A Datapro Feature Report All About Winchester Disk Drives

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IBM's introduction of the innovative 3340 Winchester disk drive launched a revolution in disk technology. Winchester disk drives have proliferated since the 3340's debut in 1973. IBM has used Winchester technology in all of its fixed-disk drives since that date, and independent vendors have followed with plug-compatible versions. All of the earlier Winchester disk drives were high-capacity drives that used 14-inch platters. Then, in 1978, Winchester disk drives with 8-inch platters were announced for users of small computer systems. These smaller drives were followed in 1980 by even smaller drives with 5.25-inch platters. Analysts predict that by 1985 the 5.25-inch and 8-inch Winchester disk drives will dominate the market.

What is a Winchester Disk Drive?

Winchester disk drives are characterized by the following key features:

- The disks, read/write heads, and head actuator are contained in a hermetically sealed head disk assembly (HDA), in which the air is continuously circulated and filtered.
- The read/write heads fly much closer to the disk surface than those on conventional disk drives.
- The head load pressure is only about 10 grams, compared to 350 grams in traditional disk drives.
- Because the light head load does not permit the heads to be mechanically lowered when rotation begins, the heads rest on a landing zone on the surface of the disk when the disk is not rotating
- The surface of the disk is lubricated to prevent damage to the heads or disks during take-offs and landings.

Winchester disk drives represent the most rapidly growing segment of the hard disk market. This report defines Winchester technology, describes the choices in backup devices, and discusses the current Winchester market. Detailed comparison charts present the basic characteristics of 215 Winchester disk drives from 66 vendors.

- The magnetic oxide coating on the surface of the disk is thinner than the coating used on other disk drives.
- Nearly all Winchester disk drives are fixed-disk drives.

Winchester disk drives offer some significant advantages over traditional disk drives. The sealed HDA virtually eliminates the problem of head crashes caused by contamination, and no preventive maintenance, such as changing air filters or cleaning and aligning heads, is required. The Mean Time Between Failures for a Winchester disk drive is from 8000 to 12,000 hours, compared to 4000 to 6000 hours for 3330-type drives.

Greater bit packing densitites and greater track densities have been achieved as a result of the low head flying height, which is typically 19 microinches or less. Because magnetic flux spreads with distance, the greater the separation between the read write head and the disk surface, the greater the area occupied by a bit of information. The low flying height on a Winchester disk drive is made possible by the light head load pressure and a low head mass. Because of the thinner coating on the disk surface, the magnetic field of the head varies less through the medium, so that the magnetized regions acquire greater definition. Winchester disks can be rotated at faster speeds than other disks because of the



Hewlett-Packard has entered the 5.25-inch Winchester disk drive market with the 9134A (top) and the 9135A (bottom). Both models include the same 6.4-megabyte Winchester disk drive, but the 9135A also includes a 420K-byte 5.25-inch floppy disk drive. A controller, interface, and power supply are included.

APRIL 1982

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Although Winchester disk drives are commonly defined as fixed-disk drives, there are two notable exceptions. The IBM 3340 uses a removable data module, as does its plug-compatible counterpart, the Memorex 3640. The removable module has certain disadvantages. It is much more expensive than a conventional disk pack. Furthermore, whenever a data module is loaded, electrical connections must be established to activate the read write heads, and positioning mechanisms must be coupled to the head assembly. Since the introduction of the IBM 3344, the successor to the 3340, Winchester disk drives have featured non-removable disks. A few vendors have announced removable "Winchesters," but in this report we have included only fixed disks, with the exception of the IBM 3340 and the Memorex 3640. We left that the 3340, as the original Winchester disk drive. should be included.

The Backup Issue

While it is generally agreed that a fixed Winchester disk drive requires a removable-media backup device, there is less agreement about the type of backup that should be used. Backup became a major issue when 8-inch Winchesters were introduced. The problem was less critical with 14-inch disk drives, because a number of suitable devices were readily available. Higher capacity removable disk drives are often used with 14-inch Winchesters, and some vendors believe that the best disk backup device is another disk.

Eight-inch and 5.25-inch Winchesters were designed for use with small computer systems, which called for readily available, cost-effective backup devices. Users want a device that is efficient, reliable, and has sufficient capacity, but costs less than the Winchester disk drive

The most commonly used backup devices for 5.25- and 8-inch Winchesters are floppy disk drives, ½-inch cartridge dape drives, and ½- and ½-inch streaming tape drives. Some vendors ofter a fixed removable combination disk drive. The Control Data Lark, for example, includes an 8-inch Winchester plus a removable cartridge disk. Reently, a 5.25-inch removable cartridge disk was introduced for 5.25-inch Winchester backup. A 5.25-inch cartridge disk is available from Seagate and is included in DMA's Micro-Magnum 5.5 subsystem and in New World computer's V-4.2 and V-4.4 subsystems.

Eight-inch and 5.25-inch Winchester disk drives are often used to upgrade floppy disk-based systems, so one of the floppies could easily be used as a backup to the Winchester without much extra cost to the user. Most 5.25-and 8-inch Winchesters are the same size as a corresponding floppy disk drive. Some vendors offer Winchester disk subsystems with integrated floppy disk drives.

Applied Data Communications, Data Systems Design, Hewlett-Packard, Micro Technology, and Scientific Micro Systems are among the vendors offering Winchester floppy disk combinations.

Hoppy disk drives usually have a maximum capacity of 16 megabytes, much less than most Winchester disk drives. It is usually recommended that floppy disks be used to back up Winchester disks with a capacity of 10 to 15 megabytes or less. Copying the entire contents of a 10-megabyte Winchester requires 8 diskettes and takes about 17 minutes. However, one vendor stated that it is seldom necessary to copy the entire contents of a disk. If only the changes to data for a day's transactions need to be copied, a one-megabyte floppy can hold several day's transactions.

For Winchester disk drives with capacities of 15 to 40 megabytes. 1/4-inch cartridge tape drives are recommended for backup. The contents of a 20-megabyte disk can be copied to tape in about 70 seconds. The largest supplier of 1/4-inch cartridge tape drives is Data Electronics. Inc. (DEI). Kennedy Company offers a formatter that simplifies interfacing Winchester disk drives with cartridge tape drives. An integrated Winchester cartridge tape subsystem is available from Irwin International.

Streaming tape drives transmit data between the tape system and the Winchester disk in a continuous stream without starting and stopping between data blocks. There are no interblock gaps. Streaming tape drives are designed specifically for loading and copying entire files, not for file access, although they do operate in start/stop mode as well as in streaming mode. The ½-inch streaming tape drives are recommended as backup to Winchesters with a capacity of 40 megabytes or more. Streaming tape drives are available from Ampex. Cipher Data Products, Control Data, DEI, and Kennedy. Streaming tape drives use industry-standard media and are less expensive than start/stop tape drives. Currently.



Quantum's Q2000 Series of 8-inch drives consists of 4 models that offer 10, 20, 30, or 40 megabytes of storage. The Q2000 Series features a rotary moving coil actuator, an optical track position encoder, and a temperature compensation servo technique.

All About Winchester Disk Drives

Table 1. USER RATINGS OF WINCHESTER DISK DRIVES

									W	eig	ght	ed	Av	rera	ges	an	d F	Res	por	150	Co	un	ts	•					
	Number	Number of Drives						T						T					I		M	ain	te	nai	nce	Ser	rvic		
Disk Drive	of User Responses	Repre- sented	P		orn			1			rat	of ion				irdv liab			Pr	om	ptr	nes	s		E	ffec	tiv	ene	rse
			w	A	E	3 8	P	V	VA	E	G	F	P	w	A	E	3 6	P	٧	VA	E	G	F	P	w	A	E	3 F	P
Control Data 33501/33502	8	122	30	3	3	1	1	3	8	6	2	0	0	2.9	3	3 2	1	1	3.	0	3	3	1	1	28	2	3	2	1
IBM	1 1							1											1										
3340/3344	9	52	34	4	5		0	3	9	8	1	0	0	3.4		3	1	0	3	7	6	3	0	0	3.8	7	2	0	0
3350	1 7 1	233	40	7	0	0	0	3	9	6	1	0	0	3.7		2		0	3	7	5	2	O.		3.7	5	2	0	
Other models	4		33	1	3	0	0	3	8	3	1	0	0	3.5	2	2	0	0	3	7	2	1	0		3.3	1	2		0
Totals	20	357	3.6	12		0			9 1	7	3	0	0	3.6	12	7	1	0	3	7 1	3	6	0	0	3.7	13	6	0	0
Memorex 3650/3653/3654	7	130	3 1	1	6	0	0	3,	4	3	4	0	0	3.0	0	7	0	0	3	3	2	5	0	0	3.3	2	5	0	0
STC	1 1							1					- 1						1										
8350	10	166	34	5	4	1	n	3	,	7	3	0	0	33	5	3	2	0	3 5		8	3	1	0	32	3	6	1	0
8360	7		38	5	1	ò	0	40	,	6	0	0	0	3.8	5	1	0	0	3	, ,		2 1	0	ol	35	3	3	0	0
8650	10	62	38	7	2	0	0	35	•	8	1	0	0	37	6	3	0	0	3		5	3 (0	01	34	4	5	0	0
Totals	27		36	17	7	1		3.8		1	4	ō	0	3.6	16	7	2	0	36	16	3 1	В	1	0	3.4	10	14	1	0
All Others	5	147	32	1	4	0	0	34	. :	2	3	0	0	3.0	1	3	4	0	3.8	1 4		1 (0	0	32	1	4	0	0
Grand Totals	67	1027	3.5	34	28	2	1	3.8	49	9 1	6	0	0	3.4	32	26	6	1	3.5	38	2	3 2	2	-	34	28	32	3	1

[&]quot;User Ratings show the number of users who responded with each rating. The legend is E for Excellent, G for Good, F for Fair, and P for Poor. The Weighted Averages (WA) are derived by assigning a value of 4 (Excellent), 3 (Good), 2 (Fair), or 1 (Poor) to each response. Cross totals may not sum to the number of responses because not all responses included a rating in every category.

however, many controllers and operating systems do not support streaming tape drives.

Obviously, there is no single solution to the backup issue. Users must consider a number of factors, such as the capacity of the Winchester disk drive, the amount of data to be transferred, the number of backup media changes required, media cost and reliability, and the cost of integrating the backup device into the system.

User Experience

To obtain information about our subscribers' experiences with Winchester disk drives, we included a user survey questionnaire in the December 1981 supplement of DATAPRO 70. By our editorial cutoff date, we had received 67 usable product ratings from 42 subscribers.

Users were asked to rate their Winchester disk drives in five categories. Overall Performance. Ease of Operation, Equipment Reliability. Promptness of Maintenance Service, and Effectiveness of Maintenance Service. To derive the Weighted Averages, a numerical value of 4 was assigned to Excellent, 3 to Good, 2 to Fair, and 1 to poor. Each response was given equal weight regardless of the number of drives represented. The results of the survey are presented in Table 1.

Users were also asked how long the drives had been installed, with what computer system they were used, and what type of backup medium was used. The users' responses are summarized below.

	Number of response
How long installed-	-
Less than one year	23
One to three years	27
More than three years	17
Computer system—	
Amdahl 470	7
IBM 370	11
IBM 303X	21
IBM 3081	ī
IBM 4300	25
Magnuson M80	3
NAS Advanced Systems	4
Other	2
Backup medium-	
Magnetic tape	59
Floppy disk	1
Hard disk	2

The Winchester Market

Winchester disk drives are available in a wide array of sizes and configurations. Most are sold to OEMs, but many are sold to end users. The three standard platter sizes are 5.25, 8, and 14 inches, but Cynthia Peripheral Corporation sells a Winchester with 11.5-inch disks and Fujitsu has a 10.5-inch Winchester. Capacities range from 2 to 38 megabytes for 5.25-inch Winchesters, from 2 to 129 megabytes for 8-inch Winchesters, and from 10 megabytes to 2.5 gigabytes for 14-inch Winchesters.

You can buy a basic Winchester disk drive to which you must add your own interface and controller, or a

.

Fourteen-inch Winchester disk drives have been readily available for several years, and offer a lower cost per megabyte than the newer 8-inch Winchesters. The 14-inch drives are expected to dominate the high-capacity market for a few more years, but lower-capacity 14-inch drives are expected to be edged out by the higher capacity 8-inch drives.

The 8-inch Winchester disk market got off to a rather slow start, partly because many manufacturers underestimated the effort involved in reaching volume production levels. Although 8-inch Winchesters were introduced in 1978, volume shipments did not really begin until mid-1980. According to some industry observers, many manufacturers did not understand the OEM market-place. It takes time for OEMs to integrate new products into their systems. The backup dilemma and the lack of a standard interface may also have impeded the acceptance of 8-inch Winchesters. However, the American National Standards Institute has proposed a standard interface, which most vendors have said they will support.

Volume shipments of 8-inch Winchester disk drives increased significantly during 1981. Several vendors



Storage Technology Corporation's 8350 is a [4-inch Winchester that is play-compatible with IBM's 3350. The 8350 provides 635 megabytes of storage STC also offers a higher performance version, the 8360, and a double-density version, the 8650. All models can be used with STCs new 8890 Sybercache disk/cache control unit.

reported a strong demand for 8-inch drives with capacities of 40 megabytes and up.

During the past year, however, the real flurry of activity has been in the 5,25-inch Winchester market, which is expected to impact the sales of lower capacity 8-inch Winchesters. As of January 1981, only five vendors had formally announced 5,25-inch Winchester disk drives. The current edition of this report includes 5,25-inch drives from 24 vendors. These 24 vendors include new companies such as MiniScribe and Rotating Memory Systems, as well as established disk drive manufacturers such as Ampex, BASE. Memorex, and Shugart.

The 5.25-inch Winchester disk drive market is expected to take off faster than the 8-inch Winchester market did. The adoption of the Seagate Technology interface as a de facto standard has hastened acceptance of the 5.25-inch drives and eased the design of controllers for the new drives. User confidence was also increased when Seagate delivered its first model on schedule.

The 5.25-inch Winchesters are expected to be used in word processing applications and in small business systems as upgrades to minifloppy-based systems. The "mini-Winchesters" are more compact, less expensive, and use less power than the 8-inch Winchesters. The 5.25-inch drives are expected to compete in the 5 to 40 megabyte Winchester market.

In general, Winchester disk drives are well suited to online storage in data processing and office automation applications where fast access and high throughput are required. Experts predict that capacities of 5.25- and 8inch Winchesters will continue to increase as small systems users demand more and more storage capacity.

Technology Advances

The first major advance in Winchester disk technology was made by IBM with the introduction of the 3370 disk drive. The 3370 uses thin-film read, write heads. Instead of a coil of wire wrapped around a ferrite core, a thin-film head uses a spiral film of electrical conductor deposited on a silicon substrate. The magnetic core of the head is Permalloy, a mixture of nickel and iron. Use of thin-film heads results in a bit density that is about 10 times greater than the bit density on conventional Winchester disk drives. The bit density can be further increased by using thin-film media. IMI. Irwin International, and Texas Instruments have introduced 5.25-inch drives using thin-film plated disks.

The IBM 3380 disk drive offers a total storage capacity of 2500 megabytes. Some experts predict that future Winchester disk drives will achieve storage capacities of 4000 megabytes.

The emerging field of optical disk technology holds the promise of achieving even greater storage capacities.

Optical disks employ a laser beam to burn holes in the

APRIL 1982

All About Winchester Disk Drives

coating on the disk. A 14-inch disk can hold 10 billion holes a micrometer in diameter. Of course, data recorded in this manner cannot be erased, so optical disks will probably be used primarily for archival storage. In addition, optical disks have relatively high error rates compared to magnetic disks. A number of companies are experimenting with optical disks, and Drexler Technology Corporation has already introduced such a product.

The Comparison Charts

The accompanying comparison charts summarize the characteristics of 215 Winchester disk drives from 66 suppliers and manufacturers. The information in the charts was furnished by the vendors in January and February 1982. Their cooperation is greatly appreciated. The absence of any specific company from our charts means that the company either failed to respond to our repeated information requests or was unknown to us.

The chart entries and their significance are explained in the following paragraphs.

Manufacturer and model identifies the specific device. Products are listed in the charts under the name of the firm that markets them. For your convenience, a list of the vendors, along with their addresses and telephone numbers, immediately precedes the charts.

Primary Market indicates whether the vendor has placed emphasis upon OEM or end-user customers, or upon both. Strictly OEM-oriented units are likely to require that the customer provide his or her own field service, while vendors with end-user products should be able to demonstrate an ability to provide service either through their own personnel or via a third-party source.

Entries under *Type* indicate whether the unit is a Winchester disk drive only or a Winchester plus a backup device such as a floppy disk. The *Disk diameter* is also presented.

Under Capacity, the Recording surfaces per drive and Tracks per surface entries clarify the exact configuration of the unit. The Unformatted capacity per drive is presented in millions of bytes. Here, we are using the term "drive" to mean the total drive unit, not just the spindle. Some drive units have two spindles, or two head disk assemblies. For those drives, we have given the total canacity and indicated that the unit has two HDAs.

Several entries describe the *Performance* of the unit. The *Head movement time* is presented, in milliseconds, for *one track*, for an *average* based on the movement across one-third of the tracks, and for the movement across all tracks. Average rotational delay is based on the time required for one-half of a revolution of the disk. The *Data transfer rate* is indicated in *bytes* per second. A word of caution here is in order. Some vendors' specification sheets give the data transfer rate in millions of *bits*



The Rotating Memory Systems RMS 500 Series is a family of 5.25-inch Winchesters available with unformatted capacities of 4.5, 9.0, 13.5, or 18.0 megabytes. The RMS 500 Series features a proprietary head positioning system that is designed to optimize access time and provide more precise alignment. Optional data separators are available.

per second, but use the abbreviation "MB," which most people in the computer industry interpret as millions of bytes. The fastest data transfer rate yet achieved on any wishester disk drive is 3.000.000 bytes per second. If you see any figures larger than that in the vendors' literature, those figures must necessarily refer to bits per second, not bytes.

The Software support entry indicates whether the vendor provides drivers, diagnostics, or any other software for the disk unit.

Packaging is just what it says. We have attempted to be as clear and concise as possible in these entries, but they may still require a bit of imagination on the part of the reader. The information is presented for the basic product line styles of the vendors. "PC boards" indicate printed circuit cards that must be housed in some kind of enclosure. Usually, they are placed in the computer housing itself, but there may be provisions in the drive housing for them. We have used the term "chassis" to indicate a mountable arrangement that may or may not be totally enclosed, but is not usually suitable for free-standing use. "Rackmounted" definitely indicates the need for an equipment cabinet, which may be the computer or peripheral cabinet supplied by the computer vendor.

The *Power source* is an important consideration. An entry of *Internal* indicates the unit includes the circuitry required to convert normally available AC power to the DC voltages required by the drive. An entry of *Separate* indicates that you have to supply the power supply circuitry or take the power from the computer power supply. A power supply can add several hundred dollars to the cost of the unit. Unhappily, the vendors were not as explicit as we had hoped in their replies to these questions, and we urge you to clarify exactly the power supply situation before you buy.

► The entries under Pricing and Availability are selfexplanatory. Prices stated are for unit quantities unless specified otherwise, and typically do not include options or expanded capacities mentioned in the other comparison chart entries.

Winchester Disk Drive Vendors

Listed below, for your convenience in obtaining additional information, are the full names, addresses, and telephone numbers of the 66 vendors listed in the comparison charts that follow.

Advanced Electronics Design, 440 Potrero Avenue. Sunnyvale. California 94086 Telephone (408) 733-3555

Advant Corporation, 696 Trimble Road, San Jose, California 95131. Telephone (408) 946-9300.

Amperif Corporation, 21345 Lassen Street, Chatsworth, California 93111 Telephone (213) 998-7666

Ampex Corporation, Memory Products Division, 200 North Nash Road, El Segundo, California 90245. Telephone (213) 640-0150.

Applied Data Communications, 14272 Chambers Road, Lustin, California 92680. Telephone (714) 731-9000.

BASF Systems, Crosby Drive, Bedford, Massachusetts 01730. Telephone (617) 271-4000

Century Data Systems, 1270 North Kraemer Blvd., Anaheim, California 92806, Telephone (714) 632-7500.

Charles River Data Systems, Inc., 4 Tech Circle, Natick, Massachusetts 01760. Telephone (617) 655-1800

Computer Memories, Inc., 9233 Eton Avenue, Chatsworth, California 91311. Telephone (213) 709-6445.

Control Data Corporation, 8100 34th Avenue South, Minneapolis, Minnesota 55440. Telephone (612) 853-8100.

Corona Data Systems, 21541 Nordhoff Street, Unit B. Chatsworth, California 91311. Telephone (213) 998-0505

Corvus Systems, Inc., 2029 O'Toole Avenue, San Jose, California 95131 Telephone (408) 946-7700

Cyberchron Corporation, P.O. Box 164, Garrison, New York 10524 Telephone (914) 424-3755

Cyberdata, 2611 Garden Road, Monterey, California 93940. Telephone (408) 373-2601.

Cynthia Peripheral Corporation (division of Cir Honeywell Bull). 3606 West Bayshore Road, Palo Alto, California 94303. Telephone (415) X56-X1X1

Dastek Corporation, 141 Albright Way, Los Gatos, California 95030 Telephone (408) 866-0550

Data General Corporation, Route 9, Westboro, Massachusetts 01581. Telephone (617) 366-8911

Data Peripherals, Inc., 965 Stewart Drive, Sunnyvale, California 94086. Telephone (408) 745-6500.

Data Systems Design, Inc., 2241 Lundy Avenue. San Jose, California 95131. Telephone (408) 946-5800.

Digital Equipment Corporation, 146 Main Street, Maynard. Massachusetts 01754. Telephone (617) 897-5111.

DMA Systems, Inc., 325 Chapala Street, Santa Barbara, California 93101 Telephone (805) 965-7059

Fujitsu America, Inc., 2945 Oakmead Village Court, Santa Clara, California 95051. Telephone (408) 727-4300

Harris Corporation, Computer Systems Division, 2101 West Cypress Creek Road, Fort Lauderdale, Florida 33309, Telephone

Hewlett-Packard Company, Disk Memory Division, 11413 Chinden Road, P.O. Box 39, Boise, Idaho 83707. Telephone (208)

Hitachi America, Ltd., 100 California Street, San Francisco, California 94111 Telephone (415) 981-7871

IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, New York 10604, Telephone (914) 696-1900

International Memories, Inc. (IMI), 10381 Bandley Drive, Cupertino, California 95014. Telephone (408) 446-9779

Irwin International, 2000 Green Road, Ann Arbor, Michigan 48105 Telephone (313) 663-3600

ISS/Univac, 3333 Scott Blvd., Santa Clara, California 95051. Tele-

Kennedy Company, 1600 South Shamrock, Monrovia, California 91016. Telephone (213) 357-8831.

Memorex Corporation, San Tomas at Central Expressway, Santa Clara, California 95052 Telephone (408) 987-1000

Micro Peripherals, Inc., 9754 Deering Avenue, Chatsworth, California 91311 Telephone (213) 709-4202.

Micro Technology, Inc., 3605 W. McArthur Blvd., Suite 714, Santa Ana, California 92704. Telephone (714) 545-8477.

Microcomputer Systems Corporation, 432 Lakeside Drive, Sunnyvale, California 94086. Telephone (408) 733-4200.

Micropolis Corporation, 21329 Nordhoff Street, Chatsworth, California 91311. Telephone (213) 709-3300.

Microtech Business Systems, 3180 Pullman Street, Costa Mesa. California 92626. Telephone (714) 557-8640.

MiniScribe Corporation, 410 South Sunset, Longmont, Colorado 80501. Telephone (303) 651-6000.

Mitsubishi Electronics America, Computer Peripherals Division, 2200 W. Artesia Blvd. Compton. California 90220. Telephone (213) 979-6055

National Advanced Systems, 800 East Middlefield Road, Mountain View. California 94043. Telephone (415) 962-6100.

NEC Information Systems, Inc., 5 Militia Drive. Lexington, Massachusetts 02173. Telephone (617) 862-3120.

New World Computer Company, Inc., 2805 McGaw, Irvine, California 92714 Telephone (714) 556-9320

Olivetti OPE, 505 White Plains Road, Tarrytown, New York 10591. Telephone (914) 631-3000.

Onyx, Inc., 1487 Chain Bridge Road, Suite 100, McLean, Virginia 22101. Telephone (703) 556-9000.

Pertec Computer Corporation, 9600 Irondale Avenue, Chatsworth. California 91311. Telephone (213) 999-2020.

All About Winchester Disk Drives

Plessey Peripheral Systems, 17466 Daimler Avenue, Irvine California 92714 Telephone (714) 540-9945

Priam Corporation, 3096 Orchard Drive, San Jose, California 95134 Telephone (408) 946-4600

Quantum Corporation, 1804 McCarthy Blvd., Milpitas, California 95035 Telephone (408) 262-1100

Rodime, Ltd., 23591 11 Loro Road, Suite 208, El Toro, California 92630 Telephone (714) 770-3085

Rotating Memory Systems, Inc., 1031-A Fast Duane Avenue Sunnyvale, California 94086, Telephone (408) 730-1346.

