CONTROL DATA®
9414 FIXED MEDIA DISK DRIVE

Designed for Original Equipment Manufacturers (OEM)

CONTROL DATA

The Control Data 9414 Fixed Media Disk Drive is a low cost, highly reliable, easily maintained, random-access storage device which uses either one or two fixed disks as storage media. The basic 9414 unit consists of a rack-mountable deck assembly which includes a spindle and drive motor, two nonremovable disks, head positioning mechanism, analog and digital electronics and air filtration system.

Read/recovery circuitry operates with either soft sectoring formats with missing clocks (such as those found in variable sector formats) or the hard sectoring formats. This unit features absolute (direct) addressing to position heads to the desired track. A closed-loop, proportional servo system is used in conjunction with a voice-coil linear actuator to provide accurate and rapid data accessing. The 9414 is designed to mount in a 19-inch (483 millimeter) relay rack and requires only 5.25 inches (133 millimeters) of rack height.

The Model 9414 provides a total of 12 megabytes of unformatted, on-line storage on 408 addressable cylinders. It is also plug compatible with the CDC® 9427H Cartridge Disk Drive, which enables the user to daisy-chain any combination of the two units (up to a maximum of four drives) and obtain 48 megabytes of unformatted data.

FEATURES

- 12 megabytes of unformatted storage—requires only 5.25 inches (133 millimeters) of rack height
- Direct drive spindle—no belts to fail; quiet operation
- No blower—most common source of audible noise
- DC Drive motor—no AC in drive; no troublesome SCR circuits; no line noise
- Field proven actuator and servo system
- MTBF of 6000 hours
- Modular construction; easy maintenance
- No electrical adjustments
- No operator controls located on unit—eliminates human error
- Plug compatibility with the CDC 9427H Cartridge Disk Drive

FUNCTIONAL DESCRIPTION

Model 9414 interface provides flexibility in the design of new controllers, yet remains compatible with existing controllers for Control Data cartridge disk drives. When connected to a host controller and power supply, the 9414 provides up to 12 megabytes of unformatted, on-line storage on two nonremovable disks or an optional six megabytes of storage on one nonremovable disk. The media is rotated at 2400 revolutions per minute, or an optional 1500 RPM, utilizing a DC drive motor and direct-drive spindle. Air supply and absolute filtering is provided to meet reliability requirements necessary for high density

recording. Air pumping is accomplished by a convolute implementation of the disk shroud, eliminating separate blowers which increases reliability and reduces audible noise.

Head positioning to any of the available 408 cylinders is performed 0through absolute (direct) addressing and field proven closed loop proportional servo system. The carriage is driven by a voice-coil linear actuator which provides an average access time of 65 milliseconds and track-to-track access time of less than 11 milliseconds. Data recording is at 2200 bits per inch, with data transfer at the interface being accomplished at 2.5 mHz in a standard configuration, or 1.56 mHz (optional) with 1500 r/min. Data recovery circuitry operates with either hard or soft sector formats. Hard sectors are available up to a maximum of 32.

The 9414 contains no controls or indicators. Power is supplied by the host system or optional power supply. Optional power supplies are available as 19-inch, rack-mounted units. These contain either single or dual supplies, which will provide all necessary power for one or two 9414s. Power supplies are also available in either 50 Hz or 60 Hz configurations.

