

Wren™ V 5¼-inch Rigid Disk Drives

MAY 12 1988



Designed for Original Equipment Manufacturers (OEM)

The Control Data Wren V is a high-capacity full-height 5¼-inch Winchester. Wren V features the high performance and reliability designed into the Wren family of products. Two industry standard interfaces are offered—SCSI and ESDI.

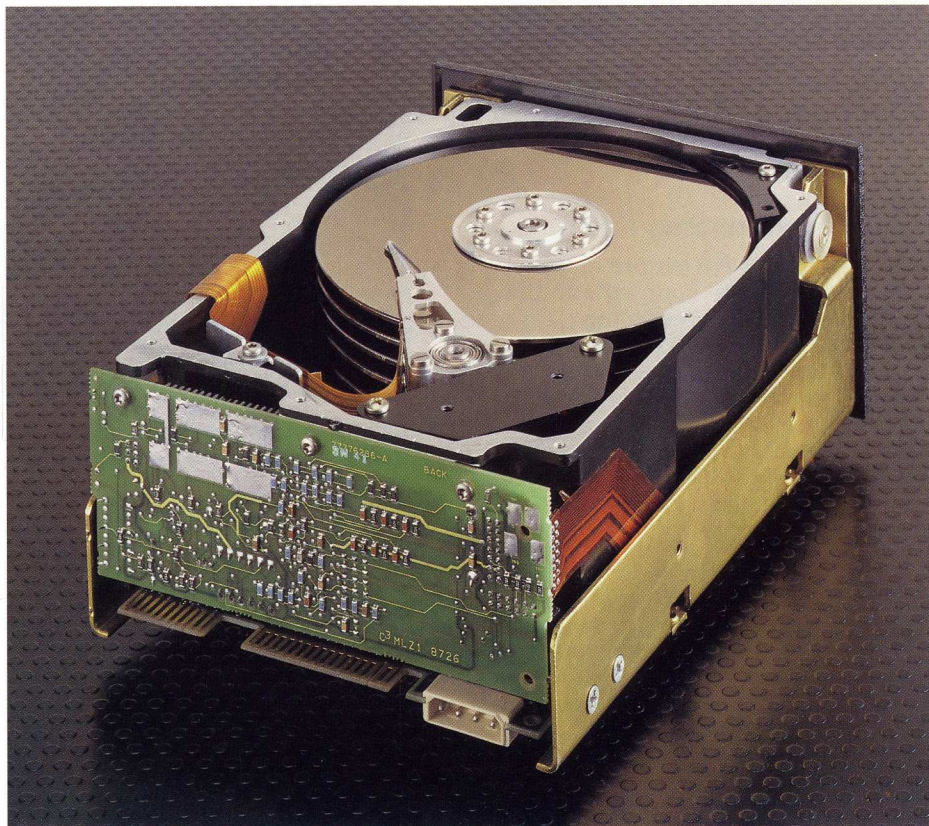
Zoned bit recording, an exclusive feature of Wren V drives with the SCSI interface, offers more capacity for the user than conventional recording techniques. The highest capacity Wren V provides 574 megabytes formatted. Another SCSI Wren V uses only five disks for a capacity of 344 megabytes formatted.

Three models with the ESDI interface provide up to 442 megabytes unformatted. One of these, with a capacity of 383 megabytes, has a blistering 14.5-millisecond average seek.

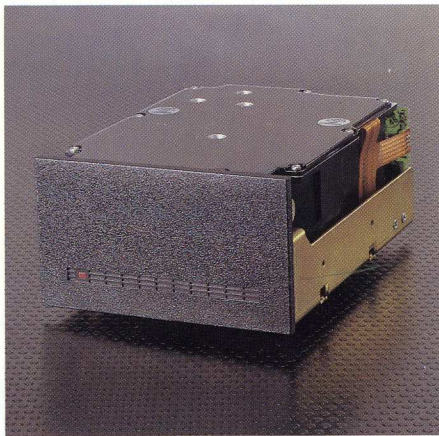
The reliability of Wren V drives is enhanced by incorporation of a lifetime environmental control system (patent pending). One Wren V model with five disks has a 40,000-hour MTBF, exceeding the already outstanding 30,000-hour specification on other Wren drives.

Features

- Capacities up to 574 megabytes formatted
- ESDI or SCSI interface
- Zoned bit recording for greater capacity (SCSI)
- In-hub spindle motor allows 8 disks in 5¼-inch form factor
- Average seek as fast as 14.5 ms
- Patented tri-phase servo for faster access
- 9–15 MHz transfer rate (SCSI)
- Synchronous data rate up to 4 Mbytes/sec (SCSI)
- 10 MHz transfer rate (ESDI)
- Automatic thermal compensation (SCSI)
- Up to 40,000-hour MTBF
- Patented lifetime internal HDA environmental control
- Read/write heads automatically retract to non-data zone
- Automatic actuator restraint/shipping lock
- Internal shock mounts
- Patented, balanced, low-mass, straight-arm, rotary, voice coil actuator
- No mounting restrictions
- Surface mount technology reduces electronics to 2 boards
- Low power consumption—24 watts
- Cool operation—no external cooling required
- Low audible noise



**You Cannot
Outdistance
Control Data**



Wren V drives provide up to 574 megabytes of formatted capacity with the SCSI interface.