Scientific Micro Systems, 777 East Middlefield Road. Mountain View, California 94043. Telephone (415) 964-5700

Seagate Technology, 340 El Pueblo Road, Scotts Valley, California 95066 Telephone (408) 438-6550

Shugart Associates, 475 Oakmead Parkway, Sunnyvale, California 94086 Telephone (408) 733-0100

SLI Industries, 21040 Victory Blvd., Woodland Hills, California 91367. Telephone (213) 884-7300.

Sperry Univac Division, Sperry Corporation, P.O. Box 500. Blue Bell. Pennsylvania 19424 Telephone (215) 542-4011

Storage Technology Corporation (STC), 2270 South 88th Street. Louisville, Colorado 80027 Telephone (303) 673-5151

System Industries, Inc., 525 Oakmead Parkway, P.O. Box 425. Sunnyvale, California 94086. Telephone (408) 732-1650.

Tandon Magnetics Corporation, 20320 Prairie Street, Chatsworth, California 91311. Telephone (213) 993-6644

Tecstor, 16/61 Gothard Street. Huntington Beach. California 92647 Telephone (714) 842-0077

Texas Instruments, Terminals Peripherals Division, P.O. Box 1444. Houston, Texas 77001. Telephone (713) 895-3124.

United Peripherals, 432 Lakeside Drive, Sunnyvale, California 94086 Telephone (408) 730-4440

United States Design Corporation, 5100 Philadelphia Way. Lanham, Maryland 20706. Telephone (301) 577-2880.

XCOMP, Inc., 7566 Trade Street, San Diego, California 92121 Lelephone (714) 271-8730

Xvcom, Inc., 750 N. Maple Road, Saline, Michigan 48176. Telephone (313) 429-4979

Xylogies, Inc., OEM Component Group, 42 Third Avenue. Burlington, Massachusetts 01803. Telephone (617) 272-8140.

ZZY Systems, Inc., 1900 Lafavette Street, Santa Clara, California 95050 Telephone (408) 496-6988

3M, Data Recording Division. 3M Center. St. Paul. Minnesota 55144 Telephone (612) 733-1110

APRIL 1982

APRIL 1982

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COMPUTERS INTERFACED	Design Winc-08	Microsupport (8-inch)	Advant Microsupport (14-inch)	Amperif 84502	Ampex Capricom Series
COMPOTERS INTERPACED	DEC LSI-11, PDP-11	Intel Multibus, S-100 bus	Intel Multibus. S-100 bus	Univac Series 90, 1100	DEC PDP-11 DG Nova and Eclipse, SMD
PRIMARY MARKET	OEM	End user, OEM	End user, OEM	End user	OEM
TYPE Style	Winchester plus floppy disk	Winchester plus floppy or tape	Winchester plus floppy or tape	Winchester disk only	Winchester disk
Disk diameter, inches	8	8	14	14	14
CAPACITY Recording surfaces per drive unit	4 to 8	4	4	-	5 or 8
Tracks per surface Unformatted capacity per drive unit, bytes	244 46.8M	256 10 7M	405 29M	1110 635M	823 or 1024 165 9M or 330 3M
PERFORMANCE Head movement time—					330 SW
1 track msec	30	19	20	6	10
Average (move of 1/3 of tracks), msec	70	70	65	20 to 25	30
Across all tracks, msec	140	150	140	40 to 50 8.3	55 8 3
Average rotational delay (1/2 rev.), msec Data transfer rate, bytes per second	593,000	9 6 540,000	889.000	1 260 000	1 209 000
SOFTWARE SUPPORT	Emulator, diag- nostics	Onboard micro diagnostics	Onboard micro diagnostics		internal diag- nostics
PACKAGING Controller	Yes	Yes	Yes	Amperif 5046	_
	1	Yes	Yes	Yes	_
Formatter	-	Yes	Yes	Yes	_
Interface	PC board	4	4	16	_
Drive units per controller	2	4	4	-	-
Drive units per formatter Drive mounting	2 drives per cabinet	Separate chassis. 1 or 2 drives	Separate chassis 1 or 2 drives	Stand-alone cabinet	Rack 10.4 x 17.53 x 28.03
Drive dimensions (h x w x d), inches	5 25 x 17 6 x 26 5	-	-		128
Drive weight, pounds Power source for drives	55	Included	Included	Internal	Internal
PRICING AND AVAILABILITY Purchase price—	s4 280	\$7 000 to \$9 000	\$7,000 to \$9,000	Contact vendor	Contact vendor
Controller	_	Included	Included Included	Ξ	_
interface	s680	Included Included	Included	Contact vendor	\$10.315 to \$12,460
First drive	\$2.795 \$2.795	Varies	Varies	-	-
Additional drive	-	-	-	-	
Software Maintenance—			_	Contact vendor	-
Controller	-	_	_	-	
Interface Drive	-	Yes	Yes	Contact vendor No	Yes
Quantity discounts available	Yes	December 1980	December 1980	1980	October 1981
First delivery, month/year	1981	30	30	-	120 NA
Availability days ARO	30 NA	NA	NA	NA Amperil	Ampex
Number of drives installed to date Serviced by	Factory	Factory	Factory		
COMMENTS		Choice of floppy disk streaming tape backs 2K-byte buffer, varial scan-disk capability, alternate sector process	ble sector sizes. error correction	Available with cache memory	SMD-compatible interface

	Ampex DFR-932	Ampex DFR-964	Ampex DFR-996	Ampex Pyxis Series	Ampex Scorpio Series
SUPPLIER AND MODEL	DFH-932		SMD/CMD	_	DEC PDP-11. DG Nova and
COMPUTERS INTERFACED	SMD/CMD	SMD/CMD	SMD CMD		Eclipse. SMD
OMPORENCE		OEM	OEM	OEM end user	OEM
PRIMARY MARKET	OEM		Winchester plus	Winchester disk	Winchester disk
	Winchester plus	Winchester plus	cartridge disk	only	B
TYPE Style	cartridge disk	cartridge disk	14	5 25	
	14	14			
Disk diameter, inches			5 plus 1	2 4 6 or 8	3 or 5 823
CAPACITY	1 plus 1	3 plus 1	823	4M. 8M. 12M.	49 7M of
CAPACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, bytes	823 16M	823 48M	80M	or 16M	82 9M
PERFORMANCE				18	6 32
Head movement time-	6	6	6 30	85	55
1 track, msec Average (move of 1/3 of tracks), msec	30	30 55	55	170	83
Average (move of 1/3 of tracks) mase:	55	8 33	8 33 1 200 000	625.000	1,209,000
	8 33 1 200 000	1 200 000	1,20000		Internal diagnostics
Data transfer rate, bytes per second	Available	Available	Available	-	
SOFTWARE SUPPORT					
		PC board	PC board	-	
PACKAGING Controller	PC board	With controller	With controller	-	-
Formatter	With controller	3100	With controller	-	-
	With controller	With controller	AMILII COLIII ONC.		
Interface		_	=	_	-
Drive units per controller	_	-	Rack	Rack	Rack
Drive units per formatter Drive mounting	Rack	Rack		3 25 × 5 75 × 8 O	5 12 x 8 55 x 14 25
	10 x 17 5 x 28 5	10 x 17 5 x 28 5	10 x 17 5 x 28 5	55	25
Drive dimensions (h x w x d), inches Drive weight, pounds Power source for drives	170 Internal	170 Internal	internal	-	Internal
PRICING AND AVAILABILITY				Contact vendor	Contact vendor
Purchase price -	Contact vendor	Contact vendor	Contact vendor Included	-	
Controller Formatter	Included	Included Included	Included	\$1,230 to \$2,150	s4 350 to \$5 100
Interface	Included \$6,400	\$7.300	\$8.100	51,230 10 \$2,130	-
First drive	-		\$400	-	-
Additional drive Software	\$400	\$400			-
Maintenance -	_	-		_	-
Controller	_	-	-	-	Yes
Interface Drive	Yes	Yes	Yes	Yes	
Quantity discounts available			June 1980	1982	1982
First delivery month year	June 1980	June 1980 45 to 60	45 to 60	120	120 NA
A adability days AHU	45 to 60 NA	NA	NA	NA Ampex	Ampex
Number of drives installed to date Serviced by	Ampex	Ampex	Ampex	Carper.	
COMMENTS	Integrated disk cartridge provides	Integrated disk cartridge provides 16 megabytes of	Integrated disk cartridge provides 16 megabytes of		
	16 megabytes of additional storage	additional storage	additional storage		

SUPPLIER AND MODEL	Applied Data Communications Series 90 (8-inch)	Applied Dat Communication Series 90 (14-inch)	ons BA	SF Systems 6171	BASF System 6172	ns B	ASF Systems 6173
OMPUTERS INTERFACED	DEC LSI 11 DG Nova S 100 bus	DEC LSI-11 DG Nova. S-100 bus IEEE 48B. RS-23		Comments	See Comments	Sec	e Comments
	IEEE 488. RS 232	OEM	OEM		OEM	OE	M
RIMARY MARKET	OEM				Winchester disk	w	inchester disk
YPE Style	Winchester plus floppy disk	Winchester plus floppy disk 14	only 8	chester disk	only 8	on 8	
Disk diameter inches				us 1 servo	3 plus 1 servo	5	plus 1 servo
CAPACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, bytes	2 or 4 512 4 2M or 8 4M	2 4 or 8 1616 12 6M 25 2M 50 2M	600	plus 14 spares	600 plus 14 spi 24 58M	ires 64	00 plus 14 spares 0.97M
PERFORMANCE					8	8	
Head movement time	19	20 65	8 27		27 80		27
1 track, msec Average (move of 1/3 of tracks), msec	70	140	80		8.3	18	3.3 800.640
Across all tracks, msec Average rotational delay (1 2 rev.) msec	96	889 000	80	0,640	800,640		
Data transfer rate bytes per second	542.000	File macros	N	one	None	1	None
SOFTWARE SUPPORT	File macros	File macros					
							No
PACKAGING		Yes	N	0	No	1	No
Controller	Yes		1	io	No		
Formatter	Yes	Yes		ntegral	integral		Integral
1	RS-232 standard	RS 232 stan		utedrai			_
Interface	others optional	others option		-	-		
Drive units per controller	2	Rack	1	Vanes	Varies		
Drive units per formatter Drive mounting	Rack	1		46x9x18	46×9×18		4.6 x 9 x 18 20 5
Drive dimensions (h x w x d), inches	8 75 x 19 x 24	8 75 x 19 x		20	20 Separate		Separate
Drive dimensions in a way of Drive weight, pounds Power source for drives	70 Internal	Internal		Separate			
AVAILABILITY					-		_
PRICING AND AVAILABILITY Purchase price	included	Included		-	=		\$ 3600 to \$4,000
Controller	Included \$275 to \$525	\$275 to \$	525	\$2,400 to \$2,80	s3 000 to \$	3 400	5.3000 10
Formatter Interface	- 2 227 to 67 7	40 \$7 790 to 50 \$3 000 to	\$5.400	-	=		-
First drive Additional drive	\$2 590 to \$3 1 \$395	\$395		_			-
Software	10000	-		-	-		_
Maintenance — Controller	-	-		-	Yes		Yes
Interface	Up to 25%	Up to 25°	6	Yes	August 19	79	July 1981
Ouantity discounts available		NA		August 1979 60	60		90 NA
and delivery month year	NA NA	NA NA		NA	NA Factory		Factory
Availability days ARO	NA Factory 3rd p	10.0	3rd party	Factory	-		Interfaces device
Availability days ARU Number of drives installed to date Serviced by		Passe bo	x nolds up	Interfaces devi		bus.	ANSI type std
COMMENTS	Basic box hol to 2 Winches disks and 2 f disks	iei isi	chester d 2 floppy	ANSI type std. and SMD	and SMD		and SMD

All About Winchester Disk Drives

MODEL	BASF Systems 6181	BASF Systems 6182	BASF Systems 6183	Century Data Systems AMS 190	Century De Systems AMS 380
SUPPLIER AND MODEL	0.0.			Most popular mini-	Most popular mi
		_	-	computers	computers
COMPUTERS INTERFACED					OEM
COM			OEM	OEM	DEM
	OEM	OEM			Winchester disk
PRIMARY MARKET			Winchester disk	Winchester disk	only
TYPE	Winchester disk	Winchester disk	only	only 14	14
Style	only 5 25	5 25	5.25		
Disk diameter, inches	5.25			7	7 712
CAPACITY	2	4	153	480	378.5M
Perording surfaces per drive unit	153	153 6 38M	9 57M	191M	
Tracks per surface Unformatted capacity per drive unit, bytes	3 19M	6 38M			
PERFORMANCE			2	6	6 25
Head movement time-	2	100	100	25 50	50
1 track, msec	100	300	300 8 3	12 5	1.280.000
Across all tracks, msec	83	8.3 625.000	625,000	960,000	
Across all tracks, msec Average rotational delay (1, 2 rev.), msec Data transfer rate, bytes per second	625,000	625.000	None	None	None
SOFTWARE SUPPORT	None	None	None		
301					
			No	Yes	Yes
PACKAGING	No	No	No.	With controller	With controller
Controller		No	No	Will Colicions	
Formatter	No	Seagate ST506-	Seagate ST506-	SMD	SMD
Interface	Seagate ST506- compatible	compatible	compatible	1	1
Drive units per controller	-		-	Optional	Optional
Drive units per formatter	Varies	Varies	Valles	8 12 x 16 5 x 24 5	8 12 x 16 5 x 24 5
Drive mounting	3 25 x 5 75 x 8 27	3 25 x 5 75 x 8 27	323 4 3 10	8 12 x 16 5 x 24 5	65
Drive dimensions (h x w x d), inches	-	Constant	6 2 Separate	Optional	Optional
Drive weight, pounds Power source for drives	Separate	Separate			
- AgusTV					Included
PRICING AND AVAILABILITY Purchase price		_	-	Included With controller	With controller
Controller	_	-			Contact vendor
Formatter Interface	Contact vendor	Contact vendor	Contact vendor	Contact vendor	-
First drive	Contact vendor	_	_		_
Additional drive Software	-				_
Maintenance -	-	-	_	-	_
Controller Interface		_	-	_ Yes	Yes
	Yes	Yes	Yes		3rd quarter 1982
Ouantity discounts available	September 1981	September 1981	September 1981	3rd quarter 1982 60	60
First delivery month year	90	90	90 NA	-	- Factory
Availability, days ARO Number of drives installed to date	NA Factory	NA Factory	Factory	Factory	
Serviced by	7 35.00 7			Controller format	See AMS 190
				ter is not sold	comments
COMMENTS				separately, available in desk-top or rack-	
				mounted modules	100

APRIL 1982

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SUPPLIER AND MODEL	Century Data Systems Marksman M20	Century Data Systems Marksman M40	Century Data Systems Marksman M80	Century Data Systems Marksman M160	Charles River Data Systems HD-11
COMPUTERS INTERFACED	Most popular mini	Most popular mini-	Most popular mini	Most popular mini-	DEC PDP-11, LSI-1
	computers	computers	computers	computers	
PRIMARY MARKET	OEM	OEM	OEM	OEM	End user, OEM
TYPE					Winchester with
Style	Winchester disk	Winchester disk	Winchester disk	Winchester disk	opt tape drive
	only	only 14	only 14	14	14
Disk diameter, inches	14	14	1.4		
CAPACITY				3	4
Recording surfaces per drive unit	2	4	3 569	845	202
Tracks per surface	213	213 40 32M	80 64M	161M	29M
Unformatted capacity per drive unit, bytes	20.16M	40 32M	60 GAM		
PERFORMANCE					
Head movement time-	20	20	12	12	20
1 track, msec	20 65	65	50	50	65
Average (move of 1/3 of tracks), msec	130	130	100	100	125
Across all tracks, msec Average rotational delay (1/2 rev.), msec	125	12 5	12.5	12 5 1 280 000	889.000
Data transfer rate, bytes per second	960,000	960,000	960,000		
SOFTWARE SUPPORT	None	None	None	None	Diagnostics
ACKAGING		Yes	Yes	Yes	Integral
Controller	Yes	With controller	With controller	With controller	Yes
Formatter	With controller		Proprietary	Proprietary	Yes
Interface	Proprietary	Proprietary	Proprietary		,
llar	1	1	1	1	i
Drive units per controller Drive units per formatter	1	1	1 Optional	Optional	Separate Chassis
Drive mounting	Optional	Optional	Optional		10 5 x 19 x 24
	86×162×24	86 x 162 x 24	8 75 x 16 5 x 22	8 75 x 16 5 x 22	100
Drive dimensions (h x w x d), inches	45	45	48	Optional	Included
Drive weight, pounds Power source for drives	Optional	Optional	Optional	Орнова	
A POLICE A P					
RICING AND AVAILABILITY Purchase price—			Included	Included	Included
Controller	Included	Included With controller	With controller	With controller	Included
Formatter	With controller	With controller	_	-	Included \$6,500
Interface	_	Contact vendor	Contact vendor	Contact vendor	\$6,500
First drive	Contact vendor	-	-		Included
Additional drive		_	-	-	
Software				_	-
Maintenance—	_	-		-	
Controller Interface	-	-	_	-	Yes
Interface Drive	-	Yes	Yes	Yes	res
Quantity discounts available	Yes			2rd quarter 1982	March 1980
	September 1978	September 1980	February 1982	2rd quarter 1982 60	30
First delivery, month, year	60	60	60	NA.	Over 500
Availability, days ARO	8000	3000	NA Factory	Factory	Factory
Number of drives installed to date	Factory	Factory	raciory		
Serviced by				See AMS 190	
100000000000000000000000000000000000000	See AMS 190	See AMS 190	See AMS 190	comments	
OMMENTS	comments	comments	Comments	and the contains and	

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All About Winchester Disk Drives

Demonstrate	ODEL Computer Memories CM 5206 CM 5412	SUPPLIER AND MODEL	ries Me	mputer Control 230 Se	Data Control Dat 240 Series
DEM			-	IBM Series /1	IBM Series/1
PRIMARY MARKET DEM	_	TERS INTERFACED			
Minchester disk only 5.25	OEM OEM	MARKET	OEM	End user	End user
Minchester disk only 5 25 5 25 14 14 15 15 15 15 15 1				Winchester d	Winchester plus
Disk diameter inches				only	floppy disk
CAPACITY Recording surfaces per driver unit 2		mater inches		14	14
Recording surfaces per drive unit 76		meter menes			
306 306	. 4	•	6	200 220	303 or 320
Package Pack	306 306	er surface	306 16 OM	9 3M 13 9M	or 9 3M 13 9M or
Final degree Fina		ANCE	1		
1 track mase		vement time-	3		7
Average index of 1.7 of tracks) make Across all tracks, make Across all tracks, make Average rotational fellar (1.2 rev.), make Data transfer all public protections of the protection of the pr		mean	90		
Acetage rotational delay (1-2 rev.) .msec Data transfer rate. bytes per second SOFTWARE SUPPORT ACKAGING Controller Formatter Interface No	a) msec 223 223	(move of 1/3 of tracks), msec	223		
Data transfer rate bytes per second problem with transfer per second with transfer per second problem proble	mul mean 8.33 8.33	estational dalay (1/2 ray) mear	9 2	8 3	
ACKAGING Controller No			542,500	1,208,750	
Controller Formatter No		E SUPPORT		Diagnostics	Diagnostics
Controller Formatter No		ıg.		No.	Vas
No No No No No No No Yes Yes Yes Drive units per controller Drive monthing OEM configuration OEM confi	No No		No.	1	
Interface No	No No		No	With controller	With controller
OEM configuration OEM configur	No No	-	No	Yes	Yes
OEM configuration OEM configur	4	ner controller	4	_	-
DEM configuration OEM co	4		4	-	
Separate 5 Separate 6 Separate 6 Separate 7 Separate 7 Separate 7 Separate 8 Included	OEM configuration OEM configuration		ion OEM confi	guration Rack	Rack
5 Separate	hes 3 25 x 5 75 x 8 0 3 25 x 5 75 x 8 0	ensions (h x w x d) inches	0 3 25 × 5 75	×80 19 25 × 19 × 2	4 19 25 x 19 x 24
Purchase price— Controller Formatter Included In	5 5	ht pounds	5 Separate	_	-
Auchas price Controller Formatter Included Inclu		ND AVAILABILITY			
Formatter Interface First drive Additional drive Software Additional drive Software Additional drive Software Controller Controller Ves					l
Interface First drive Additional drive Software Additional drive Software Administrative Software Administrative Forve Authority discounts available Ves Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	-		-		
First drive Additional drive Software S	-	-	1-		
Additional drive Software Joint Professor Software Joint Professor Software Joint Professor Software Joint Joint Professor Software Joint	\$1 370		62 140		
Software Maintenance—Controller Interface Drive Loanity discounts available Ves Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	- 41.725		- 140	- See Comments	See Comments
Controller Interface Drive Launtity discounts available Ves Yes Yes Yes Yes Yes Yes Yes Yes Yes Y			-		
Interface Drive untilly discounts available Yes Yes Yes Yes Yes Yes Yes Y		ce-			1
Drive ununtity discounts available Ves Yes Yes Yes Yes Yes Yes Yes Yes Yes Y		-	-	-	
Ves Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	_	1		-	-
mumber of drives installed to date proceed by MMENTS 30 2000 (all models) Factory 30 Customer or CDC In quantity of 50 prices for 9 3 MB 13 9MB and 63 2MB (33 9MB and 63 2MB (35 9MB) 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 2MB (35 9MB) 13 9MB and 63 2MB (35 9MB) 14 9MB and 63 2MB (35 9MB) 15 9MB and 63 2MB (35 9MB) 16 9MB and 63 2MB (35 9MB) 16 9MB and 63 2MB (35 9MB) 17 9MB and 63 2MB (35 9MB) 18 9MB and 63 2MB (3	Yes Yes	scounts available	Yes	Yes	Yes
mumber of drives installed to date proceed by MMENTS 30 2000 (all models) Factory 30 Customer or CDC In quantity of 50 prices for 9 3 MB 13 9MB and 63 2MB (33 9MB and 63 2MB (35 9MB) 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 10 150 prices for 9 3 mB 13 9MB and 63 2MB (35 9MB) 13 9MB and 63 2MB (35 9MB) 14 9MB and 63 2MB (35 9MB) 15 9MB and 63 2MB (35 9MB) 16 9MB and 63 2MB (35 9MB) 16 9MB and 63 2MB (35 9MB) 17 9MB and 63 2MB (35 9MB) 18 9MB and 63 2MB (3	March 1981 March 1981	y month year	March 105	1 1070	
umber of drives installed to date privided by 2000 (all models) Factory 2000 (all models) Pactory 2000 (all models)	30 30	days ARO		June 1979	June 1979
MMENTS MMENTS MATERIAL PROPERTY Factory Factory Factory Factory Factory Factory Factory Customer or CDC In quantity of 50 prices for 9 3MB 13 9MB and 63 2MB 13 9MB and 63 9MB 13 9MB and 63 9MB 13 9MB and 63 9MB 13 9MB and 63	2000 (all models) 2000 (all models)	drives installed to date 2		nodels) NA	NA
in quantity of 50 prices for 9 3MB prices for 9 3MB prices for 9 3MB 13 9MB and 63 2MB if 3 9MB and capacities are capacities are capacities are so from 5 10,200 s if and \$10,700 respectively fixed head floops disk powers		F			
in quantity of 50 prices for 9 3MB prices for 9 3MB prices for 9 3MB 13 9MB and 63 2MB if 3 9MB and capacities are capacities are capacities are so from 5 10,200 s if and \$10,700 respectively fixed head floops disk powers					
13 9MB and 63 2MB 13 9MB and 62 2MB 14 9MB and 62 2MB 14 9MB and 62 2MB 14 9MB and 62 2MB 15 9MB and 62 2MB and				In quantity of 5	
capacities are capacities are 57.800. \$8.300 sil 0.200 \$1 and \$10.150 and \$12.700 respectively fixed head floppir disk prosons are yields yield			1		
\$7,800 \$8,300 \$10,200 \$10 and \$10,150 and \$12,700 respectively fixed head floops disk persons are vides of SMB		1			
and \$10.150 and \$12.700 respectively respectively freep dead from the dead from the dead versions are video 0 6MB					capacities are
respectively respectively fixed head floops disk programmer floors and programmer floops disk programmer floors disk programmer floops disk programmer floors di					
fixed head floops disk presions are vides 0 6MB					
versions are vides 0 6MB					
					vides 0 6MB of
		1			