ELECTRONICS

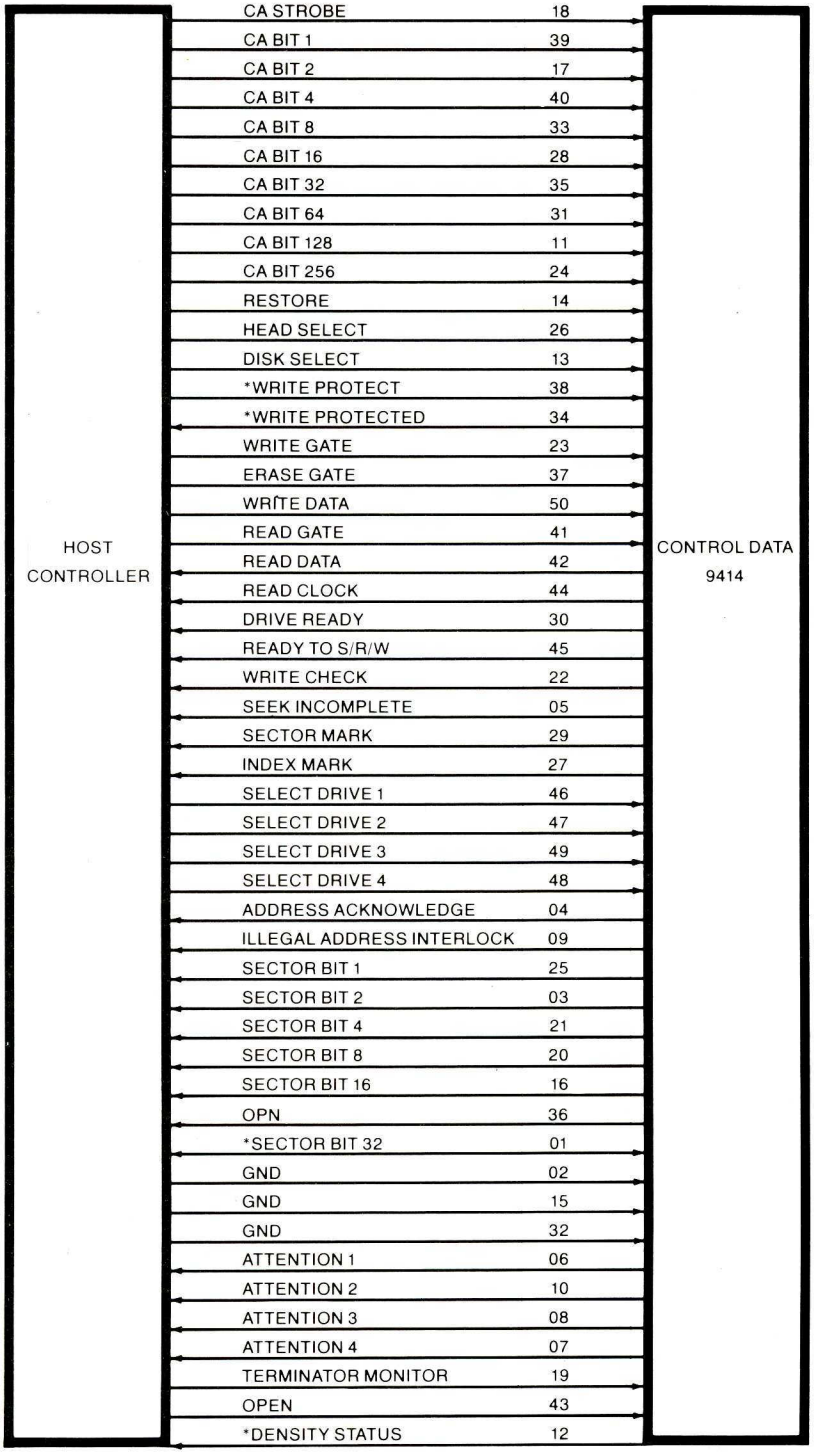
Standard logic building blocks consist of commercially available, dual in-line, low power Schottky TTL integrated circuits mounted on printed-circuit boards.

Each printed-circuit board is a 0functional module designed for easy trouble-shooting and maintenance by a board replacement. the9414requires no electrical adjustments.