Zoned Bit Recording (ZBR)

ZBR is an exclusive feature of the Wren family. When coupled with the SCSI interface, this recording technique offers more user storage capacity using fewer heads and media than conventional recording. ZBR provides more user storage capacity, faster data transfer, and higher reliability. With ZBR you get tomorrow's capacity using today's proven technology.

Tri-phase Servo

This patented servo design allows greater servo sampling, allowing faster actuator speeds than conventional designs. A unique feature of this design is the automatic single track seek error correction capability.

Eight Disk Design

Wren V utilizes eight platters of thin film media. The industry standard form factor is achieved by the use of a new high energy, low power in-hub spindle motor.

The servo surface of the Wren V has been moved from the more traditional lower surface of the bottom platter, to the center of the platter stack. This design reduces the effect of off data track errors due to thermal changes, thus adding margins to the drive.

Low-mass Actuator Improves Performance

The heads are mounted on a patented straight-line arm connected to a balanced rotary voice coil actuator. This design has 60 percent less mass than other designs. High-energy magnets in the voice coil further improve speed, resulting in a typical average seek as fast as 14.5 milliseconds.



Patented actuator has 60 percent less mass for average seeks as fast as 14.5 ms.

In-hub spindle motor allows 8 disks in the 5 1/4-inch form factor.

Automatic Thermal Compensation

SCSI models have automatic thermal compensation, minimizing the effects of temperature changes on the relationship between the servo and data heads. The servo track is referenced by the on-board micro-processor, and the system automatically adjusts head positioning during head select.

SCSI Interface

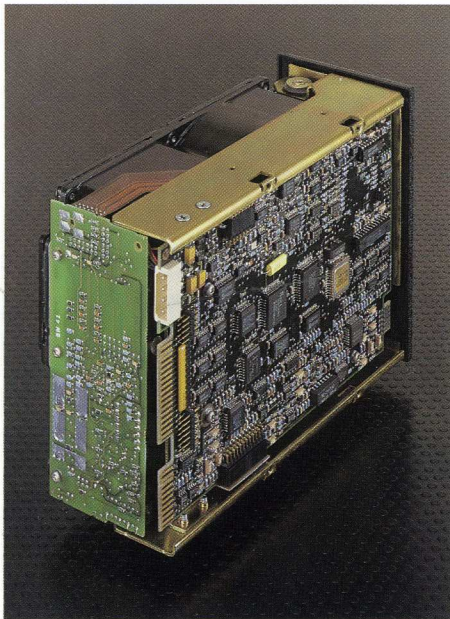
The embedded SCSI controller conforms with the ANSI SCSI standard and the Common Command Set. The SCSI interface supports multiple initiators, disconnect/reconnect, self-configuring host software and automatic features that relieve the host from the need to deal with the physical characteristics of the disk drive.

ESDI Interface

The ESDI interfaces provides an industry-standard 10 MHz transfer rate. Wren V drives support both hard- and soft-sector applications and are compatible with all industry-standard controllers and applications. Data recover and separation are incorporated in the drive.

Low Power Consumption

The Wren V typically draws only 24 watts, resulting in cool operation, higher MTBF and reduced operating cost. There is no need for external cooling.



Surface mount technology reduces electronics to 2 boards.