SUPPLIER AND MODEL	Control Data 9410 Finch	Control Data 9454/9455 Lark	Control Data 9730	Control Data 9775	33501/3350
COMPUTERS INTERFACED	-	Custom or SMD/ CMD-compatible	Custom	SMD-compatible	IBM S/370, 303X, 4300
PRIMARY MARKET	OEM	OEM	ОЕМ	OEM	End user
TYPE					
Style	Winchester disk	Winchester plus	Winchester disk	Winchester disk	Winchester disk
Disk diameter, inches	only 8	cartridge disk 8	only 14	14	14
CAPACITY					
Recording surfaces per drive unit	1 3 or 5	4	_	20	40 (2 HDAs)
Tracks per surface	605	202 plus 4	606 to 823	1686	1110
Unformatted capacity per drive unit, bytes	8M. 24M or 32M	8M	80M or 160M	675M	635M/1270M (2 HDAs)
PERFORMANCE	32W				
Head movement time-					
1 track, msec	10	10	14	10	4
Average (move of 1/3 of tracks), msec	50	25	40	25	25
Across all tracks msec	100	50	60	50	8.4
Average rotational delay (1/2 rev), msec	8 33	8 55 1 200.000	8.3	8 3 1 200 000	1,198,000
Data transfer rate, bytes per second	806,250	1,200,000	None		Diagnostics
SOFTWARE SUPPORT					
PACKAGING		No	No	No	CDC 38302 38304
Controller	No	No	100000	N-	With controller
Formatter	No	No	Separate	No	
Interface	_	Proprietary (9454).	- ,	Yes	Yes
No. of the Control of	1.	SMD (9455)	_	-	16
Drive units per controller	4	1	8	-	Stand-alone
Drive units per formatter Drive mounting		Rack	Separate chassis	Stand-alone cabinet	cabinet
Drive mounting	100 000 000		10 2 x 16 75 x 30	36.2 x 23 x 38	50 x 42 x 33
Drive dimensions (h x w x d) inches	4 16 x 8 57 x 14 25	5 18 x 8 58 x 21	85	635	760 to 900
Drive weight, pounds Power source for drives	Power supply optional	40 Separate	With drive	Internal	Internal
PRICING AND AVAILABILITY					
Purchase price—				-	\$42,063 to \$58,015
Controller	-	_	Special quote	-	With controller
Formatter	-	Included	_	Included	\$40,000 or \$50,000
Interface	-	See Comments	See Comments	\$15.650 (qty 51-100)	\$31.680 or \$41.680
First drive	See Comments	See Comments	-	-	531,000 Or 441,000
Additional drive	_	-	-	-	
Software	_				\$176 to \$226
Maintenance-	_			_	-
Controller	_	-	-	_	\$128 to \$220
Interface	-	Yes	Yes	Yes	-
Quantity discounts available	Yes	1st qtr 1981/1982	1977	3rd quarter 1980	1978
First delivery, month/year	December 1981	- St qt: . 301 . 1302	120	NA NA	NA
Availability days ARO	NA.	NA	NA CDC	Customer or CDC	CDC
Number of drives installed to date Serviced by	NA Customer or CDC	Customer or CDC	Customer or CDC	Customer of Coc	
COMMENTS	In quantity of 2000 prices for 8MB. 24MB, and 32MB capacities are	Removable disk cartridge provides 8 megabytes of additional storage, 9454 costs \$2,665	In quantity of 51-100, prices for 80MB and 160MB capacities are \$4,970 and \$6,195, respectively	bytes of zero seek time storage, dual channel option	Model A2 includes controller for up to 3 Model B2 drives. plug-compatible with IBM 3350. fixed-head option
	\$1,295, \$1,560, and \$1,755 respectively	in quantity of 1000: 9455 costs \$3,060 in quantity of 250		available	available, also see Report 7006-263-10

All About Winchester Disk Drives

SUPPLIER AND MODEL	Control Da 33801	eta	Corona Starfire	5	Corvu 6X	_	Corvi 11X	_	Corvi 20X
COMPUTERS INTERFACED	IBM S/370		Apple II		See Comments		See Comment	5	See Comment
PRIMARY MARKET	End user		Dealer, OEM, large end user		OEM, dealer		OEM, dealer		OEM, dealer
PHIMARY MARKET					Winchester disk		Winchester dis		Winchester diss
TYPE	Winchester disk		Winchester disk		only		only		only 8
Style	only 14		5 25		5 25		8		
Disk diameter inches	2.0	- 1					3		5
CAPACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, bytes	30 1110 or 1616 635M or 800M (2 HDAs)	- 1	4 153 5M		4 144 6 9M		380 11 3M		380 20 5M
PERFORMANCE				- 1		- 1.	5		6
Head movement time— 1 track msec	10	13		1	3 125		35		35
Average (move of 1/3 of tracks), msec	25	19	98 !51	- 1	240		5		65 8 3
Across all tracks, msec	50 8 4	8	3	- 1	6 25	18	3 48.000		648.000
Average rotational delay (1/2 rev.), msec Data transfer rate, bytes per second	1,198,000	6	25,000	- 1	960,000	- 1	terface diag-		nterface diag-
SOFTWARE SUPPORT	Diagnostics	di di	xtended DOS 3. CP/M. tilities. agnostics. itialization		nterface, diag- nostics		ostics		ostics
PACKAGING	CDC 38302	In	cluded	1	es	Ye	s	Ye	es
Controller	personal representation of the second			V	es	Ye	s	Ye	rs .
Formatter	With controller		cluded			Ye		Ye	15
Interface	Yes	Inc	luded	Y	25		•	1	
Drive units per controller	16	1		4		4		4	
Drive units per formatter	_	Sou	parate chassis		parate chassis	Sei	arate chassis	Se	parate chassis
Drive mounting	Stand-alone cabinet			1			×85×245	5.5	x 8 5 x 24 5
Drive dimensions (h x w x d), inches Drive weight, pounds Power source for drives	50 x 42 x 33 900 to 1100 Internal	20	8 x 13 5 ernal	5	25 x 5 75 x 8 ernal	27	rnal	27	ernal
RICING AND AVAILABILITY				1					
Purchase price —	\$43,400 to \$50,200	Incl	uded	Inc	luded	Inch	uded		uded
	With controller	Incl	uded	Inc	luded	Inch			uded uded
Interface	ncluded	Inch	uded		luded 195	s4.9	10e0 95	\$5.5	
First drive	644 930 636 610	\$2.5	995	33,	195	-		-	
Additional drive Software		Inch	uded	Inc	luded	Inclu	ded	Inclu	ided
faunten ance						-		-	
Controller	179 to \$205	_				_		-	
Interface Drive	128 to \$170	-		-		-		Yes	
uantity discounts available		Yes		Yes		Yes			
rst delivery month year	977		uary 1982		rch 1981	1980 30 to		1980 30 to	
vailability days ARO		30 NA		30 I	to 6 0	NA NA	60	NA NA	160
umber of drives installed to date	DC		ory or dealer		ler or factory	Deale	er or factory	Deale	er or factory
erviced by			CALAN CONTRA						
C 3 3 P W	lodel A2 includes ontroller for up to Model B2 drives, lug-compatible inth IBM 3350, ked-head option railable, also see eport 7006-263-14	softv		able of si incluance & III Command drive	for a number mall computers iding Apple II IBM Personal puter. TRS-80 Xerox 820 e is manufac- d by IMI	See ! Comr	Model 6X nents	See M Comm	Model 6X nents

APRIL 1982

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SUPPLIER AND MODEL	Cyberchron CHD-11	Cyberdata Wave 80 Model 11	Cyberdata Wave 80 Model 22	Cynthia Peripheral Corp. D 160 Series	Dastek 4830 Series
COMPUTERS INTERFACED	DEC LSI-11				
	and custom	Xerox 820. IBM Personal Computer	Xerox 820 IBM Personal Computer	Custom	16 and 32 bit minicomputers
PRIMARY MARKET	OEM end user	End user, OEM	Fod Orta		
TYPE		Land Gazir, GER	End user, OEM	OEM	OEM
Style	Winchester disk	Markey B			
Disk diameter inches	only	Winchester, floppy disk opt	Winchester, floppy disk opt	Winchester disk	Winchester disk
Disk diameter, inches	8	8	8	11.5	only 14
CAPACITY					20.0
Recording surfaces per drive unit Tracks per surface	3 plus servo	4	8	4 6 or 8	3 5 or 6
Unformatted capacity per drive unit, bytes	600 plus 14 spare 24M	244	244	1176 plus 1	1646
	24101	11 7M	23 4M	60M, 90M, or	202 2M, 337 1M o
PERFORMANCE				120M (formatted)	404 5M
Head movement time— 1 track, msec	8				
Average (move of 1/3 of tracks) msec	42	19 70	19	10	5
Across all tracks, msec	80	140	140	40	25 55
Average rotational delay (1/2 rev.), msec	8 3	10 6	10 6	83	16 B
Data transfer rate, bytes per second	800,000	See Comments	See Comments	920,000	1.200.000
SOFTWARE SUPPORT	DEC RL01 and RL02 emulation	Full disk utilities for file management	Full disk utilities for file management		Diagnostics
PACKAGING Controller	Included	Yes	Yes		
	Control of the Contro		tes	Optional	No
Formatter	Yes	Yes	Yes	-	No.
Interface	Yes	Yes	Yes	_	SMD
Drive units per controller	4	,			
Drive units per controller Drive units per formatter	4	1	1		
Drive mounting	Separate chassis	Desk top	Desk top	-	Rack
Drive dimensions (h x w x d), inches	5 25 x 19 x 22	8 75 × 18 5 × 19 75	8 75 x 18 5 x 19 75	56 x 12 2 x 21 8	10 1 x 17 75 x 29
Drive weight pounds Power source for drives	45 Included	33 Internal	36 Internal	53 Separate	120 Internal
PRICING AND AVAILABILITY					
Purchase price —					
Controller	Included	-		\$980	1-
Formatter	-	-	-	Included	-
Interface First drive	\$6 495	\$6.200	\$7 200	See Comments	Contact vendor
Additional drive	\$3.995	-	-	-	-
Software	-		_	-	
Maintenance — Controller			_		-
Interface	-	_		-	-
Drive	-	ū.	Yes	Yes	Yes
Quantity discounts available	Yes	Yes	res		C. C. C.
First delivery month/year	February 1981	January 1982	January 1982	1981	October 1981 Contact vendor
Availability days ARO	30	45	45	60 NA	NA
Number of drives installed to date	Over 50	6 Cyberdata	10 Cyberdata	Cynthia	Customer
Serviced by	Factory	CAberdata	Субегана	Peripheral	
COMMENTS	A 40MB model and a 22-bit Q bus address will be available in the 2nd quarter of 1982	Data transfer rate is 58K bytes sec for IEEE 488 inter face 60K bytes sec for 8-bit parallel interface and 150 to 19 200 bits sec for RS 232 interface 1MB floppy disk opt.	See Model 11 Comments	Quantity 100 prices range from \$3.160 to \$3.720 can be intermixed with other Cynthia disk drives on same controller manu- factured by Cii Honeywell Bull	Includes thin film heads.

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All About Winchester Disk Drives

and AQS VS lain- guages and file structures No. Yes Ves Ves Ves Formatter No. Yes In controller In controller No. Yes In controller No. Yes In controller In contro	SUPPLIER AND MODEL	Dastek 4835 Series	Data General 6063, 6064	Data General 6098, 6099, 6100, 6103	Data General 6101, 6102, 6104, 6105	Data Genera 6160, 6161
TYPE Sylve Data dameter inches Caractify Recording surfaces per drive unit Tracks per surface Unformatific capacity per drive unit. 184 184 184 3	COMPUTERS INTERFACED				DG microNova	
Dask dameter inches	PRIMARY MARKET	OEM	End user OEM	End user OEM	End user OEM	End user, OEM
Dask diameter unches	TYPE					
Dask dameter inches	Style					
Tracks per surface 156	Disk diameter inches		14			
Tracks per surface 2 or 4 3 or 7 384 3	CABACITY					100
1646 322 M. 337 1M or 404 5M FREFORMANCE First delivery month year Availability Park hase Contact vendor Park hase P		3.5 or 6	2	2 or 4	2 or 4	
Description	Tracks per surface	1646	32 or 64 plus 2	384	384	823
PERFORMANCE Head movement time— 1 15 5 5 5 5 5 5 5		202 2M 337 1M	-	=	-	73M, 147M
First Authority First Fi						
1 track mase					1	
25	Head movement time—			16	16	5
130	1 track msec		_			20
10.1 10.2 10.3 10.1 10.2 10.3 10.3 10.5			_	130		55
Data transfer rate bytes per second Diagnostics Diagnos	Across all tracks, msec		10.2			
Diagnostics and ADS VS Jandard Multiprogramming systems and multiprogramming systems and MP OS and MP OS systems and MoS VS plus languages and unlities diagnostics. When the programming systems are programming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems. The programming systems are programming systems and multiprogramming systems and multiprogramming systems. The programming systems and multiprogramming systems and multiprogramming systems are programming systems. The programming systems are programming systems and multiprogramming systems are programming systems. The programming systems are programming systems and multiprogramming systems are programming systems. The programming systems are programming systems are programming systems and unlited in controller. The controller and controller and controller and controlle	Average rotational delay (1/2 rev.) msec	2000000	910.000	910,600		1 209 000
ADS-VS languages and file structures ADS-VS languages and file structures ADS-VS plus languages and utilities ADS-VS plus languages and uti	Data transfer rate, bytes per second	2.00.00	310,000	3.000	3.0.00	. 203.000
Formatter No No Yes In controller No No Yes In controller Interface SMD Yes In controller In controller In controller In controller No No Yes In controller In controller No controller No controller No controller No controller No Yes In controller No controller No controller No controller No controller No controller No Rack	SOFTWARE SUPPORT	Diagnostics	and AOS/VS lan- guages and file	and multiprogram-	and MP/OS	AOS VS plus languages and
Formatter No No Yes In controller No No Yes In controller Interface SMD Yes In controller In controller No	PACKAGING					
Interface SMD Yes In controller In controller With controller Drive units per controller Drive units per controller Drive dimensions (h. x. w. x. d), inches Drive weight pounds Power source for drives Included	Controller	No	Yes	Yes	Yes	Yes
Interface SMD Yes In controller With controller With controller	Enimattes		w.			
Drive units per controller Drive units per formatter Drive dimensions (h x w x d), inches Drive dimensions (h x w x d), inches Drive weight pounds Drive dimensions (h x w x d), inches Drive weight pounds Drive dimensions (h x w x d), inches Drive weight pounds Drive dimensions (h x w x d), inches Drive dimensio			Yes	In controller	In controller	With controller
Driver dumins per formatter Driver dumensions (h x w x d), inches Driver dumensions (h x x y x d) Driver dumensions (h x x x d) Driver dumen	Interface	SMD	Yes	In controller	In controller	With controller
Driver dimensions (h x w x d), inches Driver dimensions (h x w x d), included Incl	Drive units per controller		4	1	1	2
Drive dimensions (h.x.w.x.d), inches Drive weight pounds Power source for drives 10.1 x 17.75 x 29.29 120 Internal 10.5 x 19 x 28.09 175 Included		-		-	_	
Drive weight pounds Power source for drives Power source for drived Power source for drives Power source for drived Power source for drives Power sour	Drive mounting	Rack	Rack	Rack	Rack	Rack
Drive weight pounds Power source for drives Power source for drived Power source for drives Power source for drived Power source for drives Power sour	Drive dimensions this will dinches	10 1 = 17 75 = 20 20	0.75 - 10 - 27	10 5 10 20 20	10 5 10 20 20	
PRICING AND AVAILABILITY Purchase price— Controller Formatter Interface First drive Additional drive Drive Controller Interface Controller Interface First drive Additional drive Dr						
PRICING AND AVAILABILITY Purchase price— Controller First drive Additional drive Software Maintenance— Controller Interface Included Inclu						
Purchase price— Controller Formatter Included In			10000000		The ladded	wicioneo.
Purchase price— Controller Formatter Included In	PRICING AND AVAILABILITY					
Controller First drive Additional drive Software Maintenance Controller Interface Prist drive Maintenance Controller Interface Drive Underface Prist drive Additional drive Maintenance Controller Interface Drive Underface Drive Availability days ARO Number of drives installed to date Serviced by Included Inc						
Formatter Interface Included Included Security of the Contact vendor Included Security of	Controller	_	Included	to do do d		1.00000.0000000
Included Included Service Prist drive Additional drive Software Software Included Service Software Included						
First delivery month war Awaitability days ARO Number of drives installed to date Serviced by Comments of the Serviced by Comments and the Comments of the Serviced by Com			Included			
Additional drive Software S7,900 to \$11,900 Varies Varies		Contact wender				
Software Maintenance— Controller Interface Drive Quantity discounts available Quantity discounts availa		Compet vendor	\$7,000 to \$13,900	90.U5U to \$11,220	\$5,720 to \$11,220	\$18,000 to \$24.0
Agries Varies Varies Varies Varies Varies Controller Included Incl				T	-	\$14 500 to \$20.5
Controller Interface Drive First delivery month: war Awaitability days ARO Number of drives installed to date Serviced by Duta General Duali-porting optional both models can be intermixed on same controller can be used with 10 MB sec burst multiplever channel channel program			varies	Varies	Varies	Varies
Interface Drive Ouantity discounts available Ves Up to 40% Ves August 1979 90 NA NA Data General Dual porting optional both models can be used with 10 MB sec burst multiplever channel channel program			In all of a d			1
Orwaterly discounts available Yes Ves Up to 40% Up to 40% Ves Preside livery month, war Availability days ARO Number of drives installed to date Serviced by NA Customer Customer Included April 1982 Contact vendor NA Customer Customer Customer Customer Customer Customer Dual-porting optional both models can be intermixed on same controller can be used with 10 MB sec burst multiplexer channel channel program						
Objectively month, war Available First delivery month, war Availability days ARO Number of drives installed to date Serviced by Includes thin film heads Includes thin fi		-				
First delivery, month, year Availability: days ARO Availability: day		Yes	\$90 to \$125	\$47 to \$85		
Availability days ARO NA NA Customer Contact vendor NA Customer Contact vendor NA Data General Dual porting optional both models can be intermixed on same controller can be used with 10 MB sec burst multiplever channel channel program	are in a second around	1.565	Op 10 40%	Up to 40%	Up to 40%	Yes
Availability days ARO NA NA Customer Contact vendor NA Customer Contact vendor NA Data General Dual porting optional both models can be intermixed on same controller can be used with 10 MB sec burst multiplever channel channel program	First delivery month year	April 1982	November 1977	August 1979	August 1070	
NA Customer Data General Data G	Availability days ARO			90	andres 1979	January 1982
OMMENTS Includes thin film heads Includes thin film heads Dual porting optional both models can be intermixed on same controller can be used with 10 MB sec burst multiplever channel channel program	Number of drives installed to date					
OMMENTS Includes thin film heads Dual porting optional both models can be intermixed on same controller can be used with 10 MB sec; burst multiplever channel; channel program	Serviced by	Customer				
heads to only open models can be intermised on same controller can be used with 10 MB sec burst multiplever channel channel program				Don't General	Data General	Data General
heads to all point models can be intermised on same controller can be used with 10 MB sec burst multiplexer channel channel program	OMMENTS	Includes then file		1		
can be intermixed on same controller can be used with 10 MB sec burst multiplexer channel channel program	J. T.		Dual-porting op-	1		
on same controller can be used with 10 MB sec burst multiplexer channel, channel program		neads	tional both models			1
can be used with 10 MB sec Durst multiplexer channel channel program			can be intermixed			
MB sec burst multiplexer channel, channel program						
multiplexer channel, channel program						
channel program			MB sec burst			
channel program			multiplexer channel.		1	
				1		

70D6-010-50s Memory & Storage

SUPPLIER AND MODEL	DMA Systems Micro Magnum 5/5	Fujitsu M2280 Series	Fujitsu M2301B. M2301K	M2302B M2302K	M2311. M2312
COMPUTERS INTERFACED		-	-	-	- 10-909
PRIMARY MARKET	OEM	OEM	ОЕМ	OEM	OEM
				Winchester disk	Winchester disk
YPE Style	Winchester plus	Winchester disk	Winchester disk	only	only B
Disk diameter inches	cartridge disk 5 25	14	8	8	
				8	4 7
APACITY Recording surfaces per drive unit	4	2 5 2 4 or 5	4 244	244	589
Tracks per surface	306 plus 5 spares	1646 84 3M 67 4M	11.7M	23 4M	48 3M 84 4M
Unformatted capacity per drive unit bytes	6 75M	134 8M or 168 6M			
PERFORMANCE	1			1	
Head movement time— 1 track msec	3	6	30		5 20
Average (move of 1/3 of tracks) msec	40	27	70		40
Across all tracks msec	80	10 12	10 1	10.1	8 3
Average rotational delay (1 2 rev.), msec Data transfer rate, bytes per second	6 625 000	1 012 000	592 800	592,800	1.228.000
	None	None	None	None	None
OFTWARE SUPPORT	None	None			
ACKAGING Controller	No	No	See Comments	See Comments	No
		No	See Comments	See Comments	No
Formatter	No	-			SMD
nterface	No	SMD	See Comments		
Drive units per controller	4	8	4 or 1	4 or 1	8
Orive units per formatter Orive mounting	A Rack or table top	Rack	Floppy compatible	Floppy compatible	Floppy compatible
Drive dimensions (h x w x d), inches	3 25 × 5 75 × 10 5	98 × 164 × 256	44×85×14	44×85×14	51 x 8 5 x 15
Drive weight pounds	9	100	14 or 15		20
Power source for drives	-	Separate	Separate	Separate	Separate
RICING AND AVAILABILITY			1		
Controller		_	I I		
Formatter	-		- 1	and a	-
Interface	\$2 200	-	Contact vendor	Contact vendor	Contact wender
First drive Additional drive	\$2,200	Contact vendor	Contact venoor	—	- Contact Window
Software	-	-	-	_	-
Aaintenance					
Controller Interface		_			
Drive	***		_	_	_
Quantity discounts available	Yes	Yes	Yes	Yes	Yes
irst delivery month, year	March 1982	4th quarter 1979	August 1980	August 1980	December 1980
wailability days ARO	90	90	90	90	90
umber of drives installed to date	NA C	NA	NA	NA	NA
erviced by	Customer	Fujitsu, customer	Fujitsu, customer	Fujitsu, customer	Fuptsu, customer
OMMENTS	Cartridge disk drive provides 6.75 mega- bytes of additional storage, Winchester features non-contact heads, embedded servo system	Optional fixed heads provide 655K bytes of storage	M2301K includes integral controller / formatter and requires PCB adapter for computer interface, M2301B, has SA 4000 interface, no controller	M2302K includes integral controller formatter and requires PCB adapter for computer interface. M2302B has SA 4000 interface, no controller	

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All About Winchester Disk Drives

SUPPLIER AND MODEL	Peripherals DP-400	Deta Systems Design DSD 880X 8	Deta Systems Design DSD 880X 20	Data Systems Design DSD 880X/30	Digital Equipment Corp RM80
COMPUTERS INTERFACED	-	DEC POP 11 LSI 11	DEC POP 11 LSI 11	DEC POP 11 LSI 11	DEC VAX 11 750 VAX-11 780
PRIMARY MARKET	OEM	OEM	OEM	OEM	End user
TYPE				100.0	
Style	Winchester disk	Winchester plus	Winchester plus	Winchester plus	Winchester disk
Disk diameter inches	only	floppy disk	floppy disk	floppy disk	only
	8	8	8	8	14
CAPACITY					
Recording surfaces per drive unit Tracks per surface	4	4	6	8	7 plus 1 servo
Unformatted capacity per drive unit, bytes	852 plus 12 spares 46 4M	256 10M	256 30M	256 40M	124M (formatted)
PERFORMANCE	10 411	TOM	30M	4UM	124M (formatted)
Head movement time					
1 track msec	15	19	15	15	6
Average imove of 1/3 of tracks), msec	60	47	60	65	25
Across all tracks misec	150	107	100	100	50
Average rotational delay (1 2 rev.) msec Data transfer rate, bytes per second	8 3 875.000	9 6 204 000	204 000	10 204 000	8 3 1 200 000
	8/5,000	204.000	204.000	204.000	120000
OFTWARE SUPPORT	None	Handlers, diag	Handlers, diag-	Handlers, diag	Diagnostics
		nostics	nostics	nostics	
	1		1		
ACKAGING			1		1
Controller	Optional	Yes	Yes	Yes	Yes
	1	1			
Formatter	Optional	No	No	No	Yes
interface	-	Yes	Yes	Yes	Yes
Drive units per controller	4	2	2	2	8
Drive units per formatter	4	2	2	2	8
Drive mounting	Separate chassis	Separate chassis	Separate chassis	Separate chassis	Stand-alone cabine
Drive dimensions (h x w x d) inches	4 62 × 8 55 × 14 25	5 25 x 17 6 x 23 75	5 25 x 17 6 x 23 75	5 25 × 17 6 × 23 75	39 x 21 5 x 33
Drive weight pounds	15.8	56 5	56 5	56 5	370
Power source for drives	Separate DC only	Internal	Internal	Internal	
RICING AND AVAILABILITY					
Purchase price —	1				
Controller	Contact vendor	Included	Included	Included	Included Included
Formatter	-	-		-	Included
Interface First drive	Control mades	s6 895 (2 drives)	Included \$8.545 (2 drives)	Included \$9 195 (2 drives)	\$19.900
Additional drive	Contact vendor	36 895 (2 Grives)	- 545 (2 drives)	-	
Software		Included	Included	Included	-
Maintenance -					
Controller					
Drive		-	-	_	pon.
uantity discounts available	Yes	Yes	Yes	Yes	-
	January 1982	November 1980	November 1981	October 1981	1981
rst delivery month year vailability days ARO	60 1982	30	30	30	772
umber of drives installed to date	NA	NA			NA DEC
rviced by	Factory	Factory	Factory	Factory	DEC
MMENTS	Can be daisy chained				Available with dual access feature for
	with DP 100				\$22,000
	removable- media drive				
	media drive				
			- 1		