MECHANICS

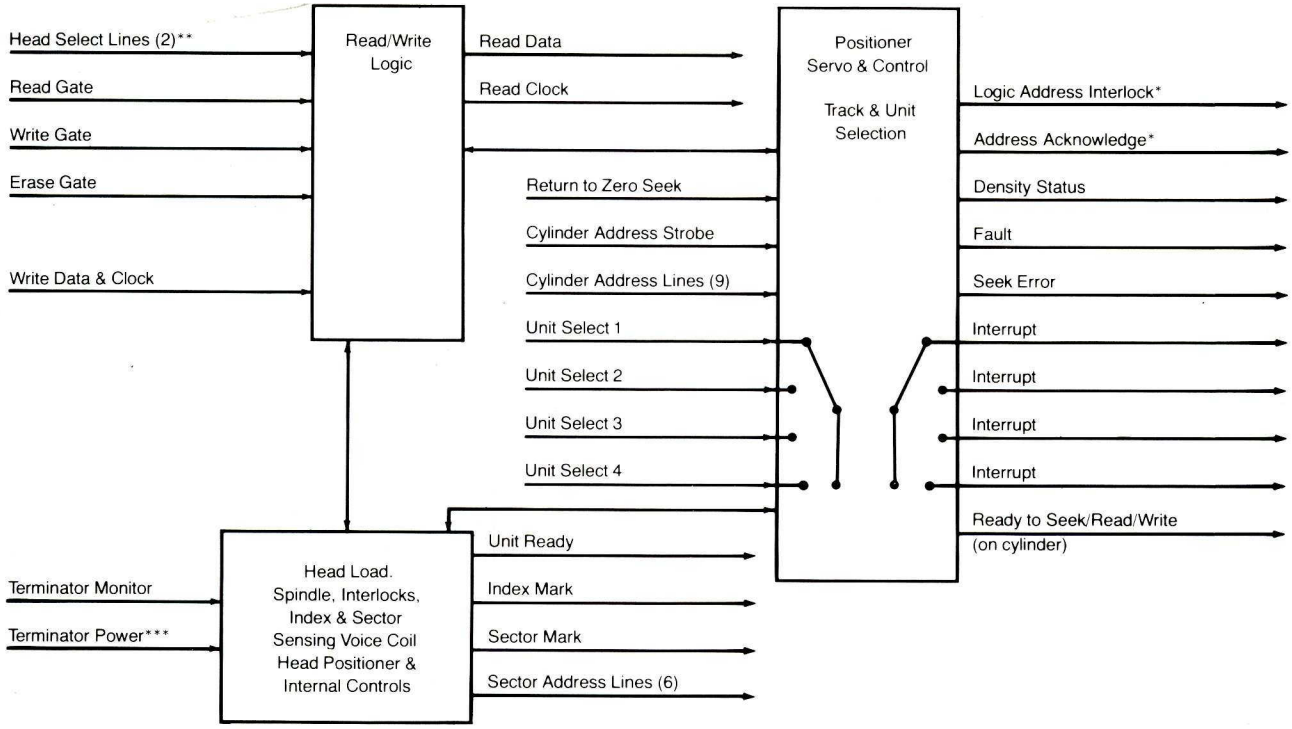
The 9414 is a modular-constructed device consisting of a rack-mounted deck assembly, drive motor, spindle, disk, head positioning mechanism, analog and digital electronics, and air filtration system. Overall construction is designed for ease of maintenance. The unit is also designed to mount in a 19-inch (483 millimeter) rack and requires only 5.25 inches (133 millimeters) of rack height. An optional power supply mounts in either a horizontal or vertical plane. In addition, both the unit and power supply provide attachments for slides.

9414 INTERFACE



*These lines are not actively used or generated in the 9414, but are pinned through and terminated for compatibility with other disc drives.