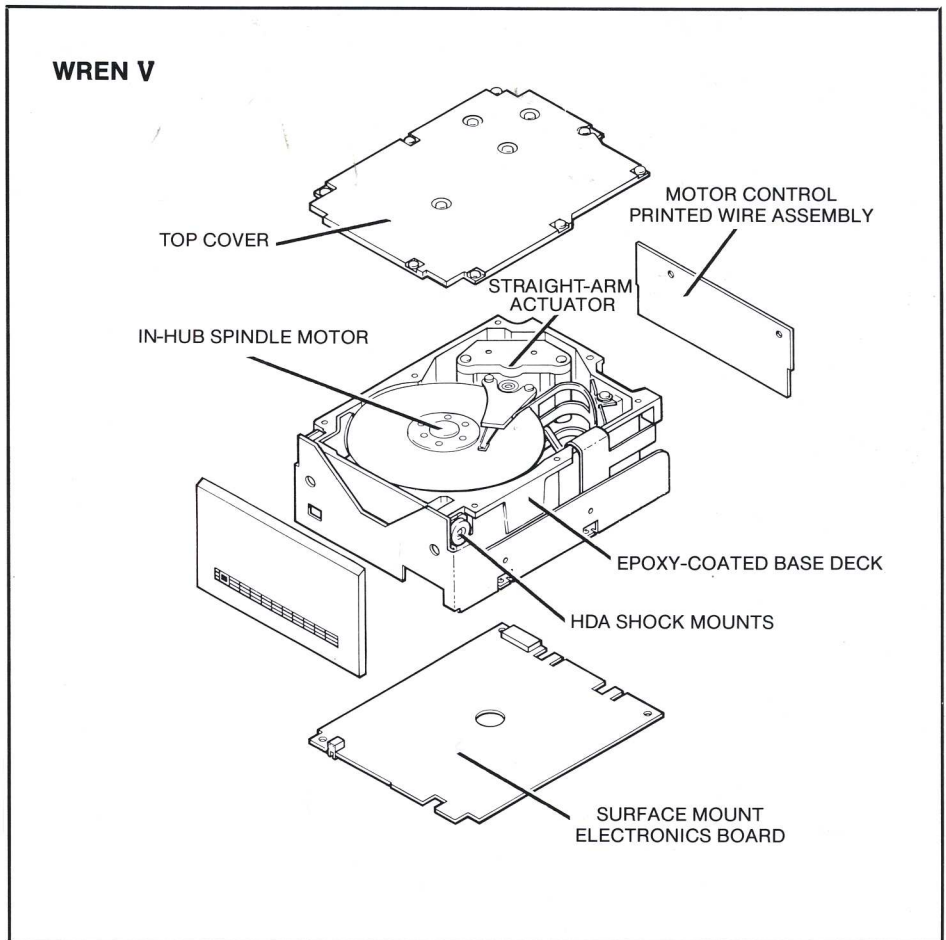
Lifetime HDA Environmental Control

The head disk assembly of Wren V incorporates a lifetime environmental control system (patent pending). This system uses advanced two phase air filtration, activated carbon to absorb thin film media harmful gases, and a unique desiccant module that controls HDA internal humidity. A capillary tube in the breather filter restricts water vapor entry.

The base casting is epoxy coated and all HDA internal metal parts are coated. This lifetime environmental control system provides rapid cleanup of the HDA, internal humidity and corrosion control, and absorption of harmful gases, resulting in a higher margin product.

Quality Designed In

Features such as HDA Environmental Control, Thermal Compensation, and ZBR allow Control Data to provide the high-performance high-reliability disk drives in the high volumes demanded today. The margins are designed into the Wren V to allow maximum application flexibility.



Product Safety Standards

All Wren family products meet requirements for UL, CSA and VDE certification. Wren drives are supplied as Class A computing devices per FCC rules governing radio frequency and electromagnetic interference.

Maintenance and Spares

All Control Data products are backed by a comprehensive maintenance and spares support program.

Repair

Control Data provides a dedicated repair facility for all Wren family products.

The Wren Family

The Wren family provides a range of models from 48 to 574 megabytes.

- Wren II: 48 to 96 MB
—ST506
—ESDI
- Wren II HH: 51 MB
—ST506
- Wren III: 101 to 182 MB
—ESDI
—SCSI
- Wren III HH: 106 MB
—ESDI
—SCSI
- Wren IV: 320 to 344 MB
—SCSI
- Wren V: 344 to 574 MB
—ESDI
—SCSI
- Wren V HH: 190 MB
—SCSI

SPECIFICATIONS	94186-383	94181-344	94186-383H	94181-574	94186-442
Capacity (Mbytes)					
ESDI—Unformatted	383		383		442
SCSI—Formatted at 1,024 Bytes/sector includes normal spares		344		574	
Configuration					
Number of disks	7	5	8	8	8
Data surfaces	13	9	15	15	15
Servo surface	1	1	1	1	1
Tracks/surface	1412	1549	1224	1549	1412
Recording method	2,7 RLL	ZBR	2,7 RLL	ZBR	2,7 RLL
Performance					
Seek time (ms)					
Single track	4	3	3	3	3
Average	19.5	16	14.5	16	16
Data transfer rate (Mbits/sec)	10	9-15	10	9-15	10
Rotation speed	3,600 rpm				
Average latency	8.33 ms				
Reliability and Maintainability					
Error Rate					
Recoverable	1 in 10 ¹⁰ bits read, max				
Unrecoverable	1 in 10 ¹² bits read, max				
Seek	1 in 10 ⁶ seeks, max				
MTBF					
5 Disks or less	40,000 hours				
6 Disks or more	30,000 hours				
MTTR	½ hour				
Preventive maintenance	None				
Service life	5 years or 30,000 hours				
Power Requirements					
DC	+12 V (± 5%) 1.7A typical +5 V (± 5%) .7A typical				
Power dissipation	24 W ESDI, 27 W SCSI				
Environmental					
Temperature					
Operating	10° to 50° C (50° to 122° F)				
Storage	-10° to 54° C (14° to 130° F)				
Transit	-40° to 70° C (-40° to 158° F)				
Relative humidity					
Operating	8 to 80%				
Storage	8 to 90%				
Transit	5 to 95%				
Altitude					
Operating	-300 to 3000 m (-1000 to 10,000 ft)				
Transit	-300 to 12,000 m (-1000 to 40,000 ft)				
Acoustical noise					
Operating	Less than or equal to 50 dBA				
Physical					
Height	82.55 mm (3.25 in)				
Width	147 mm (5.75 in)				
Depth	203 mm (8.0 in)				
Weight	3.9 kg (8 lbs)				

Distributed by:

Specifications subject to change without notice.

Control Data sales offices are located in principal cities throughout the world.

 CONTROL DATA

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