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SUPPLIER AND MODE		M23	51A	5330/6	331	5350/5	351	5660/1	is 5661	Hewlett-Paci 7908
COMPUTERS INTERFACED		-		Harris H80 to		Harris H80 to		Harris H80 to	,	HP 250 6400
PRIMARY MARKET				1		THE CO		H800		9845 1000 L E
TYPE		OEM		End user		End user		-		
Style						1		End user		End user OEM
Disk diameter, inches		Winchester d	isk	Winchester de	i k	Winchester dis		Winchester de	s.i.	Winchester plus
CAPACITY		10 5		14		only 14		only 14		cartridge tape
Recording surfaces		10					- 1	12		0
Tracks per surface Unformatted capacity per drive unit, b		1684		5 823		5		20		5
PERFORMANCE Head movement time	ytes	474 2M		82 9M		1646 165 9M		1686 675M		374 plus 6 spares 20 5M
	- 1	5	- 1				- 1			
Average (move of 1/3 of tracks) mse Across all tracks, msec	rc	18		7 30	- 1	7		10	- 1	5
Average rotational delay (1, 2 rev.), ms Data transfer rate bytes per second	ec	35 7 5		55 9 33		55	15	95 iO		41 6 70
bytes per second		1.859.000	- 1	209.000		8 33 1 209 000		200.000	- 1	8 33 537 600
SOFTWARE SUPPORT	- 1	None		Dagnostics	- 1	Diagnostics	- 1	agnostics		
	1		1"	nitializing etc		nitializing etc	10	raynostics	- 13	Driver initializer diagnostics
PACKAGING	-				- 1		- 1			
Controller	N	0	lu	Ath 5330 drive	1.	Vith 5350 drive				
Formatter	N	0	Ye		-			ith 5660 drive	1	'es
Interface		M D				es	Ye	s	V	Vith controller
Orive units per controller		•10	Ye	5	Y	es	Ye	s	Y	es
Drive units per formatter Drive mounting	8		8		8		8		1	
	Ra	Ck .	Up	to 4 per cabine	t Up	to 4 per cabine	Sta	nd-alone cabir	net S	and alone cabinet
rive dimensions (h x w x d), inches trive weight, pounds	10	4 x 17 2 x 24	10	2 × 16 75 × 30	10	2 × 16 75 × 30		2 × 23 × 38	or	rack
ower source for drives	Inte		85 Inte	ernal	85	ernal	635	rnal	Se	e Comments e Comments
ICING AND AVAILABILITY	1						1		int	ernal
ontroller							1			
ormatter	1-			uded	Inci	luded	Incl	uded		
terface				ided ided	Inci	uded	Inch	ded		
rst drive dditional drive	Cont	act vendor	\$21	900 (5330)	528	uded 3 300 (5350)	Inch	ded 000 (5660)	1 -	
oftware	-			500 (5331)	\$20	900 (5351)	\$40	000 (5661)	\$9	900
intenance— entroller			Inclu	ded	incl	uded	Inclu	ded	-	
erlace	-		Inclu		Inch	ded	Inclu	ded		1
ive			Inclus	ded to \$150	Inclu		Inclu	ded		
intity discounts available	Yes		No	10 9 150	No.	0 to \$160	5317 No	to \$475	\$46 Yes	
delivery month year lability days ARO		arter 1982	2nd g	uarter 1981	1st a	uarter 1982			1	
ber of drives installed to date	90 NA		NA		-	1362	15t qu	arter 1981	Sept 70	ember 1981
iced by		customer	Harns		NA Harris		NA		NA	
					Harris		Harris		Hewl	ett Packard
MENTS			Disk Co Model	tarris Universal ontroller 5330 includes ler Model	Disk (Model	Harris Universal Controller 5350 includes iller Model	versal troller		meas	Jalone model ures 28 4 x 14 Linches and
			5331 is only, dr manufa	disk drive ive is ctured by	5351 only dimanuf.	is disk drive frive is actured by	troller is disk	Model 5661 drive only manufac	rack n	nounted model ures 7 x 19 x d weighs
		-	Control	Uata	Contro	Data	tured b Data	Control	81 6 II	os weigns

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APRIL 1982

All About Winchester Disk Drives

P 250 1000 Sp85 64000 Sp8	SUPPLIER AND MODEL	Hewlett-Packard 7911	Hewlett-Packard 7912	Hewlett-Packard 9134A	Hewlett-Packard 9135A	Hitachi DK62- 10/20/40/80
Page 26 1000 2000 B845 64000 2000 B845 640	3011 22.11					Modeland SMO of
End user OEM Vinchester plus carridge tage Vinchester disk only tage tage tage tage tage tage tage tage	COMPUTERS INTERFACED	HP 250: 1000, 3000, 9845, 64000	HP 250 1000 3000 9845 64000	9845 9835 9825T 85 87	85 87 125 1000 L	Diable
Mynchester plus carridge tape 14 Dak dameter inches 14 Dak dameter inches 14 Dak dameter inches 14 Dak dameter inches 15 Dak dameter inches 16 Dak dameter inches 16 Dak dameter inches 17 Dak dameter inches Dak dameter inches 18 Dak dameter inches	PRIMARY MARKET	End user, OEM	End user OEM	End user	system OEM	-
Dusk dameter inches Dusk dameter inches Dusk dameter inches Surfridge tape 14 15 25 15 25 14 8 16 27 2 plus 8 spares 37 2 plus 8 spares 37 3 5M 15 0 plus 4 spares 4 15 0 plus 4 spares 6 4M 15 0 plus 4 spares 6 4M 15 0 plus 2 spares 6 4M 15 0 plus 2 spares 6 4M 15 0 plus 2 spares 6 4M 15 0 plus 4 spares 6 4M 15 0 plus 2 spares 6 4M 15 0 plus 4 spares 6 4	TVBE		Mochester plus			
Dak dameter inches Ida Ida Ida Ida Ida Ida Ida Id			cartridge tape		5 25	
APACITY STATES OF The West of the Controller Strates per drive unit. Experimental departs per drive unit. Experimental per drive unit. Experimental departs per	Disk diameter inches	14	14	5 2 3		
10 10 10 10 10 10 10 10					4	2 4 8 16
1	Recording surfaces per drive unit	2 572 plus 8 spares 31 5M	4 572 plus 8 speres 73 5M			10 8M 21 7M
1 1 2 2 2 3 3 3 3 3 3 3	PERFORMANCE					10
1 track, misse. Average involves make averag	Head movement time-	6	5			37
Average involve of 1 and 1 facts. In a fact states and a fact stat	1 track msec		26 7		173	
Driver initializer diagnostics operand between the present of the maintenance system exerciser operand the maintenance operand the maintenance system exerciser operand the maintenance operand to included include	Average (move of 1/3 of tracks), msec		50			10.1
Data transfer rate, bytes per second SOFTWARE SUPPORT Driver initializer diagnostics Driver initializer diagnostics copy and file maintenance, system exerciser None PACKAGING Controller Not included	Average rotational delay (1 2 rev.), msec	8.3	8.3	50 000		889.000
Controller Included Include	Data transfer rate, bytes per second	Driver initializer	Driver initializer	diagnostics copy and file maintenance.	diagnostics copy and file maintenance	None
Mith controller With controller With controller Mith contr	PACKAGING		Included	Included	included	No
Interface HP IB HP IB IEEE-488 IEEE-488 Fes	Controller		(1)		Included	No
Drive units per controller Drive dimensions (h.x.w.x.d), inches Drive weight, pounds Drive units per controller Drive dimensions (h.x.w.x.d), inches Drive weight, pounds Drive units per controller Drive dimensions (h.x.w.x.d), inches Drive weight, pounds Drive dimensions (h.x.w.x.d), inches Drive weight, pounds Drive units per controller Drive dimensions (h.x.w.x.d), inches	Formatter	With controller				
Drive units per controller Drive units per formatter Drive mounting Drive dimensions (h.x.w.ed) unches Drive dimensions (h.x.w.ed) unches Drive weight pounds Drive we	interface	HP IB	HP IB	IEEE-488	IEEE 488	res
Drive dimensions (h x w x d), inches Drive weight, pounds per developed provided included inc	Drive units per controller	1	1	1	1	-
Stand alone cabried or rack See Comments Stand alone cabried or rack See Comments See Comment See Comments See C	Drive units per formatter	1	1	1	1	Computer chasses
See Comments See See Com	Drive mounting			Stand-alone unit	Stand-alone drin	Compater criassis
See Comments See Comments See Comments See Comments Internal			Great Comments	51 × 16 7 × 18 7	51 x 167 x 187	11 4 x 17 x 28 4
Drive weight pounds Internal	Drive dimensions (h x w x d), inches		See Comments		32.5	77 8 or 106 7
Purchase price— Controller Formatter Included In	Drive weight, pounds Power source for drives					
Purchase price— Controller Formatter Included In	PRICING AND AVAILABILITY					
Included	Purchase price	1				
System specific First drive \$12,500 \$15,000 \$10,000 \$10,000 \$10,000 \$10,000 \$10,000 \$10,000 \$10,000 \$10,000 \$10,000 \$10,000 \$1						
Additional drive \$12,500 \$15,000 \$15,			Encluded Control			_
Additional drive Software System specific Maintenance Controller Included System specific System specific Included System specific Included Include		system specific	\$15,000			Contact vendor
Software Maintenance— Controller Included System specific Linched System specific System speci			\$15,000	34.300	25.500	Contact vertical
Maintenance		System specific	System specific	Computer dependent	\$0 to \$500	_
Controller Included I						
September 1981 Commendation of the september		Included		Included	Included	_
Drive Drive S43	Interface	System specific			Included	-
First delivery month year Availability days ARO November 1981 70 70 70 November 1981 November 1982 November 1981 Novem						_
Availability days ARO Number of drives installed to date 70 NA Hewlett Packard 81 A Hewlett Packard 82 Stand alone model measures 28.4 x 14 x 29 1 inches and weighs 188 ibs rack mounted model measures 12.5 x 19 x 27.8 inches and weighs 188 ibs nad weighs 188 ibs rack mounted model measures 12.5 x 19 x 27.8 inches and weighs 188 ibs nad weighs 188 ibs	Quantity discounts available	Yes	Yes	Yes	Yes	_
Awailability days ARO NA Hewlett Packard NA NA Hewlett Packard NA Hewlett Packard NA Hewlett Packard NA Hewl	First delivery month year	November 1981	November 1981	January 1982	lanuary 1982	September 1972
NA Hewlett Packard NA NA Hewlett Packard NA Hewlett	Availability days ARO			6 weeks		
Newlett Packard Hewlett Packard Hewlett Packard Hewlett Packard Hewlett Packard Hewlett Packard Customer	Number of drives installed to date		NA			12 000
measures 28.4 x 14 x 29.1 inches and weighs 188 bs. rack mounted model measures 12.25 x 19 x 27.8 inches and weighs 148 ibs. 20 x 28 inches 30 x			Hewlett Packard	Hewlett-Packard		
measures 28.4 x 14 x 29.1 inches and weighs 188 bs. rack mounted model measures 12.25 x 19 x 27.8 inches and weighs 148 ibs 19 x 27.8 inches and weighs 148 ibs and w						
x 29 1 inches and weighs 188 bs. weighs 188 bs. weighs 188 bs. weighs 188 bs. additional storage and has a data track mounted model model model and has a data transfer rate of 19 x 278 inches and weighs 148 bs. and weight	COMMENTS			1		
weighs 188 bs. fack mounted mosel measures 12.25 x 19 x 278 inches and weighs 148 bs. and weighs 148 bs. and weighs 148 bs. and weighs 148 bs. weighs 188 bs. additional storage and has a data transfer rate of 19 x 278 inches and weighs 148 bs. and weighs 148 bs. and weighs 148 bs.				1		available
rack mounted model and has a data measures 12.25 s measures 12.25 x transfer rate of 19 x 27.8 inches and weighs 148 bs and weighs 148 bs						
measures 12 25 x 19 x 27 8 inches and weighs 148 lbs						
19 x 27 8 inches and weighs 148 bs and weighs 148 bs and weighs 148			measures 12.25		and has a data	
and weighs 148 bs and weighs 148 second						
lbs.			and weighs 148			
			ibs		2.000	

SUPPLIER AND MODEL	Hitachi DK801-1, DK801-2	Hitachi DK811-2, DK811-4	Hitachi DK811-8	Hitachi DKU-95I	Hitachi DKU-97I
COMPUTERS INTERFACED	Modified SMD	Modified SMD	Modified SMD	Hitachi, IBM 370	Hitachi, IBM 370
PRIMARY MARKET					
	OEM	OEM	OEM	OEM	OEM
TYPE			OEM	OEM	OEM
Style	Winchester disk	Winchester disk			
Disk diameter inches	only	only	Winchester disk only	Winchester disk	Winchester disk
	8	8	8	only 14	only 14
CAPACITY				2.5	122
Recording surfaces per drive unit Tracks per surface	2.4	3 6	11		
Unformatted capacity per drive unit bytes	230 plus 1 spare 6 9M 13 9M	521 plus 1 spare 23 5M. 47M	526 plus 2 spares 89M	30 (2 HDAs) 1110 665M (2 HDAs)	40 (2 HDAs) 1666 1330M
PERFORMANCE			1	Paragraph of the same of the s	(2 HDAs)
Head movement time					
1 track, msec	30	12	12	6	6
Average (move of 1/3 of tracks), msec Across all tracks, msec	70	25	25	20	20
Average rotational delay (1. 2	150 8 4	55 8 4	55	45	45
Data transfer rate bytes per second	889 000	889.000	904.000	8 4 1 198 000	1 198 000
SOFTWARE SUPPORT	None	None			
	None	None:	None	Diagnostics	Diagnostics
PACKAGING Controller					
Formatter	No No	No No	No No	Included with drive	Included with drive
		INO.			
Interface	Yes	Yes	Yes	Yes	Yes
Drive units per controller Drive units per formatter	-	-	-	4	2
Drive mounting	Computer chassis	Computer chassis	Computer chassis	Separate chassis	Separate chassis
Drive dimensions (h x w x d), inches	57 x 9 5 x 15 2	65×95×152	79×95×152	44 5 × 47 2 × 33 3	46 1 × 62 6 × 33 5
Drive weight pounds Power source for drives	22 Separate	33 Separate	39 5 Separate	1025 From first drive	1350 From first drive
PRICING AND AVAILABILITY					
Purchase price—					
Controller	-	-	-	Contact vendor	Contact vendor
Formatter Interface	_		1=		_
First drive	Contact vendor	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Additional drive	-)—O	-	-	-
Software	-	_		-	-
Maintenance Controller	_	_		_	-
Interface	_	_	-	-	-
Drive	-	-	-	-	-
Quantity discounts available	_	-		_	
First delivery month year	April 1980	April 1981	June 1982	July 1978	December 1980
Availability days ARO	Contact vendor	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Number of drives installed to date	500 Customer	NA Customer	Customer	1000 Customer	Customer
Serviced by	Customer	Customer	Costonier	Costonic	
COMMENTS				Includes dual port feature	Two independent actuators per HDA includes dual port feature

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All About Winchester Disk Drives

SUPPLIER AND MODEL	Hitachi DKU-981	Hitachi FHD-1000	Hitachi FHD-150	1BM 680	3310
COMPUTERS INTERFACED	Hitachi	Hitachi	Hitachi (modified SMD interface)	-	IBM 4321, 4331
PRIMARY MARKET	ОЕМ	OEM	OEM	OEM	End user
TYPE Style	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester disk
Disk diameter inches	only 14	only	only 14	only 8	only 8
CAPACITY		100		-	1
Recording surfaces per drive unit	40 (2 HDAs)	2	2	11 plus 1 servo	1_
Tracks per surface Unformatted capacity per drive unit, bytes	2660M (2 HDAs)	128 plus 4 spares 3 2M	128 plus 4 spares 4 8M	358 64 5M	358 64 5M or 129M
PERFORMANCE Head movement time		1			(1 or 2 HDAs)
1 track, msec	5	See Comments	See Comments	9	9
Average (move of 1/3 of tracks), msec	16	_	_	27	27
Across all tracks, msec Average rotational delay (1/2 rev.), msec	33	10	10	46 9 6	46 9.6
Data transfer rate, bytes per second	3.000.000	625.000	937 000	1.031,000	1.031.000
SOFTWARE SUPPORT	Diagnostics	None	None	None	Diagnostics
PACKAGING					
Controller	Included with drive	No	No	No	Integrated
Formatter	No	No	No		- Total
Interface	Yes	Yes	Yes		
Drive units per controller	4	1.03	res	_	Yes
Drive units per formatter	-			-	2
Drive mounting	Separate chassis	Computer chassis	Computer chassis	Computer or	Stand-alone cabine
Drive dimensions (h x w x d), inches Drive weight, pounds	70 5 x 44 5 x 35 4	91 x 163 x 175	91 x 16.3 x 17.5	controller chassis 11 8 x 13 4 x 18 5	39 5 × 23 75 × 32
Power source for drives	1435 From first drive	57 Separate	57 Separate	53 Separate	240 to 350 Internal
RICING AND AVAILABILITY					1
Purchase price— Controller		1			
Formatter	Contact vendor			_	-
Interface	_	-	-		_
First drive	Contact vendor	Contact vendor	Contact vendor	-	-
Additional drive Software	_	-	-	Contact vendor	\$14,280 to \$23,73
Maintenance	_	-	-	_	\$11,300 to \$20,75
Controller	-			1	
Interface Drive	-	_		-	-
Quantity discounts available	-	-	_		_
		-	-	Contact vendor	\$61 to \$135
irst delivery, month, year	1st quarter 1982	October 1975		- Tanaci Vandoi	-
Availability days ARO	Contact vendor	Contact vendor	March 1974	-	_
Number of drives installed to date Serviced by	-	5000	Contact vendor	-	-
z.viced by	Customer	Customer	Customer	Customer	NA IBM
OMMENTS	.				1
IMMENIS	Two independent actuators per HDA includes dual port feature	Head-per-track disk	Head-per-track disk		Models A1 (one HDA) and A2 (two HDAs) include cor troller, one Model B1 (one HDA) or B2 (two HDAs) ca be attached to an A1 or A2 unit, see Report 70C-491-C for details

SUPPLIER AND MODEL	1BM 3340	IBM 3344	IBM 3350	IBM 3370	IBM 3375
COMPUTERS INTERFACED					
	IBM S/370 303X 308X 4331 4341	IBM S 370 303X 308X 4331 4341	IBM S 370 303X 308X 4341	IBM 303X 308X 4331 4341	IBM 303X, 308X, 4331-2, 4341
PRIMARY MARKET					
TYPE Style	End user	End user	End user	End user	End user
Disk diameter, inches	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester disk
	14	only 14	only 14	only 14	only
Recording and				14	14
Recording surfaces per drive unit Tracks per surface	3 or 6	30 (2 HDAs)	30 (2 HDAs)		- 0
Unformatted capacity per drive unit bytes	696 69 8M or 139 6M	1110 plus 10 spares	1110 plus 10 spares		
PERFORMANCE Head movement time	(2 HDAs)	559M (2 HDAs)	635M (2 HDAs)	571 3M	819 7M
	10	lace .			F 1877
Average (move of 1/3 of tracks), msec Across all tracks, msec	25	10	10	5	-
Aurrana services msec	50	50	25 50	20 40	19
Data transfer rate, bytes per second	10.1 885.000	10 1	8.4	10 1	10 1
SOFTWARE SUPPORT		885,000	1,198,000	1.859.000	1.859.000
SOLLOW	Diagnostics	Diagnostics	Diagnostics	Diagnostics	Diagnostics
PACKAGING					
Controller	IBM 3830-2 3880-1	See Comments	IBM 3830-2 or	Integrated Adapter	IDAA 2000 1 2000 2
Formatter	or 3880-2	See Comments	3880 1 2 or 11	(4331) or 3880-1 or 2	IBM 3880 1 3880 2
	-	-	-	-	-
Interface	Yes	Yes	Yes	Yes	Yes
Drive units per controller	16 to 32	12	16 to 32	16 to 32	10. 00
Drive units per formatter Drive mounting		-	-	16 10 32	16 to 32
	Stand-alone cabinet	Stand-alone cabinet	Stand-alone cabinet	Stand-alone cabinet	Stand-alone cabinet
Drive dimensions (h x w x d), inches Drive weight, pounds Power source for drives	47 x 48 x 34 600 to 900 Internal	47 x 45 x 34 750 Internal	47 x 48 x 34 800 to 1050 Internal	39 5 x 30.5 x 32 375 to 575 Internal	39 5 × 30 5 × 32 375 to 575 Internal
PRICING AND AVAILABILITY					
Purchase price— Controller					
Formatter	\$23,200 to \$78,790	\$23 200 to \$78 790	\$23 200 to \$254 550	\$78,790	\$78.790
Interface First drive	-	-	-		_
Additional drive	\$24.570 \$13.510 to \$17.200	\$32.940	\$41,600 \$32,940 to \$43,030	\$44,350 \$29,550	\$50,720 \$33,850
Software	-	-	-	-	- 433,600
Maintenance— Controller	\$166 to \$176	\$166 to \$176	\$176 to \$676	\$176	5176
Interface	-	\$100 10 \$170	\$17010 \$676	5176	5176
Drive Quantity discounts available	\$62 to \$116	\$128	5128 to \$179	\$94 50 to \$126	\$98 50 to \$130
First delivery, month/year	November 1973	1976	1st quarter 1976	-	-
Availability, days ARO Number of drives installed to date	NA	NA	NA	NA.	NA.
Serviced by	IBM	IBM	IBM	IBM	IBM
COMMENTS	Model A2 includes	Attaches to 3340	Model A2 includes	Two independent	HDA has two inde-
	controller for up to 3 Model B1 (1 HDA)	A2 can be inter mixed with 3340	controller for up to 3 B2 or 2 B2 and 1	actuators per HDA. Model A1	pendent actuators. Model A1 includes
	or B2 (2 HDAs)	B1 and B2 units	C2 drives fixed	includes controller	controller for up to
	drives, uses remov-	fixed-head models	head models avail-	for up to 3 Model	3 Model B1 or 2
	able HDA, see Report 70C 491 06	available see Report 70C-491-06	able see Report 70C 491 06 for	B1 units, see Report 70C-491-08	Model B1 and 1 Model D1 unit, see
	for details	for details	details	for details	Report 70C 491 08 for details
					To details

All About Winchester Disk Drives

SUPPLIER AND MODEL	IBM 3380	IMI 6006	5006H, 5012H, 5018H	IMI 5007	7710, 7720
OMPUTERS INTERFACED	IBM 370/158. 370/168.303X	-	Mark	-	
	308X, 4341	DEM	OEM	DEM	OEM
RIMARY MARKET				Winchester disk	Winchester disk
YPE	Winchester disk	Winchester disk	Winchester disk	only	only
Style	only	only	only 5 25	5.25	8
Disk diameter, inches	14	5 25	7.53	1	11111111
	1		2.4.6	4	3.5
APACITY Recording surfaces per drive unit	-	4	306	144	380 12 3M, 20 5M
Tracks per surface		153 6.38M	6 38M, 12 76M.	6 9M	12 JW 20 JW
Unformatted capacity per drive unit, bytes	2520M (2 HDAs)	0 July	19 14M	1000000	Water or
PERFORMANCE					and the same of th
Head movement time—		3	3	3	6
1 week man		122	122	125	35 65
Average (move of 1/3 of tracks), msec	30	36.5	365	240 6.25	83
Across all tracks, msec Average rotational delay (1/2 rev), msec	8.3	83	8.3 625.000	960.000	648.000
Outs transfer rate, bytes per second	3,000,000	625.000	625.000	300.000	
SOFTWARE SUPPORT	Diagnostics	None	None	None	None
PACKAGING	IBM 3880-2 -3			Optional	Embedded, optional
Controller	or -13		Acres de la companya del companya de la companya del companya de la companya de l	Optional	Embedded optional
Formatter	-	-			IMI/ANSI
Interface	Yes	ST506	ST506	-	IMI/ANSI
Interface				2	-
Drive units per controller	16	-	_	2	-
Orive units per formatter	Stand-alone cabinet	Minifloppy-	Minifloppy-	Minifloppy-	Separate chassis
Drive mounting		compatible	compatible	25 x 5.75 x 8.0	55×85×19.25
Drive dimensions (h x w x d), inches	70 5 x 42 x 32	3.25 x 5.75 x 8 0	3 25 x 5 75 x 8.0	5	22
Drive weight, pounds Power source for drives	1000 to 1200 Internal	Separate	Separate	Separate	Separate
					A Committee of the Comm
PRICING AND AVAILABILITY		1	1		1075
Purchase price— Controller	\$78,790 to \$263.91	0 -	Service Control of the Control of th	\$325	\$375
Formatter		-	-		_
Interface	\$101.550 to \$116.06	50 51 000	\$925 to \$1,270	\$1.075	\$2,200 to \$2,650
First drive Additional drive	\$84.240	-	-	-	-
Software	_	-	-	-	_
Maintenance—	e176 e711		1_		_
Controller	\$176 to \$711	-		-	-
Interface Drive	\$240 to \$325	-	-	-	-
Quantity discounts available	-	Yes	Yes	Yes	Yes 1978
First delivery, month/year	4th quarter 1981	January 1982 60	June 1982	February 1981 60	60
Availability, days ARO Number of drives installed to date	NA NA	NA		Over 5000	Over 18,000
Number of drives installed to date Serviced by	IBM	Customer factory	Customer factory		Factory
COMMENTS	Two independent actuators per HDA Model A4 inclues controller for up to 3 Model B4 units. Model AA4 can b attached to 2 388 storage directors, see Report 70C. 4 O6 for details	e 80	Use thin-film plated media	Uses thin-film plated media	