9414 BLOCK DIAGRAM



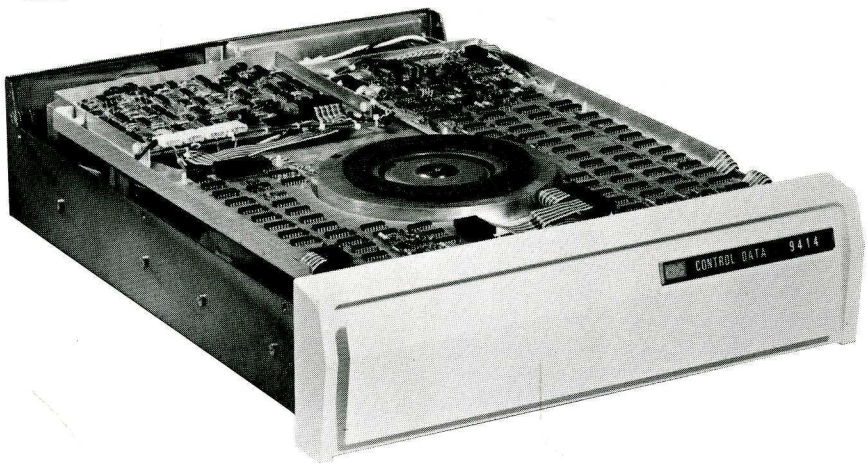
*With the optional availability of Logical Address Interlock and Address Acknowledge interface lines using a Winchester connector, the 9414 is compatible with the Diablo 40 Series Cartridge Disk Drive. Address interlock is not available on the ELCO connector.
**Switches are provided to invert each of these signals to allow compatibility with any head and disk numbering scheme.
***Terminator power is supplied by the 9414 on Winchester and 3M connector options. With ELCO or AMP connections, it is optionally supplied by either the controller or supplied by the 9414 on Winchester and 3M connector options. With ELCO or AMP connections, it is optionally supplied by either the controller or the 9414.

STANDARD FEATURES

- 12 megabytes of unformatted on-line storage via two nonremovable disks
- Choice of hard sectoring from 1 to 32
- Daisy-chain capability (up to four drives)
- 3M I/O connector
- Straddle erase heads
- Direct drive DC spindle motor
- 2400 RPM
- 24-inch rack depth

OPTIONAL FEATURES

- 1500 RPM
- Winchester, Elco, AMP, I/C adapters
- Front panel
- Slides
- Power supply—available in both single or dual, rack or slide mounting in vertical or horizontal planes
- Six megabytes of unformatted on-line storage via one non-removable disk
- Customer logo
- Off-line field tester and power supply
- PLO with or without NRZ option



SPECIFICATIONS

Performance

Max Access Time: 115 ms
Max Track-to-Track Access Time: 11 ms
Average Access Time: 65 ms
Spindle Speed: 2400 RPM (optional 1500 RPM)
Latency Time: 12.5 ms at 2400 RPM (20 ms at 1500 RPM)

Functional

Capacity (unformatted)
Bits/Track: 62,500
Bits/Surface: 25,500,000
Bits/Disk: 51,000,000
Bits/Drive (two disks): 102,000,000
Recording Density: 1530 bits/in (1530 bits/25.4 mm) outer track, 2210 bits/in (2210 bits/25.4 mm) inner track
Track Density: 200 tracks/in (200 tracks/25.4 mm)
Tracks/Surface: 408
Tracks/Cylinder: 4 (2 if one disk removed)
Recording Mode: Double frequency
Bit Rate, Nominal: 2.50 mHz at 2400 RPM 1.56 mHz at 1500 RPM
Media Type: 5440
Sectors Available: 1 through 32
Units/Controller I/O: 4 maximum, in daisy-chain configuration

