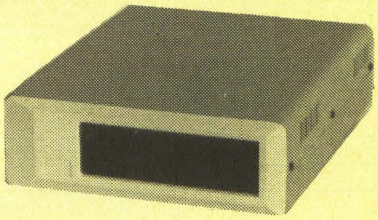

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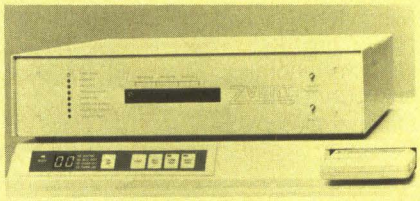

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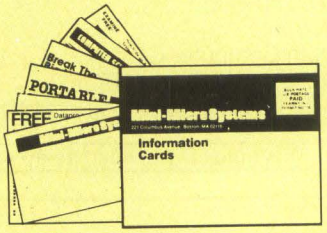

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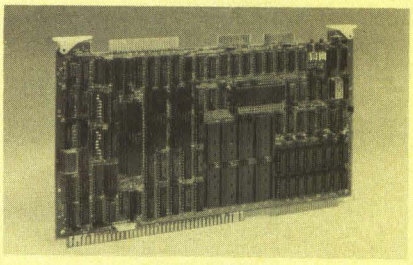

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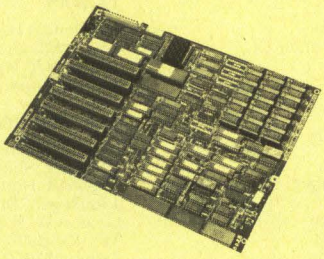

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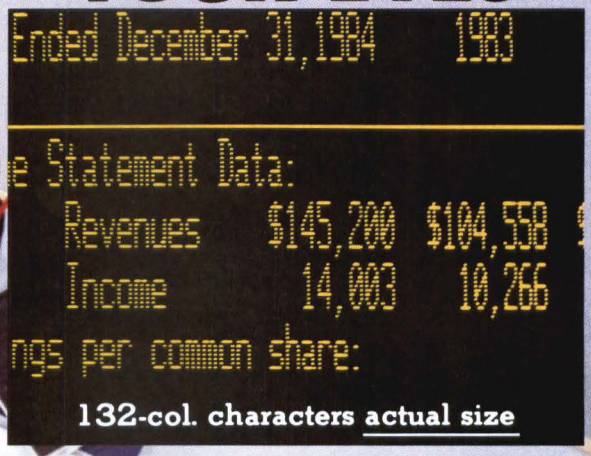

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