SUPPLIER AND MODEL	7740	IMI 8100	Irwin International 510	ISS/Univac 717	Kennedy 5300-1, -2, -3
OMPUTERS INTERFACED		1			
		-	DEC LSI-11 S-100 bus Multibus	_	-
Miss and a second	and the same of		ous munique		
RIMARY MARKET	OEM	OEM	DEM		OEM
YPE		OEM	OEM	OEM	OEM
Style	Winchester disk				
Disk diameter inches	only	Winchester disk	Winchester plus cartridge tape drive	Winchester disk only	Winchester disk
	8	8	5.25	14	14
APACITY			1200		
Recording surfaces per drive unit Tracks per surface	5	8	2	7	1, 3, 5
Unformatted capacity per drive unit, bytes	760 41M	1200	612	1120	700
PERFORMANCE	41M	100M	12.3M	154M	14M, 42M, 70M
Head movement time					1
Track mean	6	5	8	7	10
Average imove of 1/3 of tracks) msec Across all tracks, msec	45	30	25	35	45
Average rotational delay (1.17	80	60	55	70	80
Data transfer rate, bytes per second	8.3 648.000	8 3 648 000	8 3 675,000	8.3 1.198.000	1.000.000
SOFTWARE SUPPORT		040.000		, , , , , , , , , , , , , , , , , , , ,	
OF TWARE SUPPORT	None	None	Drivers for opt	-	None
	1		interfaces, CP/M		
		1			
PACKAGING					
Controller	Embedded optional	Embedded, optional	Optional	-	No
Formatter				1	
- Constitution	Embedded, optional	Embedded, optional	included with controller	-	No
Interface	IMI/ANSI	IMI/ANSI	Optional	SMD-compatible	No
Drive units per controller					
Drive units per formatter	-	1	2		
Drive mounting	Separate chassis	Same as 8-in	Minifloppy	Rack	Separate chassis
Orive dimensions (h x w x d), inches	65-05-1035	floppy 4 6 x 8 55 x 15.25	compatible 3 25 x 5 75 x 8 0	8 75 × 16.56 × 27.75	7 × 19 × 23.5
Drive weight pounds	5 5 x 8 5 x 19 25	20	55	115	75
Power source for drives	Separate	Separate	Separate	Included	internal
			100	124	
PRICING AND AVAILABILITY			2		
Purchase price— Controller			6975		
Formatter	\$375	_	9975	_	=
Interface	-	-	\$600	-	-
First drive Additional drive	\$3.100	\$3,400	\$3,000	Contact vendor	\$3,500 to \$4,500
Software				-	_
Maintenance-			2	100	
Controller	-		-	1=	
Drive				Contact vendor	-
Quantity discounts available	Yes	Yes	Yes	-	Yes
	1981	July 1982	March 1981	June 1979	September 1977
First delivery, month, year Availability, days ARO	90	July 1902	60	Contact vendor	60
Number of drives installed to date	(2)		575	NA NA	NA Factory
Serviced by	Factory	Factory	Customer	NA.	Pactory
COMMENTS			Integrated 7-track,		1
	2007		6250-bpi cartridge tape drive can		
			back up formatted		1
	i		disk contents in 8 minutes		
			o minutes		1
					1
			1,01-1		
			1967		
			1	1	1

All About Winchester Disk Drives

SUPPLIER AND MODEL	Kennedy 5380	Kennedy 7300	Memorex 101	Memorex 102	Memorex 306
COMPUTERS INTERFACED	701-3			200-	-
PRIMARY MARKET	OEM	OEM	OEM	OEM	OEM
TYPE		Winchester disk	Winchester disk	Winchester disk	Winchester disk
Style Disk diameter, inches	Winchester disk only 14	only 8	only 8	only 8	only 5.25
CAPACITY	-0.00	Esta Laura	4	8	4
Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, bytes	823 80M	5 plus 1 servo 411 40M	244 11 77M	244 23 4M	6.7M
PERFORMANCE					199809
Head movement time— 1 track, msec	10	6	19.5	19.5	18
Average (move of 1/3 of tracks), msec	30	30	70	77	175
Across all tracks, msec Average rotational delay (1/2 rev.), msec	55	55 8 33	140 10.06	153 10.06	495 8.3
Data transfer rate, bytes per second	1,000,000	1,200,000	596,600	596,600	625,000
SOFTWARE SUPPORT	None	None	None	None	None
PACKAGING					-
Controller	No	No	No	No	No
Formatter	No	No	No	No	No
Interface	No	No	Floppy compatible	Floppy compatible	ST506 compatible
Drive units per controller	-	-	4	4	
Drive units per formatter Drive mounting	OEM configuration	OEM configuration	Floppy compatible	Floopy compatible	T 7.53.5
Drive dimensions (h x w x d), inches	7 x 19 x 24 76	4 62 x 8 55 x 14 25	4 38 x 8 55 x 14	46 x 8 55 x 14	3.25 x 5.75 x 8
Drive weight, pounds Power source for drives	75 Internal	27 Separate	12 Separate	13 Separate	5 5 Separate
PRICING AND AVAILABILITY					
Purchase price— Controller				1	to be been
Formatter	-	_	_	-	-
Interface First drive	65,400		-	_	_
Additional drive	-	63,200	\$1,900 \$1,140	62,470	\$950 (OEM gty.)
Software Maintenance—	~	-	-	61.400	_
Controller	-				
Interface	-	_	_	-	-
Drive Quantity discounts available	Yes	-	-	-	_
	1	Yes	Yes	Yes	Yes
First delivery, month/year Availability, days ARO	December 1978	August 1981 90	June 1980	October 1981	2nd quarter 198
Number of drives installed to date Serviced by	NA Factory	NA Factory	2000	30 NA	25to quarter 190
		ractory	Factory	Factory	
COMMENTS	The same of				
	186				
	150		1		
		1			
		1			
	1	4	1	1	1

SUPPLIER AND MODEL	Memorex 310	Memores 3640	Memorex 3644	Memores 3650 3653 3654	Memorex 3652/3655/ 3656
COMPLITERS INTERFACED					
		IBM 5-3, S-370, 4300	IBM S 3. S 370. 4300	Amdahi 470V IBM 5/370, 303X, 4341	Amdahi 470V IBM S 370 303X 4341
PRIMARY MARKET					
TYPE	OEM	End user	End user	End user	End user
Style					
Date of	Winchester disk	Winchester disk only	Winchester disk only	Winchester disk	Winchester dak only
Druk diameter, inches	5.25	14	14	14	14
CAPACITY					
Recording surfaces per drive und Tracks per surface	8	12 (2 HDAs)	30 (2 HDAs)	30 (2 HDAs)	30 (2 HDAs)
Unformatted capacity per drive unit, bytes	TOM	596 70M or 140M	1120 560M (2 HDAs)	1120 635M (2 HDAs)	2240 1270M (2 HDAs)
ERFORMANCE	TOM	(2 HDAs)	BOOM (2 HUAS)	03010 (2 110-0)	12.00
Head movement time			/		4-10000
1 track, muse	18	7	10	10	7
Average (move of 1/3 of tracks), mucc	175	20	25	25	18
Average rotational delay (1/7 res)	495	45	50	8.4	30 8.4
Deta transfer rate, bytes per second	8.3 625.000	10 1	885.000	1.198.000	1,198,000
OFTWARE SUPPORT		1		Diagnostics	Diagnostics
OF THATE SUPPORT	None	Diagnostics	Diagnostics	Chagnostics	Diagnostics
	1				
PACKAGING				2021 2020	Memorex 3674 3676
Controller	No	Memorex 3674. IBM 3830-2, 3880	See Comments	Memorex 3674, 3676 IBM 3830-2, 3880	IBM 3830 2 3880
Formatter	No	Yes 18430-2, 3880	Yes	Yes	Yes
Interface			Yes	Yes	Yes
ricertace	ST506 compatible	Yes	res	1100	100
Drive units per controller	-	16	12	Up to 16	Up to 16
Drive units per formatter Drive mounting	-	Stand-alone cabinet	Stand-alone cabinet	Stand alone cabinet	Stand-alone cabinet
			and the second	46 x 44 5 x 32	46 x 43 3 x 32
Drive dimensions (h x w x d), inches	3 25 x 5 75 x 8	43 3 x 44 5 x 33 5 950	46 x 44 5 x 32 960	980 to 1000	950
Drive weight, pounds Power source for drives	5.5 Separate	Internal	Internal	Internal	Internal
PRICING AND AVAILABILITY					
Purchase price—			See Comments	\$49,440 or \$75,770	\$49 440 or \$75 770
Controller Formatter	-	\$49 440	See Conunerus	-	-
Interface	-	_	-	\$42,000	\$74 225
First drive	\$1.250 (OEM gty)	\$36,000 \$25,200	631,680	\$33.265 or \$43.450	\$57 745 or \$77.830
Additional drive Software		- \$25,200	_	=	
Maintenance-					_
Controller	-			=	-
Interface Orive	-		-	-	No.
Quantity discounts available	Yes	No	No	No	
	2nd quarter 1982	October 1976	October 1978	April 1977	May 1974
First delivery month year Availability days ARO	- Zno quarter 1502	NA	NA	NA NA	NA NA
Number of drives installed to date	-	NA Memorex	NA Memorex	Memorex	Memorex
Serviced by	-	Memorek	Marino-ca		
	1	Model 3643 includes	Connects to 3643	Model 3653 includes	Model 3655 includes
COMMENTS		Model 3643 includes controller for up	can be intermixed	controller for 3	controller for 3
		to 3 Model 3640 or	with 3640 drives.	Model 3650 or 2	Model 3652 or 2 3652 and 1 3656
		3644 drives: plug- compatible with	also see Report 70D6-625-04	3650 and 1 3654 drive. plug-com-	drive plug
		IBM 3340 uses re-	7000 020 04	patible with IBM	compatible with
		movable HDA, also		3350, also see	IBM 3350 also see Report 7006
		see Report 70D6		Report 70D6- 625-05	625-05
		625 04			
	1	1			

All About Winchester Disk Drives

SUPPLIER AND MODEL	Micro Peripherals Model 10	Micro Technology MD3400 Series	Micro Technology MD3500 Series	Micro Technology MD3700 Series	Microcompute Systems Corp 1690 Series
COMPUTERS INTERFACED	-	DEC LSI-11. Q-bus	DEC LSI-11. Q-bus	DEC LSI-11 Q-bus	Hewlett Packard 1000, 3000 Series
PRIMARY MARKET	OEM	OEM. distributor	OEM. distributor	OEM. distributor	End user
TYPE				Dual Winchester	Winchester disk
Style	Winchester disk	Winchester disk	Winchester plus floppy disk	disks	only
Disk diameter, inches	5.25	8	В	8	14
CAPACITY				2 4 6 or 8	20
Recording surfaces per drive unit	4	2. 4. 0. or 8	2. 4. 6. or 8	512	1686
Tracks per surface Unformatted capacity per drive unit, bytes	352 14 66M	10M. 20M. 30M.	10M, 20M, 30M, or 40M	10M, 20M, 30M, or 40M	875M
PERFORMANCE		or 40M	or 40M	or acres	100000000
Head movement time-			1.7	16	10
1 track, msec	3	15	15 55 to 65	16 85 to 65	25
Average (move of 1/3 of tracks), msec Across all tracks, msec	25	55 to 65 100	100	100	50
Average rotational delay (1/2 rev.), msec	8.33	10			8.3
Data transfer rate, bytes per second	625,000	642,600	542,500	642,500	1 200 000
OFTWARE SUPPORT	None	- 1- 10	_	-	None
			1		
ACKAGING	- A-		- T		
Controller	No	Optional	Optional	Optional	Included
Formatter	No	-	-	-	-
nterface	Yes	External	External	External	PC board, HP-IB
Drive units per controller	4		134		
Drive units per formatter	-	-	_		-
Orive mounting	Computer or separate chassis	Rack or desk-top	Rack or desk-top	Rack or desk-top	Separate chassis
Drive dimensions (h x w x d), inches	3 25 x 5 75 x 8	- 1	_	_	32 2 × 23 × 38
Drive weight, pounds	4.2	-	-	-	635
Power source for drives	Separate	Included	Included	included	internal
RICING AND AVAILABILITY	13			- 1	
urchase price—				_	
Controller	-	\$1.895	\$2.695	\$1,895	included
Interface	Included	2	_	1.00	Included
First drive	\$1.150 (gty 1000)	\$4,100 to \$6,410	65,210 to \$7,580	67,265 to \$11,965	\$34,500 to \$39,500
Additional drive Software	\$1.150 iqty 1000)	-	-	-	-
Asintenance—		-	-	7	-
Controller	-	-	-	_	
Interface Drive	-	-	-		
luantity discounts available	Yes	Yes	Yes	Yes	Yes
rst delivery, month/year	February 1982	April 1980	April 1980		
vailability, days ARO	30 to 60	60		60 E	1980
umber of drives installed to date erviced by	NA Factory	NA		NA	NA
erviced by	Pactory	Factory	Factory	Factory	Factory
MMENTS	A STATE OF THE STA	Also available with	See MD3400	See MD3400	
	THE RESERVE A STATE OF	streaming tape			Drive is manufactured by Control
		backup: drive is			Data
	-	manufactured by Quantum, also			
	* March 1	compatible with			
7	44.11	Shugart SA1000	100		
		1			
		1			
				and the second s	

APRIL 1982

70D8-010-50dd Memory & Storage

All About Winchester Disk Drives

SUPPLIER AND MODEL	Microcomputer Systems Corp. 9800 Series	Micropolis 1201/1202/ 1203	Micropolis 1221/1222/ 1223	Microtech Business Systems Dart SM-10	Microtech Business Systems Dart SM-3
					DG compatible
COMPUTERS INTERFACED	_		_	Data General Digidyne Point 4 SCI Bytronix	DG companies
PRIMARY MARKET	End user OEM	OEM	OEM	OEM	OEM
TYPE					Winchester plus
Style	Winchester disk	Winchester disk	Winchester disk	Winchester plus 0.25 in tape	0 25 in tape
Disk diameter inches	only	only	only 8	8	14
bisk diameter, inches	5 25	8	8	1	1
CAPACITY				4	3
Recording surfaces per drive unit	4	1 3 5	1 3 5	185 plus 5 spares	555 plus 6 spare 33 9M
Tracks per surface Unformatted capacity per drive unit, bytes	153 6 38	580 9M 27M 45M	9M 27M 45M	10 2M	33 9W
	0.30	July 27.11			
PERFORMANCE					8
Head movement time— 1 track, msec	3	12	12	23 73	45
Average (move of 1/3 of tracks) msec	170	42	42	140	85
Across all tracks, msec	500		83	8.4	9 7
Average rotational delay (1: 2 rev.), msec Data transfer rate, bytes per second	8 33 625 000	8.3 922.000	922 000	900,000	
Cota transfer rate, bytes per second	625 000		None	IRIS RDOS	IRIS. RDOS.
SOFTWARE SUPPORT	None	None	No.	BLISS BITS	BLISS, BITS
				Yes	Yes
PACKAGING Controller	Included	No:	Yes	163	
Controller	I Conco		Yes	Yes	Yes
Formatter	-	No	100	Yes	Yes
Interface	HP IB	Yes	Yes	163	12
interface	10.00	4	4	4	4
Drive units per controller		4	4	Up to 4 drives per	Up to 4 drives p
Drive units per formatter	Separate chassis	OEM configuration	OEM configuration	cabinet	cabinet
Drive mounting		4 62 x 8 55 x 14 5	4 62 x 8 55 x 14 25	14 × 8 5 × 4 5	20 x 16 6 x 6 8
Drive dimensions (h x w x d), inches	64 x 10 5 x 12	22	22	20 Separate	Separate
Drive weight, pounds Power source for drives	Internal	Separate	Separate	S. parete	
PRICING AND AVAILABILITY				42.050	\$2.050
Purchase price —	Included	-		\$2.050 \$950	\$950
Controller	- Included	-		Included	s3,000
Formatter Interface	Included	See Comments	See Comments	\$2,400	\$3,000
First drive	\$3.450	See Commerce	-	\$2,400 Included	Included
Additional drive		- "	-	anci-baec	
Software			-	-	_
Maintenance— Controller	-		-		-
Interface	-	_		Yes	Yes
Drive	Yes	Yes	Yeş		May 1981
Quantity discounts available		December 1979	December 1979	May 1981	30
First delivery month year	1981	60 to 90	60 to 90	30 30	100
A. m. Labellay days ARO	Immediate NA	2500	2500 Factory	Factory	Factory
Number of drives installed to date	Factory	Factory	ractory		
Serviced by				Controller includes	Controller include
	Drive is manufac-	\$1 672. \$2.075, or	\$2.078, \$2.481, or \$2.896 in quantity of	logic for streaming	logic for streami
COMMENTS	tured by Seagate.	\$2,490 in quantity of	100 coding scheme.	tape drive which	tape drive which
	MSC also sells con	100	enhanced pulse	is included in subsystem	subsystem
	trollers for 5 25		modulation provides 2M more bytes per	Subsystem	
	disk drives		data surface than		
		1	1201/1202/1203		
	1		1201 1202 1200	1	
			12017 1202 1200		
			12017 1202 1200		

All About Winchester Disk Drives

SUPPLIER AND MODEL	Microtech Business Systems Dart SM-68	Microtech Business Systems Dert SM-158	Mini Scribe Model 1006	MiniScribe Model 1012	Mitsubish M2860 Series	
COMPUTERS INTERFACED	DG-compatible	DG-compatible	-	-		
PRIMARY MARKET	OEM	OEM	OEM	OEM	M3O	
PRIMARI MARKET				Winchester disk	Winchester disk	
TYPE	Winchester plus	Winchester plus	Winchester disk	only	only	
Style	O 25 in tape	0 25-in tape 14	5 25	5 25	8	
Disk diameter inches	-				3 or 7	
CAPACITY		7	2	4 306	549	
Recording surfaces per drive unit. Tracks per surface. Unformatted capacity per drive unit. bytes.	3 1108 plus 3 spares 67 8M	1108 plus 3 spares 158M	306 6 4M	12 BM	21 73M or 50 71M	
PERFORMANCE				1 75	10	
Head movement time— 1 track_msec	8	8	1 75	179 (125)*	35	
Average (move of 1/3 of tracks), msec	45	40	534 (375)*	534 (375)*	60	
Across all tracks msec	85	74 9 7	83	8 3	8 33	
Average rotational delay (1 2 rev.) msec Data transfer rate, bytes per second	9 7	1 040 000	625,000	625 000	806.000	
SOFTWARE SUPPORT	IRIS RDOS BLISS BITS	IRIS ROOS. BLISS BITS	None	None	Diagnostics	
ACKAGING		Yes	No	No	No	
Controller	Yes			No	No	
Formatter	Yes	Yes	No		Included	
nterface	Yes	Yes	No	No	enc.	
Drive units per controller	4	4	4	4	8	
Orive units per formatter Orive mounting	4 Up to 4 drives per	Up to 4 drives per	OEM configuration	OEM configuration	Rack or standard	
	cabinet 20 x 16 6 x 6 8	20 x 16 6 x 6 8	3 25 × 5 75 × 8	3 25 x 5 75 x 8	5 12 x 8 54 x 16 9	
Drive dimensions (h x w x d), inches Drive weight, pounds	33	36	55	5 5	26 5	
Power source for drives	Separate	Separate	DC from OEM	DC from OEM	Separate	
RICING AND AVAILABILITY						
Purchase price —						
Controller	\$2 050 \$950	\$2 050 \$950	_		_	
Formatter Interface	Included	included		_	-	
First drive	\$3.800	\$5 350	\$1 210	\$1,350	Contact vendor	
Additional drive	\$3.800	\$5,350	\$1.210	\$1,350	-	
Software	Included	Included	-	-	_	
laintenance						
Controller nterface			_	-	_	
Drive	-	_	_	_	_	
uantity discounts available	Yes	Yes	Yes	Yes	Yes	
rst delivery, month year	September 1981	January 1982	September 1981	September 1981	3rd quarter 1981	
vailability days ARO	45	70	30	30	90	
umber of drives installed to date	30	5	NA Santas	NA Samuel	NA NA	
erviced by	Factory	Factory	Factory	Factory	Mitsubishi customer	
MMENTS	Controller includes logic for streaming tape drive which is included in subsystem	Controller includes logic for streaming tape drive which is included in subsystem	*The faster access times can be achieved through a scheduled seek algorithm in the controller	'The faster access times can be achieved through a scheduled seek algorithm in the controller		

7006-010-50ff Memory &

All About Winchester Disk Drives

SUPPLIER AND MODEL	Mitsubishi M4863	National Advanced Systems	Δc	lational dvanced systems 7360	Info	NEC ormation ystems 200 Series	Info	NEC simulation ystems 01510
The state of the s	Series	7350	10	7360	_		SMD-co	mpatible
OMPUTERS INTERFACED	_	IBM 360/370 and 303X, NAS Advanced Systems	4300 h	3081 and NAS Advanced	SMD-co	ompatible		
			System End us	15	OEM		OEM	
RIMARY MARKET	OEM	End user	Ena us				be	ester disk
YPE				ester disk		ester disk	only	
Style	Winchester disk	Winchester disk	only	ester un	only 14		14	-
_	only	only	14		14			1
Disk diameter, inches	5 25	14					15	
APACITY			40 (2	HDAs)	1 2 0	lus 10 spares	555 p 331 5	us 6 spares
Recording surfaces per drive unit	2. 4. or 6	30 (2 HDAs) 1110 plus 14	1110	a unasi	20.88	A 41 500	331 5	·
Tracks per surface	160 3 33M, 6 66M.	635M (2 HDAs)	1270	M (2 HDAs)	or 83	1M	1	
Unformatted capacity per drive unit bytes	or 10 OM		1		1		1.	
PERFORMANCE	and the second		1.		-		20	
Head movement time-		6	20		40		35	
1 track, msec Average (move of 1/3 of tracks), msec	18 75	20	45		0.3		0.2	
Across all tracks, msec	160	45	0.2		8 3	0 000	1.19	B 000
Average rotational delay (1/2 rev.) msec	8 33	1 198 000	1,19	8 000			None	
Data transfer rate, bytes per second	625.000	198.00		nostics	None	0	1,40,11	
	None	Diagnostics	Diag	i i i i i i i i i i i i i i i i i i i				1
SOFTWARE SUPPORT	Two Tree							
					No		No	
		7070 22	NAS	5 7860	NO.			1
PACKAGING	No	NAS 7830 22			No		No	1
Controller		No	No		-		Yes	
Formatter	No		Yes		Yes			
	Included	Yes	1		_		-	
Interface	III. III. III. III. III. III. III. III	1.6	16		-		Str	and-alone cabinet
Drive units per controller	4	16	-	and-alone cabin	net Ra	ck	314	214
Drive units per controller Drive units per formatter	- constant	Stand-alone cabir				× 17 × 28	39	4 × 22 8 × 31 4
Drive mounting	Rack or standard		40	x 63 x 34	99		44	l 1 gernal
	3 38 × 5 88 × 8 19	44 x 47 x 33 924 or 1023	02	6 or 1345		parate	In	(E1.10)
Drive dimensions (h x w x d), inches Drive weight, pounds Power source for drives	5 52 Separate	From first drive	Fre	om first drive				
	1		- 1		200		-	
PRICING AND AVAILABILITY		\$49 470	\$	32.800 to \$51	380	-		
Purchase price—	-	549470		ncluded	-	Comments	\$	11.300
Controller Formatter	-	Included	s	54 730	15	ee Comments	-	
Formatter	Contact vendor	\$39.600 \$31.360 or \$41		44 825			1	
First drive	-	\$31,360 07 541	-	~				_
Additional drive	-		1.	150 to \$175				
Software		\$216	1				1	
Maintenance—	-			\$170 to \$225		Yes		Yes
Controller		\$145 to \$203	1	No				1979
	Yes	No		1st quarter 198	82	1979		120 (min)
Quantity discounts available	1.00	March 1979		1st quarter 750		90		NA
	1st quarter 1982	190		NA		NA Customer		Customer
First delivery month/year	90	Over 200		NAS		Casio		
Availability days ARO Number of drives installed to date	Mitsubishi	NAS	1			, 00	orices	Fixed head, test
Serviced by	customer		. 1	Two independ	ent	Quantity 100 range from \$	3 050	and diagnostic
5.11.00		Two independ				range from s.	ed-head	options available
1				Mardel A4 Inci	Ore >	antion availab	HC.	
COMMENTS		Model A2 incli controller for to	ID I	troller tor	1			
1				Model B4 driv		83 1MB mod	PIS	
1		a p 2 and 1 U	Z Chine	1044 3350 ca	u pe			
1				intermixed Wi	th			
1		IBM 3350 als Report 7006		7350 drives				
-1		Report 7006	030 01					
						1		