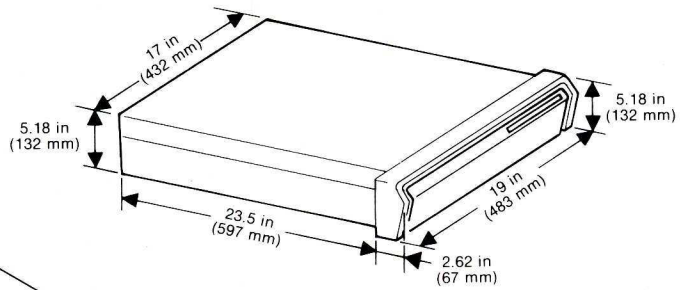
Reliability

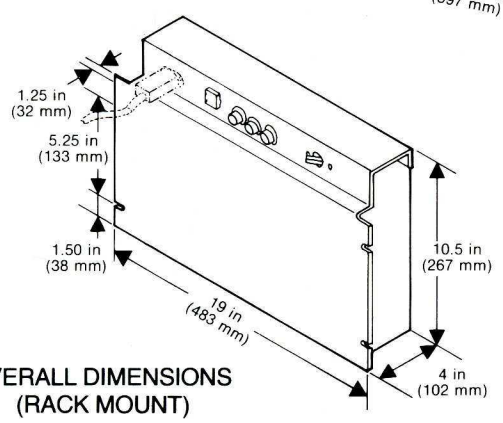
MTBF (Design): 6,000 hours
MTTR (Typical): 1.5 hours
Service Life: 5 years
Error Rate: Soft (recoverable), less than 1 in 10^9 bits transferred. Hard (unrecoverable), less than 1 in 10^{12} bits transferred
Access Error: Less than 1 in 10^5 seeks

Physical

Environmental Limits
Temperature Range: +50°F to +95°F (10°C to 35°C)
Humidity: 20% to 80% RH
Altitude: -1000 ft to +10,000 ft (-305 m to +3048 m)
Power Requirements (9414)
DC: +5 V (+5%, -3%)
+15 V (+5%)
-15 V (+5%)
Mechanical Dimensions (9414)
Height: 5.25 in (133 mm)
Width: 17.25 in (438 mm)
Depth: 24 in (610 mm) behind front panel
Panel Depth: 2.62 in (67 mm)
Weight: 70 lb (32 kg)
Power Requirements (Optional Power Supply)
AC: 115 V (+10%) 60 Hz
220 V (+10%) 50 Hz
240 V (+10%) 50 Hz
Mechanical Dimensions (Optional Power Supply)
Slide Mount, Dual Power Supply
Height: 3.5 in (89 mm)
Width: 19 in (483 mm)
Depth (behind panel): 24 in (610 mm)
Weight: 60 lb (27 kg)
Rack Mount, Single Power Supply
Height: 10.5 in (267 mm)
Width: 19 in (483 mm)
Depth (behind panel): 4 in (102 mm)
Weight: 35 lb (16 kg)

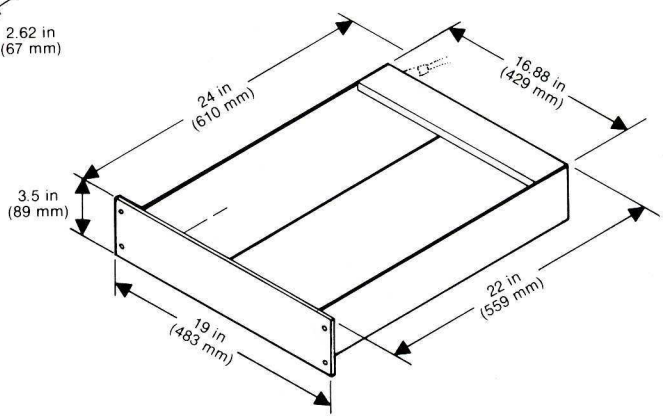
9414 OVER ALL DIMENSIONS





OVERALL DIMENSIONS (RACK MOUNT)

POWER SUPPLY OVERALL DIMENSIONS (SLIDE MOUNT)



Specifications subject to change without notice

CONTROL DATA SALES OFFICES ARE LOCATED IN PRINCIPAL CITIES THROUGHOUT THE WORLD

PERIPHERAL PRODUCTS SALES
BOX 0, MINNEAPOLIS, MINNESOTA 55440
TELEPHONE: (612) 843-3111
TWX: 910-576-2978

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