All About Winchester Disk Drives

D2200 Series SMD interface OEM Winchester disk only 8 3 or 5 415 25 5M or 42 5M 10 30 60 8 55 1.198 000 None	V-4/0 S-100 O bus Multibus, Sid-bus Ontel OEM Winchester disk only 5.25 1.2 160 2M. 4M 5 28.3 100 8.3 780,000 BIOS drivers, diag- nostics Optional Optional	Multibus Std bus Ontel OEM Winchester plus carridge disk 5 25 2 160 4M (fixed)	Winchester disk	OEM Winchester disk only 5 25 4 180 7 5M 2 120 360 8 33 6625 000 None
Winchester disk gmly 3 or 5 415 25 5M or 42 5M 10 30 60 8 5 1, 198 000 None	OEM Winchester disk only 5.25 1.2 160 2M.4M 5.28.3 100 8.3 780,000 BIOS drivers. diagnostics	OEM Winchester plus carridge disk 5 25 2 160 4M (fixed) 5 28 3 100 83 780.000 BIOS drivers, diagnostics	Winchester disk only 8 1 200 per inch 4 2M 5 25 75 8 3 — None	Winchester disk only 5 25 4 180 7 5M 2 120 360 8.33 625 000
Winchester disk gmly 3 or 5 415 25 5M or 42 5M 10 30 60 8 5 1, 198 000 None	Minchester disk only 5:25 1:2 1:60 2M. 4M 5 28:3 100 8:3 780,000 BIOS drivers. diagnostics	Vénchester plus cartridge disk 5 25 2 160 4M (fixed) 5 28 3 100 83 780 000 BIOS drivers, diagnostics Optional	only 8 1 200 per inch 4 2M 5 5 75 75 8 3 - None	only 5 25 4 180 7 5M 2 120 360 833 625 000
only 8 3 or 5 4/15 25 5M or 42 5M 10 30 60 8.55 1.198 000 None	only 5 25 1 2 160 2M. 4M 5 6 28.3 100 8.3 780,000 BIOS drivers. diagnostics	carridge disk 5 25 2 160 4M (fixed) 5 28 3 100 8 3 780 000 BIOS drivers, diagnostics	only 8 1 200 per inch 4 2M 5 5 75 75 8 3 - None	5 25 4 180 7 5M 2 120 360 8 33 625 000
only 8 3 or 5 4/15 25 5M or 42 5M 10 30 60 8.55 1.198 000 None	5 25 1 2 160 2M. 4M 5 28 3 100 8 3 780,000 BIOS drivers. diagnostics	5 25 20 160 4M (fixed) 5 8 3 100 8 8 3 780.000 BIOS drivers, diagnostics	8 1 200 per inch 4 2M 5 25 75 8 3 — None	2 120 360 8.33 625.000
8 3 or 5 415 25 5M or 42 5M 10 30 60 8 55 1,198 000 None	1, 2 160 2M, 4M 5 28, 3 100 8, 3 780,000 BIOS drivers, diagrostics	2 160 4M (fixed) 5 28.3 100 8.3 780.000 BIOS drivers, diagrostics	4 2M 5 5 25 75 8 3 - None	7 5M 2 120 360 8.33 625,000
415 25 5M. or 42 5M 10 30 60 8 55 1,198 000 None	160 2M. 4M 5 28.3 100 80 810S drivers. diagnostics Optional	160 4M (fixed) 5 28 3 100 83 780 000 BIOS drivers, diagnostics	4 2M 5 5 25 75 8 3 - None	7 5M 2 120 360 8.33 625,000
415 25 5M. or 42 5M 10 30 60 8 55 1,198 000 None	160 2M. 4M 5 28.3 100 80 810S drivers. diagnostics Optional	4M (fixed) 5 28.3 100 6.3 780,000 BIOS drivers, diagnostics	4 2M 5 5 25 75 8 3 - None	7 5M 2 120 360 8.33 625,000
10 30 60 8.55 1,198,000 None	100 8 3 780,000 BIOS drivers, diag- nostics	28 3 100 8 3 780 000 BIOS drivers, diagnostics	75 8 3 None	360 8 33 625 000
30 60 8 55 1 198 000 None	100 8 3 780,000 BIOS drivers, diag- nostics	28 3 100 8 3 780 000 BIOS drivers, diagnostics	75 8 3 None	360 8 33 625 000
30 60 8 55 1 198 000 None	100 8 3 780,000 BIOS drivers, diag- nostics	28 3 100 8 3 780 000 BIOS drivers, diagnostics	75 8 3 None	360 8 33 625 000
60 8 55 1.198 000 None No	100 8 3 780,000 BIOS drivers, diag- nostics	100 8 3 780,000 BIOS drivers, diagnostics	8 3 None Optional	8 33 625 000
8 55 1 198 000 None No	8 3 780.000 BIOS drivers, diagnostics Optional	780.000 BIOS drivers, diagnostics Optional	None Optional	625,000
1,198,000 None No	780,000 BIOS drivers, diagnostics Optional	BIOS drivers, diagnostics Optional	Optional	
No No	Optional	nostics Optional	Optional	PROTECT OF THE PROTEC
No				
No				_
	Optional	Optional	Optional	
Vaa				
res	Optional	Optional	Optional	_
4	4	4	4	-
_	4	4	4	-
-	Desk-top or rack	Desk-top or rack mount	mount	-
55 x 86 x 165	2 x 5 75 x 8	3 25 × 5 75 × 8		3 24 x 5 75 x 8 5 28
26 Separate	2 Separate	Separate	Separate	_
-			\$1 000 to \$2,500	
_			-	
42 450 to \$2 950		\$1 000 to \$1 200	Contact vendor	\$1 300
93,43U to 93,83U	- VIDENI GIY	-	-	-
_	-	-	-	_
-			Contact vendor	_
Yes	Yes Yes	Yes	Yes	Yes
May 1981	July 1981	November 1981	December 1980	August 1981
90	30	30	30	90
NA	100 (both models)	20 (both models)	NA	NA
Third party	_		Factory	Customer factory
	Contains multiple head assembly with 8 read write heads per surface to im- prove access time		Contains multiple head assembly with 16 read/ write heads average access time to en- tire disk capacity is 28.3 milliseconds	
525	5.5 x 8.6 x 16.5 16.5 Separate 33.450 to \$3.850 Separate Way 1981 90 NA	4 Desk top or rack mount	4	Desk top or rack mount 2 x 5 75 x 8 2 2 5 575 x 8 3 5 5 5 5 x 8 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5

Disk diameter inches 5.25 CAPACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit bytes 180 3.75M Tracks per surface Unformatted capacity per drive unit bytes 180 3.75M 7.11 PERFORMANCE 1.1 track misec Average intonational delay 1.1 2 rev.] misec Across all tracks. misec Average rotational delay 1.1 2 rev.] misec 189 SOFTWARE SUPPORT None PACKAGING Controller Formatter Interface Drive units per controller Drive units per formatter Drive units per formatter Drive units per formatter	ester disk r 6 1.7.5M 25M	Perkin Elmer 16 and 32 bit End user Winchester disk only 14 BOM 30 8 3 1 200 000 Diagnostics	Perion Elmer 16 and 32 bit End user Winchester disk only 14. 160M 30 8.3 1.200.000 Diagnostics	Perkin Elmer 16 and 32 bit End user Winchester disk only 14 20 1686 675M 10 25 50 8.3 1,200,000 Diagnostics	Perkin Elmer 16 and 32-bit End user Whichester plus removable disk 14 80M 30 8-3 1-200-000 Diagnostics
Disk diameter inches Style Disk diameter inches 5 25 APACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit bytes FERCORMANCE Head movement time— Tracks mase; Average inowe of 1 3 of tracks; msec Average rotational delay (1 2 rev.) msec Data transfer rate, bytes per second ACKAGING Controller PACKAGING Controller Drive units per controller Drive units per formatter Drive units per controller Drive u	r 6 . 7 5M 25M	Winchester disk only 14 80M 30 83 1 200 000 Diagnostics	Winchester disk only 14. 160M 30 8.3 1.200.000 Diagnostics	Winchester disk only 14 20 1686 675M 10 25 50 8 3 1,200,000 Diagnostics	Winchester plus removable disk 14 80M 30 8 3 1 200 000 Diagnostics
Disk diameter inches APACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit bytes PERFORMANCE Head movement time— 1 tracks mase Across all Tracks, mase Data transfer rate, bytes per second Base Data transfer rate, bytes per second Drive units per controller Drive units per controller Drive units per formatter Drive units per formatter Drive units per formatter Drive units per controller Drive dumensions (h x w x d) inches Drive weight pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller	r 6 . 7 5M 25M	only 1.4 BOM 30 8.3 1.200.000 Diagnostics	only 14. 160M 30 8.3 1 200 000 Diagnostics	only 14 20 1686 675M 10 25 50 8 3 1,200 000 Diagnostics	removable disk 14 80M 30 8 3 1 200 000 Diagnostics
Dask diameter inches CAPACITY Recording surfaces per drive unit Tracks per surface Linformatted capacity per drive unit bytes PERFORMANCE Head movement time— 1 track mesc Average move of 1.3 of tracks; msc Average rotational delay i.1 2 rev.; msec Data transfer rate, bytes per second SOFTWARE SUPPORT PACKAGING Controller Drive units per controller Drive units per formatter Drive units per formatter Drive units per formatter Drive weight; pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller	r 6 . 7 5M 25M	only 1.4 BOM 30 8.3 1.200.000 Diagnostics	only 14. 160M 30 8.3 1 200 000 Diagnostics	only 14 20 1686 675M 10 25 50 8 3 1,200 000 Diagnostics	removable disk 14 80M 30 8 3 1 200 000 Diagnostics
APACITY Recording surfaces per drive unit Tracks per surface Uniformatited capacity per drive unit bytes 3 75M or 11. PERFORMANCE Head movement time————————————————————————————————————	7 5M 25M	BOM 30 8 3 1 200 000 Diagnostics Yes	160M 30 8.3 1.200.000 Diagnostics	20 1686 675M 10 25 50 8 3 1,200 000 Diagnostics	30 8 3 1 200 000 Diagnostics
Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit bytes of 11. A controller Director and tracks make Across all tracks and tracks make Across all tracks and tracks	7 5M 25M	30 8 3 1 200 000 Diagnostics	30 8 3 1 200 000 Diagnostics	10 25 50 8 3 1,200,000 Diagnostics	30 8 3 1 200 000 Diagnostics
Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit bytes of 11. A controller Director and tracks make Across all tracks and tracks make Across all tracks and tracks	7 5M 25M	30 8 3 1 200 000 Diagnostics	30 8 3 1 200 000 Diagnostics	10 25 50 8 3 1,200,000 Diagnostics	30 8 3 1 200 000 Diagnostics
ITRACK per surface Unformatted capacity per driver unit bytes PERFORMANCE Head movement time— 1 track mise Across all tracks, mise Average individe and 1 3 of tracks) mise Average individe and 1 3 of tracks) mise Average individed and 1 3 of tracks) mise Data transfer rate, bytes per second SOFTWARE SUPPORT PACKAGING Controller Prove units per controller Drive units per formatter Drive units per controller Drive unit	25M	30 8 3 1 200 000 Diagnostics	30 8 3 1 200 000 Diagnostics	10 25 50 8 3 1,200 000 Dragnostics	30 8 3 1 200 000 Diagnostics
PERFORMANCE I track misec. Average inove of 1:3 of tracks) misec. Across all tracks, misec. Average rotational delay (1:2 rev.) misec. Boats transfer rate. bytes per second FORTWARE SUPPORT None ACKAGING Controller Formatter Interface Drive units per controller Drive units per formatter Drive mounting Drive dimensions (h. x. w.x. d.) inches Drive weight, pounds Power source for drives RICING AND AVAILABILITY Purchase price— Controller Controller		8 3 1 200 000 Diagnostics Yes	8 3 1 200 000 Diagnostics	25 50 8 3 1,200,000 Diagnostics	8 3 1 200 000 Diagnostics
1 1 1 1 1 1 1 1 1 1	00	8 3 1 200 000 Diagnostics Yes	8 3 1 200 000 Diagnostics	25 50 8 3 1,200,000 Diagnostics	8 3 1 200 000 Diagnostics
1 track msec Across all tracks msec Detail transfer tate. bytes per second SOFTWARE SUPPORT None ACKAGING Controller Formatter Interface Drive units per controller Drive units per formatter Drive units per controller Dri	000	8 3 1 200 000 Diagnostics Yes	8 3 1 200 000 Diagnostics	25 50 8 3 1,200,000 Diagnostics	8 3 1 200 000 Diagnostics
Across all tracks, mase. Average rotational delay if 2 rev_i mase. Boats transfer rate, bytes per second OFTWARE SUPPORT None ACKAGING Controller Formatter Interface Drive units per controller Drive units per formatter Drive units per formatter Drive weight pounds Power weight pounds Power source for drives RICING AND AVAILABILITY Purchase price— Controller Controller	00	8 3 1 200 000 Diagnostics Yes	8 3 1 200 000 Diagnostics	8 3 1,200,000 Diagnostics	1 200 000 Diagnostics
Average rotational delay (1-2 rev.) msec Data transfer rate. bries per second SOFTWARE SUPPORT None CONTROLLER SOFTWARE SUPPORT None CONTROLLER SOFTWARE SUPPORT None SOFTWARE SUPPORT SOFTWARE SU	000	1 200 000 Diagnostics Yes	1 200 000 Diagnostics Yes	1,200,000 Diagnostics	1 200 000 Diagnostics
Direct units per controller Drive units per controller Drive units per controller Drive units per controller Drive units per formatter Drive units per formatter Drive units per formatter Drive dimensions (h. x. w. x. d), inches Drive weight, pounds Power source for drives RICING AND AVAILABILITY Purchase price— Controller	00	1 200 000 Diagnostics Yes	Diagnostics Yes	Diagnostics	
ACKAGING Controller Formatter Drive units per controller Drive units per formatter Drive units per formatter Drive dimensions ft x w x di inches Drive weight pounds Power source for drives RICING AND AVAILABILITY Purchase price— Controller		Yes	Yes		
Controller Formatter Interface Drive units per controller Drive units per formatter Drive units per formatter Drive units per formatter Drive units per formatter Drive dimensions (h x w x d) inches Drive weight pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller		_	-	Yes	Yes
Controller Formatter Interface Drive units per controller Drive units per formatter Drive units per formatter Drive units per formatter Drive units per formatter Drive dimensions (h x w x d) inches Drive weight pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller		_	-	-	_
Formatter Interface Drive units per controller Drive units per formatter Drive dimensions (h x w x d) inches Drive dimensions (h x w x d) inches Drive weight pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller		SMD	- SMO	-	-
Interface Drive units per controller Drive units per formatter Drive mounting Drive dimensions h x w x dj inches Drive weight pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller		SMD	CMD		
Drive units per controller Drive units per formatter Drive dimensions (h x w x d) inches Drive weight pounds Power source for drives RICING AND AVAILABILITY Purchase price— Controller		SMU		SMD	SMD
Drive mounts per formatter Drive mounting Drive dimensions (h x w x d) inches Drive weight, pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller			4	4	4
Drive mounts per formatter Drive mounting Drive dimensions (h x w x d) inches Drive weight, pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller		4		-	-
Drive mounting Drive dimensions (h x w x d) inches Drive weight pounds 5 28 Power source for drives PRICING AND AVAILABILITY Purchase price— Controller		Rack	Rack	Pedestal	Rack or pedestal
Drive dimensions in x vx of including to the pounds pounds pounds pounds pounds pounds pounds provided the			100000	36 2 × 23 × 38	105 x 19 x 30 5
Drive dimensions in 3 w 3 units of 5 28 Drive weight pounds Power source for drives PRICING AND AVAILABILITY Purchase price— Controller	5 75 × 8	10 2 x 19 x 30 1	10 2 x 19 x 30 1 125	635	170
Power source for drives PRICING AND AVAILABILITY Purchase price Controller		125	Internal	Internal	-
Purchase price— Controller			litteria		
Purchase price— Controller					Contact vendor
Controller		Contact vendor	Contact vendor	Contact vendor	Contact ve
Formatter		_	-	-	-
		_	Contact vendor	Contact vendor	Contact vendor
Interface \$1,090	to \$1.560	Contact vendor	Contact venuo	_	
First drive		-	_	-	
Additional drive					Contact vendor
Maintenance—		Contact vendor	Contact vendor	Contact vendor	
Controller		-	Contact vendor	Contact vendor	Contact vendor
Interface		Contact vendor	Yes	Yes	Yes
Orive Quantity discounts available Yes		Yes	1.63		NA
	.002	NA	NA	NA 30 to 60	30 to 60
First delivery month year March	1982	30 to 60	30 to 60	NA	NA
A adabition days ARO		NA	NA Onyx	Onyx	Onyx
Number of drives installed to date	ner factory	Onyx	Oliva	20.51	
Serviced by				See MD50-101	Removable media
OMMENTS		Fixed-head option provides 1 9MB of	See MD50 101 Comments	Comments	drive provides 16N
Comme.		additional storage. drive is manu- factured by Control			storage drive is manufactured by Control Data
		Data			

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All About Winchester Disk Drives

SUPPLIER AND MODEL	Pertec TrakSta D 8033	r TrakSta	Pertec TrakSta D 8084	FSV06J	FSV061J
COMPUTERS INTERFACED	-:	-	-	DEC LSI-11	DEC LSI-11
PRIMARY MARKET	OEM	OEM	OEM	End user, GEM	End user, OEM
	1				1
TYPE	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester plus 0.25 in tape
Style Disk diameter inches	only 8	only 8	only 8	only 8	8
Washington Company of the Company of				1	}
CAPACITY	4	4	5	5	5
Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, byte:	476	950 67 29M	950 84 11M	580 35M	580 35M
PERFORMANCE	1				
Head movement time-	1000	l.	1.0	12	12
1 track, msec	10	10	10	42	42
Average (move of 1/3 of tracks), msec Across all tracks, msec	80	80	80	_	-
Across all tracks, msec Average rotational delay (1/2 rev.), msec	83	8 3	83	8 33	8 33
Data transfer rate, bytes per second	1.062.500	1.062.500	1.062.500	922,000	922.000
SOFTWARE SUPPORT	None	None	None	Diagnostics	Diagnostics, cartridg image backup utility file interchange program utility
PACKAGING					
Controller	No	No	No	included	Included
Formatter	No	No	No	Included	Included
Interface	Yes	Yes	Yes	included	included
Drive units per controller	4	4	4		
Drive units per formatter	1-	1-	4	4	4
Drive mounting	Computer Chassis	Computer Chassis	Computer Chassis	Separate chassis	Separate chassis
Drive dimensions (h x w x d) inches	4 65 × 8 58 × 14 3	4 65 x 8 58 x 14 3	4 65 x 8 58 x 14 3	5 25 x 19 x 24	5 25 x 19 x 24
Drive weight, pounds Power source for drives	18 Separate	18 Separate	18 Separate	60 or 85 Internal	70 Internal
RICING AND AVAILABILITY			1		
Purchase price —					1
Controller	-	_		Included	
Formatter	-	-	_	Included	Included
Interface	-	_	-	Included	Included
First drive Additional drive	\$3 625	\$4,250	\$4,630	\$6,694 or \$12,999	\$10.920
Software	\$1,995	\$2.340	\$2.550	Contact vendor	Contact vendor
Maintenance —			_		Included
Controller	_	-	1_	Contact vendor	_
Interface Drive	-	-	_	Contact vendor	Contact vendor
	Yes	Yes	-	Contact vendor	Contact vendor
		res	Yes	Yes	Yes
rst delivery, month/year	1st quarter 1982	2nd quarter 1982	3rd quarter 1982	September 1981	C
vailability days ARO umber of drives installed to date	-	-	-	30	September 1981 30
	Pertec	Destroy	-	375	Over 300
	· Critico	Pertec	Pertec	Plessey	Plessey
S	Microcomputer con- rolled, hard or soft sector NRZ n, NRZ out, 8-in loppy form factor	See D 8033 Comments	See D 8033 Comments	FSV06J includes one disk drive; FSV06JJ includes two disk drives	Streaming tape drive is bootable from RAM

SUPPLIER AND MODEL	Plessey PM-FSV06ZJ	Plessey PM-FS11D	Plessey PM-FS11K	DISKOS 1070	DISKOS 3350
COMPUTERS INTERFACED	DEC LSI-11	DEC PDP-11	DEC PDP-11	-	
PRIMARY MARKET	End user OEM	End user, OEM	End user, OEM	OEM	OEM
TYPE	End date, Ocial	End date, Octo			
Style		Winchester disk	Winchester disk	Winchester disk	Winchester disk
	Winchester plus floppy disk	only	only	only	only 14
Disk diameter, inches	8	14	14	8	1.
CAPACITY					1.5
Recording surfaces per drive unit	5	8	16	4	561
rracks per surface	580	823	823	190 10.8M	33.9M
Unformatted capacity per drive unit, bytes	35M	MOB	160M	10 am	
PERFORMANCE					4 44 100
Head movement time—			1		8
1 track, msec	12	7	7	23 73	45
Average (move of 1/3 of tracks), msec	42	30	30	140	85
Across all tracks, msec	-	55	55 8.3	8.4	9.7
Average rotational delay (1/2 rev.), msec	8.3	8 3	1,200,000	900,000	1,040,000
Data transfer rate, bytes per second	922,000	1.0			None
SOFTWARE SUPPORT	Diagnostics, RK06 emulation	Diagnostics RP11C/ RP02/RP03 emulation	Diagnostics, RP11C/ RP03 emulation	None	Table 1
	emulation				
PACKAGING				Yes	Yes
Controller	Included	Included	Included	Yes	Yes
Formatter	Included	Included	Included	Yes	Yes
Interface	Included	Included	Included	4	14
Drive units per controller	4	8	8	4	4
Drive units per formatter	4	-	Separate chassis	Separate chassis	Separate chassis
Drive mounting	Separate chassis	Separate chassis			69×166×176
	F 25 - 10 - 24	10 2 x 19 x 30 1	10.2 x 19 x 30 1	4 6 x 8 55 x 14 25	34
Drive dimensions (h x w x d), inches Drive weight, pounds	5 25 x 19 x 24	125	125	20 Separate	Internal
Power source for drives	Separate	Separate	Separate	Separate	
PRICING AND AVAILABILITY				1000	
Purchase price—			Included	6900	\$900
Controller	Included	Included	included	\$900	\$900
Formatter	Included	Included	Included		s3 600
Interface	Included \$9.492	ss 930	\$10,825	\$2,195	\$2,020
First drive Additional drive	Contact vendor	Contact vendor	Contact vendor		
Software	_	-			
Maintenance—		a	Contact vendor	-	
Controller	Contact vendor	Contact vendor	_	-	
Interface	Contact vendor	Contact vendor	Contact vendor	Yes	Yes
Drive	Yes	Yes	Yes	Yes	
Quantity discounts available			December 1981	August 1980	July 1979
First delivery, month/year	September 1981	December 1981 30	30	30	30 NA
Availability, days ARO	30	30	20	NA	Factory, customer
Number of drives installed to date	80 Plessey	Plessey	Plessey	Factory, customer	Paciory, costo
Serviced by	Plessey				1
OMMENTS	Roppy disk drive	180,1681		1	
The state of the s	provides 1 2 MB of		No. of Contrast of Contrast		
	RXO2-compatible		A THE REST OF		1
	backup				
				1	
				1	1

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All About Winchester Disk Drives

SUPPLIER AND MODEL	Prism DISKOS 3450	Prism DISKOS 6650	DISKOS 7050	DISKOS 15450	Quantum Q2010
SUPPLIEN AND INC.		-		-	Custom
COMPUTERS INTERFACED	-	-			55.000
	OEM	OEM	OEM	OEM	OEM
PRIMARY MARKET	DEM		Winchester disk	Winchester disk	Winchester disk
TYPE Style	Winchester disk	Winchester disk	only	only	only 8
Disk diameter, inches	only 8	14	8	'*	
CAPACITY			5	3.5	2 512
Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit bytes	5 525 36M	1 5 1121 67 9M	1049 70M	1121 158 5M	10 66M
PERFORMANCE				8	15
Head movement time— 1 track, msec	8	8 45	8 42	40	55 100
Average (move of 1/3 of tracks), msec	42 75	85	75	75	10
Across all tracks, msec Average rotational delay (1/2 rev.), msec Data transfer rate, bytes per second	8 3 806,000	9.7 1.040,000	8 3 806,000	1.040.000	542.500
SOFTWARE SUPPORT	None	None	None	None	None
PACKAGING Controller	Yes	Yes	Yes	Yes	No
Formatter	Yes	Yes	Yes	Yes	No
Interface	Yes	Yes	Yes	Yes	No
202000	4	4	4	4	
Drive units per controller Drive units per formatter Drive mounting	4 Separate chassis	4 Separate chassis	4 Separate chassis	4 Separate chassis	8-in floppy-
	4 6 x 8 55 x 14 25	69×166×176	46 x 8 55 x 14 25	69×166×176	compatible 4 62 x 8 55 x 14
Drive dimensions (h x w x d), inches Drive weight, pounds	20	34 Internal	20 Separate	37 Internal	17 Separate
Power source for drives	Separate	internal	Separate	interrum.	Separate .
RICING AND AVAILABILITY Purchase price					
Controller	\$900	\$900	\$900	\$900	-
Formatter Interface	\$900	\$900	\$900	\$900	
Interface First drive	\$4.100	\$4.800	\$5.500	\$6.700	51 200 (OEM gty
Additional drive	\$2,380	\$2,700	\$2.950	\$3,800	
Software Maintenance—	~~	-	-		
Controller	_	-	_	_	
Interface			-	-	-
Drive Quantity discounts available	Yes	Yes	Yes	Yes	Yes
irst delivery, month/year	July 1980	August 1980	January 1982	June 1981	
Availability, days ARO	120	60	90	120	September 1980 60 to 90
Number of drives installed to date	NA	NA	NA	NA	NA
Serviced by	Factory, customer	Factory, customer	Factory, customer	Factory, customer	Factory custome
DMMENTS					
				,	

SUPPLIER AND MODEL	Quantum Q2020	Quantum Q2030	Quantum Q2040	Rodime RO 101	Rodime RO 102
COMPUTERS INTERFACED	Custom	Custom	Custom	-	-
PRIMARY MARKET					
TYPE	OEM	OEM	OEM	OEM	OEM
Style	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester disk
Disk diameter, inches	only 8	only 8	only 8	only 5.25	only 5 25
CAPACITY					
Recording surfaces per drive unit	4	6	8	2	4
	512	512	512	192	192 8M
Unformatted capacity per drive unit, bytes	21 33M	32M	42 66M	4M	OWI
PERFORMANCE Head movement time—					-1975
1 track, msec	15	15	15	3	3
Average (move of 1/3 of tracks), msec Across all tracks, msec	60	60	65	70 170	70 170
Average rotational delay (1/2	100	100	105	83	83
Data transfer rate, bytes per second	10 542.500	10 542 500	542,500	625.000	625,000
	042,000	042.000			None
SOFTWARE SUPPORT	None	None	None	None	None
PACKAGING					Children soul
Controller	No	No	No	No	No
Formatter	No	No	No	No	No
Interface	No	No	No	ST506	ST506
Drive units per controller	_	-	-	4	14
Drive units per formatter	-	-		4 See Comments	See Comments
Drive mounting	8-in floppy-	8-in floppy-	8-in floppy- compatible	See Comments	
Drive dimensions (h x w x d), inches	compatible 4 62 x 8 55 x 14 25	compatible 4 62 x 8 55 x 14 25	4.62 x 8.55 x 14.25	3.25 x 5.75 x 8	3 25 x 5 75 x 8
Drive weight, pounds	17	17	17	5.5	5.5
Power source for drives	Separate	Separate	Separate	Separate	Separate
PRICING AND AVAILABILITY	1 3				1
Purchase price—				2	-
Controller Formatter	-		_	-	-
Interface		_	=	-	\$1,435
First drive	\$1,500 (OEM qty.)	61,800 (OEM qty.)	\$2,100 (OEM qty.)	\$1,145 Contact vendor	Contact vendor
Additional drive	-			-	-
Software Maintenance—	_				
Controller	_	-	-	-	
Interface	-	-	T 9		_
Orive Quantity discounts available	Yes	Yes	Yes	Yes	Yes
		September 1980	September 1980	June 1981	June 1981
First delivery, month/year	September 1980 60 to 90	60 to 90	60 to 90	30	30
Availability, days ARO Number of drives installed to date	NA	NA	NA	150	350 Customer
Serviced by	Factory, customer	Factory, customer	Factory, customer	Customer	Customer
COMMENTS				Same mounting and voltage requirements	Same mounting and voltage requirement
			1	as industry	as industry
				standard 5 25-in floppy disk drives	standard 5 25-in floppy disk drives
				noppy disk drives	moppy trial trives
		1	1	1	

All About Winchester Disk Drives

Rodime RO 103 OEM Winchester disk only 5.25 6 192 12M 3 70 170 8.3 625.000 None	OEM Winch only 5 8 192 16M 3 70 170 8 3 625 Non		OEM Winch only 5.25 2 216 4.5M 2 70 175 8.33 625 Non	000	OEN Winnonly 5.25 4 216 9M	chester disk	only 5 25 6 216 13 5 2 70 175 8 33	3,000
Winchester disk only 5.25 6 192 12M 3 70 170 8.3 625,000 None	Winch only 5 25 8 192 16M 3 70 8 3 62.5 Non No	000	Winch only 5.25 2 216 4.5M 2 70 175 8.33 625 Non	000	Win only 5.25 4 216 9M	chester disk	Winch only 5 25 6 216 13 5 2 70 175 8 33 625	M 3,000
Winchester disk only 5.25 6 192 12M 3 70 170 8.3 625,000 None	Winch only 5 25 8 192 16M 3 70 8 3 62.5 Non No	000	Winch only 5.25 2 216 4.5M 2 70 175 8.33 625	000	Win only 5.25 4 216 9M	chester disk	Winch only 5 25 6 216 13 5 2 70 175 8 33 625	M 3,000
Winchester disk only 5.25 6 192 12M 3 70 170 8.3 625,000 None	Winch only 5 25 8 192 16M 3 70 8 3 62.5 Non No	000	Winch only 5.25 2 216 4.5M 2 70 175 8.33 625	000	9M 216 9M 270 17 8:62	5 5 5 33 5,000	only 5 25 6 216 13 5 2 70 175 8 33 625	M 3,000
Winchester disk only 5.25 6 192 12M 3 70 170 8.3 625,000 None	Winch only 5 25 8 192 16M 3 70 8 3 62.5 Non No	000	2 216 4 5M 2 70 175 8 33 625	000	9M 216 9M 270 17 8:62	5 5 5 33 5,000	only 5 25 6 216 13 5 2 70 175 8 33 625	M 3,000
only 5 .25 6 192 12M 3 70 170 8.3 625,000 None	8 192 16M 3 70 170 8 3 625.	000	2 216 4 5M 2 70 175 8 33 625	000	5.25 4 216 9M	5 5 33 35,000	6 216 13 5 2 70 175 8 33 625	3,000
only 5 .25 6 192 12M 3 70 170 8.3 625,000 None	8 192 16M 3 70 170 8 3 625 Non No		2 216 4 5M 2 70 175 8 33 625 Non	000	2 70 17 8: 62	5 33 5,000	2 70 175 8 33 625	3,000
6 192 12M 3 70 170 8.3 625,000 None	3 70 170 8.3 625.		216 4 5M 2 70 175 8 33 625 Non	000	2 70 17 8: 62	5 33 5,000	2 70 175 8 33 625	3,000
3 70 170 8.3 625,000 None	3 70 170 8.3 625.		216 4 5M 2 70 175 8 33 625 Non	000	2 70 17 8: 62	5 33 5,000	2 70 175 8 33 625	3,000
12M 3 70 170 18.3 625,000 None	3 70 170 8.3 625.		2 70 175 8 33 625 Non	000	17 8: 62	5 33 5,000	70 175 8 33 625	000
3 70 170 170 8.3 625.000 None	170 8.3 625. Non		175 8.33 625 Non	000	17 8: 62	5 33 5,000	70 175 8 33 625	000
70 170 8.3 625,000 None	170 8.3 625. Non		175 8.33 625 Non	000	17 8: 62	5 33 5,000	175 8 33 625	000
70 170 8.3 625,000 None	170 8.3 625. Non		175 8.33 625 Non	000	62	5,000	8 33 625	000
170 8.3 625,000 None	170 8.3 625. Non		8 33 625 Non	000	62	5,000		
8.3 625,000 None	Non		Non				Nor	Mary Complexity
No No	Non No				No	one		
No No	No No				1		1	1
No	No						- 1	1
No	No				- 1			1
No	No				N		No	5200
No	No		No				No	
0.000	1		No		1	lo		
ST506			6.4	andard	15	Standard	St	andard
	ST	506	Su	i idan d	-1.		4	
4	4		4			- to factor	FI	oppy form factor
I A	4	e Comments	Flo	oppy form facto	1	Floppy form factor		25 x 5 75 x 8
See Commen			3	25 x 5 75 x 8	1	3.25 x 5.75 x 8	14	
3 25 x 5 75 x	8 3	25 x 5.75 x 8	14		-	Separate	S	eparate
5.5 Separate	S	eparate	S	eparate			- 1	
Suparare			1		1		-	
			- 1		3		1	all a contract
	min.	-				_	- 1	
_	To the second	-	1.			91,545	- 1	\$1,760
\$1.790		\$2,005	- 1	61,200		-	1	-
Contact ven	ndor	Contact vendor	1	_		-	1	Mary Hill San
1-		-	- 1			_		- 10000
_	1	_	- 1	_		-		-
-		_	- 1			-		Yes
Yes	-	Yes				1.00		April 1981
		Luna 1981		April 1981				45 to 60
June 1981	1	30		45 to 60		45 to 60		NA
300						Factory		Factory
Customer		Customer		1.00.0				
		1	and	Data separat	ors		ors	Data separators available
Same mo	ounting and		rements			available		available
as indust	trv-	as industry-		1				
standard	5.25-in	Standard 5	rives	1				
floppy dis	sx drives	Loppy Glan		1				1
100		1		1				F 10.00
1		1		1				
1		1		1				1
1				1		1		
1								
						DOTE LISA		
	Yes June 198 30 300 Customer Same mivoltage n	Yes June 1981 30 300 Customer Same mounting and voltage requirements a standard 5 25 in floppy disk drives	Yes June 1981 30 300 400 Customer Same mounting and voltage requirements a standard 5 25 in floppy disk drives	Yes June 1981 30 300 300 Gustomer Same mounting and voltage requirements and voltage requirements as industry-standard \$ 25-in floppy disk drives	Yes June 1981 June 1981 30 30 30 400 Customer Customer Same mounting and voltage requirements and and 5 25-in floppy disk drives Same mounting and voltage requirements and 5 25-in floppy disk drives	Yes June 1981 30 30 30 400 Customer Same mounting and voltage requirements as undustry. standard 5 25-in floppy disk drives	Yes Yes Yes April 1981 June 1981 June 1981 April 1981 30 300 Customer Same mounting and voltage requirements as andstrd 5 25 in floppy disk drives Same mounting and voltage requirements and shared 5 25 in floppy disk drives Same mounting and voltage requirements are included to the shared of	Yes Yes Yes Yes Yes Yes April 1981 April 1981

SUPPLIER AND MODEL COMPUTERS INTERFACED	Rotating Memory Systems RMS 518	Scientific Micro S	c ems	Scientific Micro Syste Disk Syste 11X	eme	Seaga Technol ST41	te ogy 2	Seaga Technol ST50
- WIENTACED	-	DEC PDP-11			_			-
PRIMARY MARKET		LSI-11		DEC LSI-11		-		-
	OEM	1						1
TYPE Style	OCIM	OEM		OEM, end user		OEM		OEM
Disk diameter, inches	Winchester disk	Winchester plus	- 1					
CAPACITY	5 25	floppy drsk 8		Winchester plus floppy disk 8		Winchester dis only 5 25	k	Winchester dis
Recording surfaces per drive unit Tracks per surface		1	- 1			5 25		5 25
Tracks per surface Unformatted	8	-		2 or 4				
Unformatted capacity per drive unit, bytes	216 18M	-	- 1	-		4 306		153
Head movement time—		10M 20M 30M or 40M		10M, 20M, 30M, or 40M		12 76M		6 38M
Average (many	2	19	- 1.		- 1			
Average reserve	70	65	- 13	Varies		3	- 1	3
Average rotational delay (1/2 rev.) msec Data transfer rate, bytes per second	175 8 33	-	- 1-		- 1	100		170 500
Thes ber second	625,000	10 543 000	1:	/aries	8	33	- 1	8 33
SOFTWARE SUPPORT	None	Diagnostics	- 1			25.000		625 000
		Diagnostics	10	Diagnostics	1	one	1	None
PACKAGING Controller								
Formatter	No	Integrated	In	tegrated	N)	١,	Wo .
	No	Yes	Ye	nc .	N			
Interface	Standard				N)	1	W O
Drive units per controller		Yes	Ye	25	No	Č.	1	lo
brive units per formatte.	4	4	-		4			
Drive mounting	Floppy form factor	4	-		4		4	
Drive dimensions (h x w x d), inches		Separate chassis	Ra	ck or table top	Se	parate chassis	S	eparate chassis
Drive weight, pounds Power source for drives	3 25 x 5 75 x 8	5 25 x 19 x 21	10	5 x 17 25 x 21	3 2 4 6	5 x 5 75 x 8	3	25 × 5 75 × 8
	Separate	1-		ernal		parate		6 eparate
RICING AND AVAILABILITY							1-	porote
Turchase price—		1	1				- 1	
Controller Formatter	-	_		luded	1			
Interface	-	-		luded	-		-	
First drive	\$1.980	-	Incl	uded	1		-	
Additional drive Software	- 360	\$6,900 to \$9,700		400 to \$12,500	\$1,6	520	\$1	500
faintenance—	-	-	-		\$1.0	050 (qty 500)	-	
Controller		1	1		-		-	
nterface Drive	_		-		-		-	
partition discourse	-	_			-		-	
1	Yes	Yes	Yes		Yes		Yes	
st delivery, month/year	April 1981	1980					ies	
manability days ARO	45 to 60	30	Sept	ember 1980	-			1980
	NA	NA	NA		Imme NA	ediate	60	22
	Factory	Factory	Facto	ory		omer factory	32 C Cusi	omer, factory
MMENTS C	Data separators variable		Winc with mega	rate 14-inch hester drive 13 2 or 26 4 bytes of stor- an be added to			requi	the same nting and voltage rements as itry-standard
			syster	m			drives	oppy disk

All About Winchester Disk Drives

SUPPLIER AND MODEL	Seagate Technology ST538	Shugart SA602/604	Shugart SA606	Shugart Associates SA1002/ 1004	Shugart SA1104/110
	_	-	-	-	
COMPUTERS INTERFACED					OEM
-	OEM	OEM	OEM	OEM	0.54
PRIMARY MARKET		Winchester disk	Winchester disk	Winchester disk	Winchester disk
TYPE Style	Winchester disk	Mucuester disk	only	only 8	8
	only 5 25	5 25	5 25	•	
Disk diameter, inches			6	2/4	3 5 plus servo
CAPACITY	6	2/4	256 tracks/inch	256	659 20 3M 33 9M
Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, bytes	612 38 25M	256 tracks inch 3.33M 6.66M	10M	5 33M / 10 7M	20.386.33.58
PERFORMANCE				19	10
Head movement time—	NA	18	18 75	70	35
1 track, msec Average (move of 1/3 of tracks), msec	NA	75	160	150	70
Il tracks meac	NA 0.00	160 8.33	8 33	96	9 6 542 500
Average rotational delay (1/2 rev.), msec Data transfer rate, bytes per second	8 33 625,000	625,000	625.000	542 500	
SOFTWARE SUPPORT	None	None	None	None	None
PACKAGING		No	No	No	No
Controller	No		No	No	No
Formatter	No	No	No	No	No
Interface	No	No	No		
Drive units per controller	4		-		_
Drive units per formatter	4	-	Minifloppy-	Rack or standard	Separate chassis
Drive mounting	Separate chassis	Minifloppy- compatible	compatible		4 62 x 8 55 x 14 25
Drive dimensions (h x w x d), inches	3 25 x 5 75 x 8	3 38 x 5 88 x 8 19	3 38 x 5 88 x 8 19	4 62 x 8 55 x 14 25	18
Drive weight, pounds Power source for drives	NA Separate	4 Separate	4 Separate	Separate	Separate
PRICING AND AVAILABILITY					
Purchase price					_
Controller	-	-	_	_	_
Formatter			_	-	-
Interface	Contact vendor	Contact vendor	Contact vendor	\$995/\$1 205	\$1,650 \$1,980kgry 5
First drive Additional drive	_	-	-	-	-
Software	-	-	1-	-	-
Maintenance —				1_	1_
Controller					1-
Interface Drive	_	_	-	-	-
Quantity discounts available	Yes	Yes	Yes	Yes	Yes
First delivery month year	4th quarter 1982	December 1981	December 1981	1st quarter 1980	1st quarter 1982
Availability days ARO	NA	NA .	NA NA	NA NA	90 NA
Number of drives installed to date	Customer, factory	NA Factory, customer	Factory, customer	Factory, customer	Factory customer
Serviced by	Customer, factory	ractory, customer	raciory costomer	Tractory, coatories	/detail comment
COMMENTS	Uses thin-film heads, can be com- bined with the ST706 5 25-in removable cartridge drive for 6 38MB of backup storage				

Memory & Storage

	1 specie	Winchester 2	Sperry Univac 8450	Sperry Univac 8470	Storage Technology Corp. 8350
SUPPLIER AND MODEL	SLI Industries Cheyenne 116	Sperry Univac 8417	Quint	Univac 1100/60	IBM 370, 303X
		Univac System 80	Univac 90/80 1100 Series	1100/80	3081, 4300
COMPUTERS INTERFACED			End user	End user	End user, OEM
	OEM	End user	End user	Winchester disk	Winchester disk
PRIMARY MARKET	diek	Winchester disk	Winchester disk	only	only 14
TYPE Style	Winchester disk only	only 14	14	17	30 (2 HDAs)
Disk diameter inches	8		15 plus servo	16 plus servo 1260	1120 636M (2 HDAs)
CAPACITY Recording surfaces per drive unit	7 plus servo 823	1110	1120 243M	403M	630W (2 112
Tracks per surface Unformatted capacity per drive unit bytes	116M	118 2M			7
COMANCE		7	4	4 23	25 39
Head movement time	7	35	23 46	46	8.3
1 track, msec	40 70	70	8.3	8 3 2 097 000	1,198,000
Across all tracks, msec	93	8.8	1,260,000	2,037,000	D
Across all tracks, msec Average rotational delay (1/2 rev.), msec Data transfer rate, bytes per second	1 200 000	1,130,000	-		Diagnostics
SOFTWARE SUPPORT	Built-in diagnostics				
					STC 8000 8880
		With host computer	Univac 5046	Univec 5056	8890
PACKAGING	No	With host computer		_	Yes
Controller		-	-		Yes
Formatter	No	Mose	Yes	Yes	
Interface	SMD ANSI	Yes	Up to 32	Up to 32	32
Drive units per controller	8	8	_	Free-standing	Stand-alone cabine
Drive units per tormetter	8	Up to 3 drives	Free-standing cabinet	cabinet	47 x 43 5 x 31 5
Drive mounting		per cabinet	-	-	935 or 1040
Drive dimensions (h x w x d), inches	51 x 8 75 x 19 4	_		Internal	AC from first drive
Drive weight pounds Power source for drives	30 Separate	Internal	internal		DC per drive
PRICING AND AVAILABILITY				\$87,200	\$55,500 to \$336,3
Purchase price	1_	-	\$102,000	367,200	Included
Controller		-	_	-	included \$40.750
Formatter Interface	Included	\$9.671	\$66,600	\$33,600	\$32,240 or \$42,2
First drive	\$5.020	-	-	_	Included
Additional drive	-	-	-		Contact vendor
Software Maintenance—		_	\$509	\$327	-
Controller		-	s288	\$109	Contact vendor
Interface		\$54	- 3200	_	Yes, to OEMs
Quantity discounts available	Yes	_		1000	March 1977
	2nd quarter 1982	1980	1977 NA	1980 NA	60
First delivery month/year Availability days ARO	45	NA NA	NA NA	NA	Over 10,000 STC customer
Number of drives installed to date	NA Factory	Sperry Univac	Sperry Univac	Sperry Univac	SIC customer
Serviced by COMMENTS		Fixed-head option	Fixed-head option provides 181KB of	Fixed-head option provides 241KB of	Model A2 include controller for up to
COMMENTS		provides 860KB of additional storage	additional storage, can be used with Univac's Cache/ Disk System	additional storage can be used with Univac's Cache/ Disk System, can	3 Model B2 drives or 2 B2 and 1 C2 drive, plug-compa with IBM 3350; a
			DISK SYSTEM	be intermixed with 8450 drives	see Report 7006- 789-04

SUPPLIER AND MODEL	Shugart Associates SA4004/ 4008	SLI Industries Cheyenne 22	SLI Industries Cheyenne 37	SLI Industries Cheyenne 52	SLI Industrie Cheyenne 83
COMPUTERS INTERFACED	4008				
The state of the s	-	-	-	-	
PRIMARY MARKET					1
	ОЕМ	ОЕМ	OEM	OEM	OEM
TYPE Style		oc.u	CEM	DEM	OEW
	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester disk
Disk diameter inches	only 14	only 8	only	only	only
CAPACITY	0.000	l°	8	8	8
Recording surfaces per drive unit Tracks per surface	2/4	2 -1			
Unformatted capacity per drive unit bytes	404	3 plus servo 656	5 plus servo 656	7 plus servo 656	5 plus servo 823
ERFORMANCE	14 5M / 29M	22M	37M	52M	83M
Head movement time					1
Average (move of 1 in	20	2	7	7	7
Across all tracks, msec	65	40	40	40	40
	140	70	70	70	70
bytes per second	889.000	680.000	8 3 680 000	8 3 680.000	8 3 1 200 000
SOFTWARE SUPPORT	None	Built in diagnostics	Built-in diagnostics	Built-in diagnostics	Built-in diagnostics
PACKAGING					
Controller	No	No	No	No	No
Formatter	No	No	No	17274	
Interface				No	No
Drow	No	SMD. ANSI, SA1000	SMD ANSI SA1000	SMD, ANSI, SA1000	SMD. ANSI
Drive units per controller Drive units per formatter	-	8	8	8	8
Drive mounting	Separate chassis	8	8	8	8
Drive dimensions (h x w x d), inches	E1 100 010		200		_
	51 x 166 x 219 35	51 x 8 75 x 19 4 30	5 1 x 8 75 x 19 4 30	51 x 8 75 x 19.4 30	5 1 x 8 75 x 19 4
Power source for drives	Separate	Separate	Separate	Separate	Separate
PRICING AND AVAILABILITY					
Purchase price— Controller		1			
Formatter	_	-	-	_	_
Interface	_	locluded			-
First drive Additional drive	\$2,550 \$3,500	\$3,460	Included \$3,780		Included \$4.580
Software		-	-	-	-
Maintenance Controller			_	-	
Interface	_	-	-	- 1	_
Drive Quantity discounts available		=	_	_ :	
	Yes	Yes	Yes	Yes	res
Availability days APO	June 1978		June 1979	June 1979	Ond quarter 1982
Number of drives installed to date			From Stock	From stock 4	15
	Factory, customer				IA actory
COMMENTS					
Availability, days ARO Number of drives installed to date Serviced by	90 NA	From stock NA	June 1979 From Stock NA	June 1979 2 From stock 4	2nd quarter 198 15 IA

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SUPPLIER AND MODEL	Storage Technology Corp. 8360	Storage Technology Corp. 8370	Storage Technology Corp. 8380	Storage Technology Corp.	System Industries 2284
COMPUTERS INTERFACED	IBM 370, 303X 3081, 4300	IBM 4331, 4341	IBM S 370. 303X	8650 IBM 370. 303X	DEC PDP 11 11 70
PRIMARY MARKET			4341	3081 4300	VAX 11 / 750 VAX 11 / 780 DG Nova
TYPE	End user OEM	End user OFM	End user OFM	End user, OEM	Eclipse End user
Style		- s usus OCM	Cha aser, OEM	ena user. CEM	Erid üser
Disk diameter, inches	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester disk
CAPACITY	14	only 14	only 14	only 14	only 14
Recording system					
Tracks per surface Unformatted capacity per drive unit, bytes	30 (2 HDAs) 1120	_	_	30 (2 HDAs) 2240	5 823
PERFORMANCE	635M (2 HDAs)	571M	2520M (2 HDAs)	1270M (2 HDAs)	165M
Head movement time— 1 track, msec					100000
Average (move -4 s -	6	6		6	6
Across all tracks, msec	18	20	16	6 23	27
	28	40	_	39	55
and, bytes per second	8.3 1.198.000	10 1	8 3 3 000 000	8 3 1.198.000	10 12
SOFTWARE SUPPORT	1	C.S.A.L. VERNOLES, I	300000	1.198.000	1.012.000
	Diagnostics	Diagnostics	Diagnostics	Diagnostics	Operationg system diagnostics, micro- diagnostics
PACKAGING Controller					
Controller	STC 8000, 8880	STC 8880	STC 8880 8890	STC 8000, 8880	Yes
Formatter	8890 Yes	With controller	With controller	8890 Yes	Yes
Interface	Yes	Yes	Yes	Yes	
Drive units per controller	100	res	res	res	Yes
Drive units per formatter	16	-	_	16	8
Drive mounting	8 Stand-alone cabinet	Stand alone cabinet	Stand-alone cabinet	8 Stand-alone cabinet	8 Computer chassis
Drive dimensions (h x w x d), inches			ois is a control		our-puter criabilis
	47 x 43 5 x 31 5 935 or 1040			47 x 43 5 x 31 5 935	10.3 x 18 9 x 26 6
Power source for drives	AC from first drive DC per drive	=	-	AC from first drive. DC per drive	100 Separate
PRICING AND AVAILABILITY	po por dive			DC per drive	
Purchase price — Controller					9
Formatter	\$55,500 to \$336,323	\$77,150 to \$142 178	\$77 150 to \$336.323	\$55.500 to \$336.323	
Interface	Included Included	Included	Included •	Included	-
First drive	\$50.010	\$43.450	Included \$99.515	Included \$60.880	Contact vendor
Additional drive Software	\$37,235	\$28.960	\$82.555	\$51.355	Contact vendor
Maintenance—	Included	Included	Included	Included	
Controller	Contact vendor	Contact vendor	Contact vendor	Contact vendor	
Drive	-		-		_
Quantity discounts available	Contact vendor Yes, to OEMs	Contact vendor Yes, to OEMs	Contact vendor Yes to OEMs	Contact vendor Yes, to OEMs	_ Yes
First delivery month year	June 1980	4th quarter 1981	2nd guarter 1982	May 1979	1980
Availability days ARO	60	- quarter 1501	- quarter 1902	May 1979 60	30 to 45
Number of drives installed to date Serviced by	Over 500 STC customer	- STC	-	Over 2000	Over 450
	37C Customer	STC customer	STC customer	STC. customer	S I field service
COMMENTS	Model A2 includes	Two independent	Two independent	Model A2 includes	
	controller for up to	actuators per HDA	actuators per HDA	controller for up to	1
	3 Model B2 drives.	Model A1 includes	Model A4 includes	3 Model B2 drives	
	IBM 3350, also see	controller for up to 3 Model B1 drives	controller for up to 3 Model B4 drives	plug-compatible with IBM 3350	
		plug-compatible	plug compatible	also see Report	
		with IBM 3370, also see Report	with IBM 3380. also see Report	7006-789-04	
		70D6 789 04	70D6 789-04	1	

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APRIL 1982

All About Winchester Disk Drives

SUPPLIER AND MODEL	System Industries 9775	Tandon Magnetics TM 601/601E	Tandon Magnetics TM 602/602E	Tandon Magnetics TM 603/603E	Tecstor Sapphire 160	
JULY BELLEVIE	3//6	8.550 Rossion 7-1			SMD-compatible	
OMPUTERS INTERFACED	DEC PDP-11 -11/70 VAX-11/750 VAX- 11/780 DG Nova	-	-	_	OEM	
	Eclipse End user	OEM	OEM	OEM	OEM	
RIMARY MARKET	Line out			Winchester disk	Winchester disk	
YPE	Winchester disk	Winchester disk	Winchester disk only	only	only 14	
Style Disk diameter inches	only 14	only 5 25	5 25	5 25		
			4	6	6	
APACITY Recording surfaces per drive unit	20	2	153 230	153 230	1400 plus 8 spare	
Tracks per surface	843	153 230	6 4M 9 6M	9 6M 14 4M	169M	
Unformatted capacity per drive unit, bytes	675M	3 2M / 4 8M				
PERFORMANCE			_	3	8	
Head movement time-	10	3	153 210*	153 210°	35	
1 track, msec Average (move of 1/3 of tracks), msec	25	153 210	153/210		65	
	50	R 34	8.34	8 34	1000.000	
Average rotational delay (1/2 rev.) msec Data transfer rate. bytes per second	8 3 1 200,000	625,000 500,000	625,000 500,000	625 000 500 000	21.51	
SOFTWARE SUPPORT	Operationg system diagnostics micro-diagnostics	None	None	None	None	
PACKAGING			No	No	No	
Controller	Yes	No	No	_	No	
Formatter	Yes	-	-	2000	Included	
Interface	Yes	Yes	Yes	Yes		
Drive units per controller	8	-	-	-	-	
Drive units per formatter	8	-	-	-	Rack	
Drive mounting	Separate cabinet	Minifloppy standard	_	_	10 2 × 18 98 × 24	
Drive dimensions (h x w x d), inches Drive weight, pounds Power source for drives	36 2 x 23 x 38 635 Internal	3 25 x 5 75 x 8 - -	3 25 × 5 75 × 8 6 5	3 25 × 5 75 × 8 6 5 —	88 Internal	
A A A A A A A A A A A A A A A A A A A						
PRICING AND AVAILABILITY Purchase price—						
Controller			-	-	-	
Formatter	-	-	-	=	Included	
Interface	-	-	Contact vendor	Contact vendor	\$8.250	
First drive Additional drive	Contact vendor	Contact vendor	Contact vericor	- Comact vencor	_	
Additional drive Software		_	=	-		
Maintenance—						
Controller	-	-	-	-	-	
Interface	_	-	1,500	_		
Drive Quantity discounts available	Yes	Contact vendor	Contact vendor	Contact vendor	Yes	
First delivery month year	1980	March 1982	November 1980	November 1980	November 1980	
Availability days ARO	30 to 45	Contact vendor	Contact vendor	Contact vendor	30 to 60	
Number of drives installed to date Serviced by	Over 100 S1 field service	NA Customer	Customer	Customer	Factory, custome	
COMMENTS		Can be interfaced with Tandon floppy disks	Can be interfaced with Tandon floppy disks, "with fast seek algorithm in the controller, average access time is 98 msec on TM602 137 msec on TM602E	Can be interfaced with Tandon floppy disks, "with fast seek algorithm in the controller; average access time is 98 misec on TM603, 137 misec on TM603E		

SUPPLIER AND MODEL	Texas Instruments 525/61	Instruments 525/62	Texas Instruments 525/122	United Peripherals UP-1696	United Peripherals UP-1698	
COMPUTERS INTERFACED				-		
		-	_	HP 3000 Series	HP 3000 Series 30, 33, 40, 44, 64	
PRIMARY MARKET				1		
	OEM	OEM	OEM	End user	End user	
TYPE Style						
	Winchester disk	Winchester disk	Winchester disk	Winchester disk	Winchester disk	
Disk diameter inches	only 5.25	only	only	only	only	
CAPACITY	325	5 25	5 25	14	14	
Recording surfaces per drive unit	2					
Tracks per surface	306	153	306	40 843	843	
Unformatted capacity per drive unit bytes	6 38M	6 38M	12.76M	675M	675M	
PERFORMANCE Head movement time				1.000000		
Average (move of 1 3 of tracks) msec Across all tracks msec	3 100	170	3	10	10 25	
Average and	270	471	270	25 50	50	
Data transfer rate bytes per second	8 33	8 33	8 33	183	83	
SOFTWARE SUPPORT	625 000	625.000	625,000	1.200.000	1.000.000	
SOPPORT	None	None	None	Plug-compatible with HP 7925	Diagnostics	
PACKAGING						
Controller	No			V	lant de d	
Formatter	1.00	No	No	Yes	Included	
Interface	No	No	No	-	-	
interface	Yes	Yes	Yes	Yes	Yes	
Drive units per controller					ł	
Drive units per formatter Drive mounting			_	4	4	
The second secon	-	-	-	Stand-alone cabinet	Stand alone cabine	
Drive dimensions (h x w x d), inches Drive weight, pounds	3 25 × 5 75 × 8	3 25 x 5 75 x 8	3 25 x 5 75 x 8	36 2 × 23 × 38	36 2 × 23 × 38	
Power source for drives	Separate	Separate	Separate	600	635	
PRICE						
PRICING AND AVAILABILITY Purchase price	1	1				
Controller	1					
Formatter Interface	_		_		1	
First drive			-	_	_	
Additional drive	\$1.225	\$1.360	\$1.575	Contact vendor	Contact vendor	
Software Maintenance	-	_	_	=	=	
Controller	1_					
Interface Drive	-	_	-	-		
Quantity discounts available	-	-	-	-	-	
	Yes	Yes	Yes	Yes	Yes	
First delivery, month, year Availability, days ARO	April 1981	3d quarter 1982	3rd quarter 1982	August 1980	January 1982	
Number of drives installed to date	30 NA	-	-	30	30	
Serviced by	Texas Instruments	Texas Instruments	Texas Instruments	110	NA	
			- cas instruments	Factory	Factory	
COMMENTS	Uses thin-film		Uses thin-film		Emulates four	
	plated media		plated media		HP 7925 disk drives	

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APRIL 1982

All About Winchester Disk Drives

	SUPPLIER AND MODEL	SUPPLIER AND MODEL United St Design CSS-1		United State Design CSS-525	s United Stat Design CSS-700	United Sta Design CSS-80	O	Design CSS-900	
	COMPUTERS INTERFACED DEC LSI-1		DEC LSI-11 DEC LS Intel Me		1: DEC LSI-11, PDP. Intel Multibus, IBM Personal	11. DEC LSI-11. PDP-11. Intel Multibus, IBM Personal		DEC LSI-11, PDP-11; Intel Multibus, IBM Personal	
	PRIMARY MARKET	OEM	Co	imputer id user	Computer End user, OEM	Computer OEM		Computer OEM	
	Style								
	Disk diameter, inches	Winchester plus 0.25 in tape 8	on 5.2		Winchester with opt floppy or tape 5.25	Winchester plus 0 25-in tape		Winchester plus 0.05-in. tape	
- 1	CAPACITY Recording and and	1			1	l°		8	
- 1	Recording surfaces per drive unit Tracks per surface	5 (20MB)	4		14	1-	- 1		
- 1	Unformatted capacity per drive unit byt	380 10M, 20M, or 40	140		140	5 525	- 1	5	
	PERFORMANCE Head movement time— 1 track, msec	10M 20M 6r 40	M 6.7	м	6 7M	35M or 70M		525 35M or 70M	
- 1	Average imove of 1/2 of trans	6	13		1_		- 1		
- 1	Across all tracks, msec	35 65	125		125	8		8	
- 1	Average rotational delay (1/2 rev.) insecond Data transfer rate. bytes per second	8.3	240		240	42 75		42	
- 1	rate byres per second	648,000	6.25	000	6 25	83		75 3 3	
S	SOFTWARE SUPPORT	Diagnostics and	- 1		625,000	800.000		800,000	
		driver	Diag	nostics	Diagnostics	Diagnostics		Diagnostics	
P	ACKAGING Controller					1	1		
		Included	Includ	to d		1	- 1	1	
1.	ormatter	With controller			Included	Included	1	cluded	
1e	nterface		With	controller	With controller		1.	cluded	
10	70m	Included	Includ	led		With controller	W	ith controller	
10	rive units per controller rive units per formatter	8	-		Included	Included	lan.		
D	rive mounting	8	2	1	2	4	1	cluded	
D	tive dimensions a	Table-top or rack- mounted	Table-		2	4	4	1	
	rive dimensions (h x w x d), inches rive weight, pounds	65 x 175 x 22	1		Table-top or rack- mounted	Table-top or rack-	4		
Po	ower source for drives		5 25 x	05x14	7 x 17 x 17 5	mounted	Ta	ble-top or rack-	
1		Included	Include	- I	35	5 5 x 17 x 22 5	9 9	5 x 17 x 22	
	CING AND AVAILABILITY rchase price — ontroller			~ '	ncluded	included	45	luded	
Fo	ormatter	Included	1	- 1			1	1	
In	terface	Included	Include	ed L	ncluded			1	
A	rst drive dditional drive	\$10,050	Include	, h	ncluded	Included	Inci	uded	
Sc	Oftware	-10.050	84,250	1		Included Included	Incl	uded	
Mai	intenance—	-	\$3,415	s	4.900	\$12,300	Incl	uded	
Int	erface	_		1	-	-	515	500	
Dri	IVP	-	-			_	-		
Qua	intity discounts available	Yes	_			-		- 1	
First	delivery many	ies	Yes	1-	- 1	-	1	1	
Avai	lability days ARO	September 1979			es .	Yes	-		
Serv	ober of drives installed to date	30 170	March 1	1982 M	lav 1002		Yes	1	
		Factory, third party	NA	190)	March 1982			
OM	MENTS	triird party	Factory.	third party Fa		30 NA	90	1982	
Siell	MEI/12	324 5	1	DB	ictory third	actory, third	-	1	
		32K-byte buffer holds full track	Emulate	. D.c	11	arty	Facto	ory, third	
				2 drives	in be configured		party		
		DEC software			estern 2 Win. 3	2K of multiported	Can	be configured	
			nostics, USDC I/		ppy disk or	nemory, cache	with	2 Winchesters	
	1								
	1								
	1							hester and floppy or	
				US	DC I O bus	1	G-on	S Of Multibure	
					- ous	1	back	plane	

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Custom single Doard micro	SUPPLIER AND MODEL	XCOMP ST/R	XCOMP ST/S	XCOMP X/BT-5	XCOMP X/BT-10	Xycom 3875/3975
PRICING AND AVAILABILITY PRICING AND AVAILABILITY PRICING AND AVAILABILITY PRICING AND AVAILABILITY Province of the source for drivers Prover source for drivers Prover source for forms	OMPUTERS INTERFACED	Custom single	Custom S-100	IBM PC, TRS 80 IL	IBM PC, TRS 80 II.	RS-422-A serial interface, SDLC
Vector V		coard micro			any Z80-based	protocol
Winchester dask only 5.25	RIMARY MARKET	OEM	OEM	End user	End user	End user
Winchester disk only 525	YPE					
Disk dameter inches	Style				Winchester disk	Winchester disk
APACITY Percoraing surfaces per drive unit Placks per surface Inflacts per surface Inflactsurface Inflacts per surface Inflacts per surface Inflacts per sur	A 2000					
A	Disk diameter, inches				5 25	8
Recording surfaces per drive unit	APACITY					
306 306	Recording surfaces per drugs	4		4	4	
Package Pack						350
### ### #### #### ####################	Unformatted capacity per drive unit, bytes			6 4M	12.8M	11 3M
Head movement time— 1 track mase	ERFORMANCE				1	
175	Head movement time-					
S34	1 track msec			1 75		
Average rotational delay 11 2 rev misc	Across all tracks and tracks), msec					
According	Average intational dolar (1.2.	534	534	534	-	83
Driver formatter diagnostics Driver formatter diagnostics Driver formatter diagnostics Driver formatter diagnostics PACKAGING Controller Yes Yes Yes Yes Yes Yes Yes Y	Data transfer rate, bytes per second	625 000	625 000	625.000	625 000	648,000
Driver Cornater Driver D					Driver formatter	None
Ves	WARE SUPPORT			diagnostics	diagnostics	
Yes						
Interface	Controller	Yes	Yes	Yes	Yes	Optional
The proper controller	Formatter	Yes	Yes	Yes	Yes	-
Drive units per controller 4	Interface		1000	Vac	Yes	-
A		-	-	ies		
Table top cabinet Tabl	Drive units per controller			4	4	4
Drive dimensions (h x w x d), inches 3 25 x 5 75 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 7 5 x 8 7 5 x 8 7 5 7 5 x 8	Drive mounting	4	4	Table too cabinet	Table-top cabinet	Table top (3875)
25 x 5 75 x 8 3 25 x 5 75		-				rack (3975)
PRICING AND AVAILABILITY	Drive dimensions (h x w x d), inches	3 25 × 5 75 × 8				See Comments
PRICING AND AVAILABILITY	Power source for drives					Internal
Purchase price		CONTONE!				
Controller S980 S980 Included Incl	PRICING AND AVAILABILITY					
Formatter	Purchase price—	1			to stude d	
Interface						
First drive		included	Included		Included	-
Software		\$1.268	\$1.368	\$3.495	\$3,995	\$7,950
Maintenance— Controller Interface Drive Guantity discounts available Yes Yes Yes Yes Yes Yes Yes Y				-		-
Controller Interface Price Country discounts available Yes Y		Included	Included	Included	Included	
Interface Drive Country discounts available Ves Ves Ves Ves Ves Ves Ves Ves Ves Ve				_	1_	
Quantity discounts available Yes				_	-	
Comments			-	_	_	Vac
Availability days ARO 30 30 30 30 30 30 30 3	Quantity discounts available	Yes	Yes	Yes		100
Availability days ARO 30 30 30 30 60	First delivery month year	December 1980	December 1980		September 1981	
COMMENTS COMMENTS Factory F	Availability days ARO					60
Drive is manufe tured by MM. M 3875 measures 16 8 x 20 inch. Model 3975 m 8 x 18 8 x 20	Number of drives installed to date Serviced by					
tured by MIM. III. 3875 measures 16.6 x 20 inche Model 3975 m. 8 x 18.8 x 20.0 c. 20 x 20		-				
tured by MM. M 3875 measures 16 8 x 20 inche Model 3975 m 8 x 18 8 x 20	COMMENTS					Drive is manufac-
16 8 x 20 inche Model 3975 m 8 x 18 8 x 20						
Model 3975 m 8 x 18 8 x 20						16 8 x 20 inches.
8 x 18 8 x 20						Model 3975 meas
inches				1		8 x 18 8 x 20
						inches

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All About Winchester Disk Drives

SUPPLIER AND MODEL	Xycom 3876/3976	Xylogics XD1000/440	Xylogics XD1000/530	XVIogics XD1000/650	Xylogics XD1000/85
SUPPLIER AND MODEL		Multibus	DEC 151.11 11/23 DEC PDP 11		DG Nova Eclipse
COMPUTERS INTERFACED	RS-422-A serial interface. SDLC protocol	Multibus			OEM, end user
PRIMARY MARKET	End user	OEM	OEM, end user	OEM end user	Winchester disk
		Winchester disk	Winchester disk	Winchester disk	only
TYPE Style	Winchester disk	only	only	only 8	8
	only	8	8 or 14	0	
Disk diameter inches				3 plus 1 servo	3 plus 1 servo
CAPACITY Recording surfaces per drive unit Tracks per surface Unformatted capacity per drive unit, bytes	5 380 20 5M	3 plus 1 servo 600 plus 14 spares 24M	3 or 2 600 or 420 24M or 20 16M	600 plus 14 spares 24M	600 plus 14 spares 24M
PERFORMANCE					R
Head movement time—		8	8 or 3	8 42	42
1 track mean	6 35	42	42 or 60	80	80
Average (move of 1/3 of tracks), msec	65	80	80 or 130 8 3 or 12 5	83	8 3
Across all tracks, msec Average rotational delay (1/2 rev), msec	83	8.3 800.640	83 or 12 5 800 640 or 960 000	800.640	800 640
Data transfer rate, bytes per second SOFTWARE SUPPORT	648,000 None	CP M driver 8080/ 8086 diagnostics	RL01/RL02 emula-		IRIS driver emula- tor patches to AOS initializer for RDOS, BUSS, COBO
					sysgen
PACKAGING Controller	Optional	Yes	Yes	Yes	Yes
Formatter	-	-	-	_	
100-14 CD		_	_	-	-
Interface					2
Drive units per controller	4	2	1 or 2	2	2
Drive units per formatter Drive mounting	Table top (3876)	Separate chassis	Separate chassis	Separate chassis	Separate chassis
Drive dimensions (h x w x d), inches	rack (3976) See Comments	-	_	- 1	-
Drive weight, pounds	-	-	_	-	
Power source for drives	Internal	_	-	-	-
PRICING AND AVAILABILITY			1		
Purchase price — Controller	_	included	Included	included I	ncluded
Formatter		-	-	-	=
Interface	-	-		-	
First drive Additional drive	\$8.850	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Software	_	_		_	
Maintenance—					
Controller	-	-	-	- -	
Interface Drive	_	-	_	- -	-
Quantity discounts available	Yes	Contact vendor	Contact vendor	Contact vendor	Contact vendor
First delivery month year					
Availability days ARO	September 1981	Contact vendor	Contact vendor	_	
Number of drives installed to date	5	NA vendor			Contact vendor
Serviced by	Factory	Factory			actory
COMMENTS	Orive is manufac- tured by IMI, Model 3876 measures 8 x	The XD1000 series is one of many Win-			ice XD1000/ 40 Comments
	16 8 x 20 inches Model 3976 measures 8 x 18 8 x 20 inches	chester disk sub- systems offered by Xylogics			

SUPPLIER AND MODEL	ZZY Sys ZRP-X	ZZY Systems 38 ZRP-XXX 8421/		22	3M 8431/843	2 3M 8523		3M 8533
COMPUTERS INTERFACED DEC PDP		LSI 11	Custom		DEC LSI 11 5 10 and Intel Multibus	.	Custom	DEC LSI 11 5-100 and Intel Multibus compatible custom
PRIMARY MARKET	5		1		compatible custor	"		A CONTRACTOR
TYPE	End user OEN	4	OEM		OEM	- 1	OEM	OEM
Style						- 1		
200020000	Winchester plu	15	Winchester disk		Winchester disk		Winchester disk	Winchester disk
Disk diameter inches	opt tape drive		only 8		only 8		only B	only 8
CAPACITY			ľ		6	- 1	0	
Recording surfaces per drive unit	5						4	4
Iracks per surface			2 4 280		2 4 280		938	838
Unformatted capacity per drive unit by	tes 165M	- 1	10M 20M		10M 20M	16	50M	60M
PERFORMANCE Head movement time—								
1 track msec Average (move of 1 3 of tracks) msec	6	- 1	18 6		186	6		6
MCTOSS all tracks meer	1 22		65		65		10	30 55
Average rotational delay (1. 2	55		110		96		5 6	96
Data transfer rate, bytes per second	1 000 000		33 333		933 333		33.333	933,333
SOFTWARE SUPPORT	Transparent to operating system		lone		None	N	lone	None
ACKAGING								
Controller	Yes	l _N		- 1	No	N	o	No .
	1.63	"		- 1		1		
ormatter	Yes	Yes No		No N		o No		No
nterface	Yes	Yes 3N			ANSI 1226		м	ANSI 1226
rive units per controller	2 8				8	8		8
rive units per formatter	-	8			8	8		8
rive mounting	Cabinet or rack	Ra	ck mount or		Rack mount or		ick mount or	Rack mount or computer chassis
rive dimensions (h x w x d) inches	10 3 x 19 x 26 6		nputer chassis 1 x 8 55 x 11 75	1122	computer chassis 4 51 x 8 55 x 14 21		mputer chassis 51 x 8 55 x 11 75	4 51 x 8 55 x 14 21
ive weight, pounds	50		15		16/17	15		17
wer source for drives	Separate		parate	5	Separate	Se	parate	Separate
CING AND AVAILABILITY	1	1		1				1
rchase price-				1		1		1
ontroller	Included	-		1-	-	-		-
rmatter erface	Included	-		1-	-	-		_
errace st drive	Included Contact vendor	611	26 \$1,910		2 345 \$2 675	53	570	\$5.200
ditional drive	Contact vendor	-	20 91,910	1-		1-	70.076	-
ltware	Included	-		1-		-		-
ntenance— ntroller				1				_
erface	_	1-		1=		_		_
ve	-	-		-		-		-
ntity discounts available	Yes	Yes		Ye	s	Yes		Yes
delivery, month year	July 1981	Anni	1981	An	ord 1981	,bo	uary 1982	January 1982
ability days ARO	30 30	30	. 301	30		NA		NA
per of drives installed to date	NA	NA	NA NA		A NA			NA OFFA
ed by	Factory	OEM		OE	M	OEN	^	OEM
1			- 1					
ENTS	Available with	Does	not include		ves are compatible		s not include	Drive is compatible
5	treaming tape drive				h other ANSI		handling	with other ANSI drives and includes
	or 75-ips tape	electro		2	res and include a separation	erect	ronics	data separation
	rive, up to 4 isks per cabinet		1	att	o separation		1	1.0
١٠	and per submet		1		1			
1	1		- 1					
	1		- 1				1	
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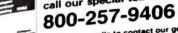
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