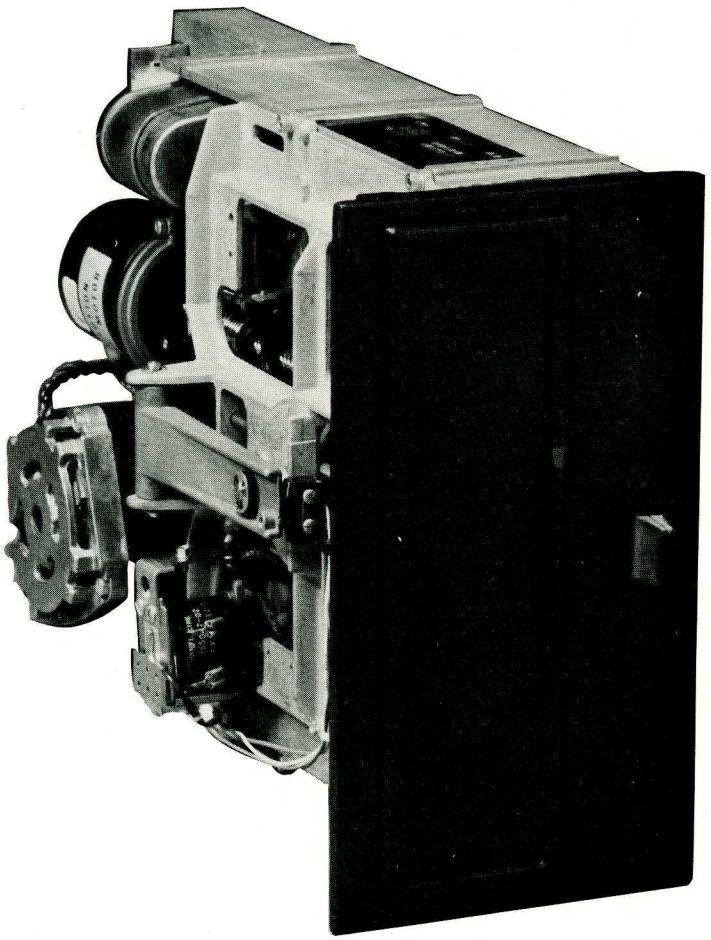
CONTROL DATA® 9404 FLEXIBLE DISK DRIVE

Designed for Original Equipment Manufacturers (OEM)

The CDC® 9404 Flexible Disk Drive is a low-cost, highly reliable, random-access storage device. It uses a single interchangeable diskette as its storage medium, and is capable of either hard- or soft-sector (missing clock) format operation. Compatible with diskettes written on IBM 3540, 3740, 3790, and System 32 equipment, the 9404 will also read or write any equivalent diskette having the appropriate format.

The 9404 can operate in either single- or double-density formats. When operated in a single-density format, each diskette has a capacity of 3.2 megabits of unformatted data (1.9 megabits in IBM 3740 format). Utilizing MFM encoding, the 9404 provides 6.4 megabits of unformatted capacity.



Features

- Single- or double-density capability
- Long life ceramic read/write head
- Daisy chaining, up to four drives
- Write current switching
- Ready interrupt
- 483-millimeter (19-inch) RETMA rack mounting
- Superior positioning system
- Power reduction on stepper motor
- Wide range of options to allow unique applications
- No negative DC voltage required

Functional Description

Operation

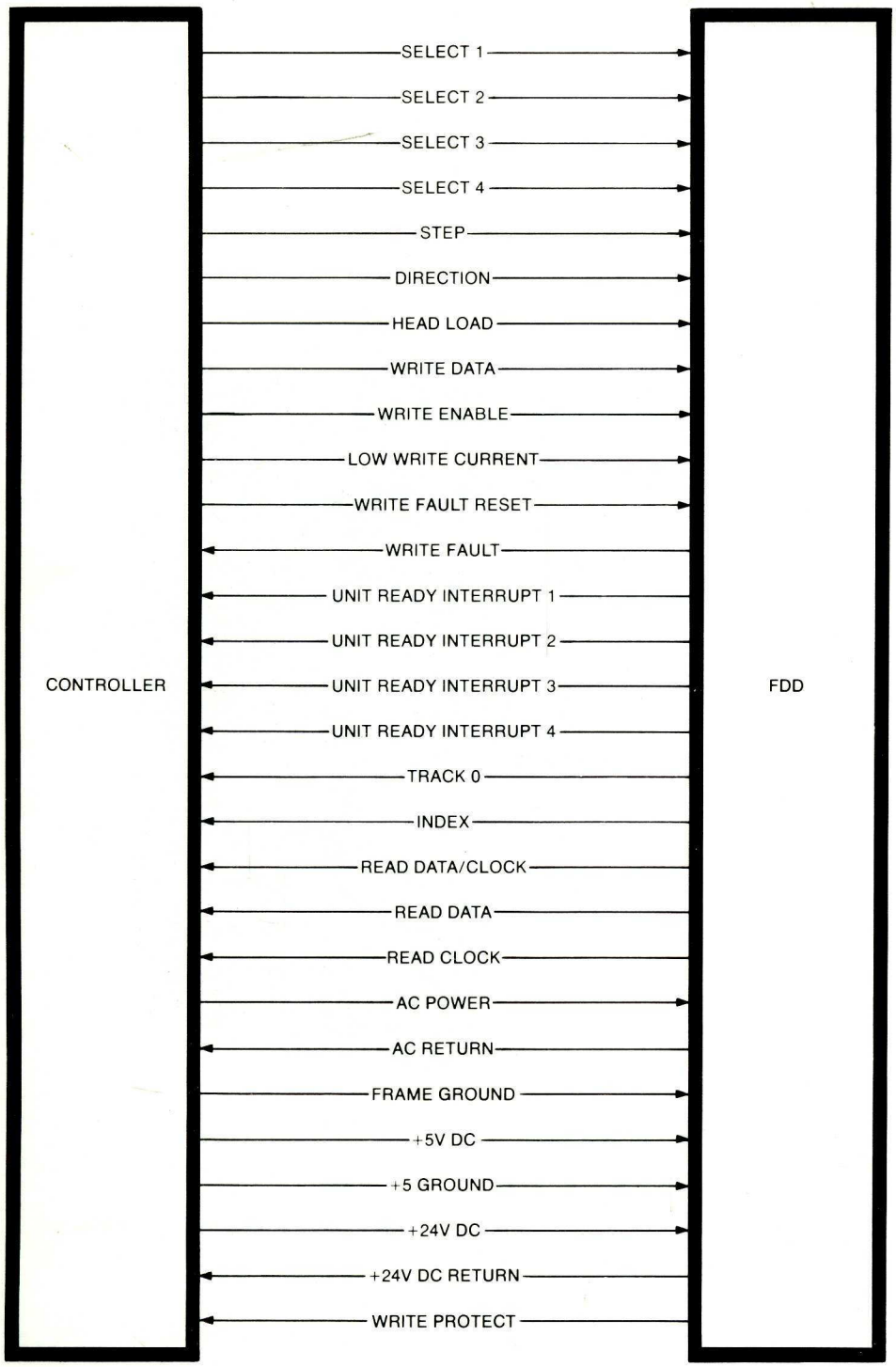
To load the 9404, the operator opens the access door and inserts the diskette in position. As the door is closed, an expanding cone automatically centers and clamps the diskette to the drive spindle, and the spindle rotates the diskette within the envelope. This envelope has an inner liner which serves to cushion and clean the medium automatically during rotation. Optical sensing of the index hole is achieved through a phototransistor and LED system.

The head is positioned via step commands to a stepper motor, which moves the head carriage by means of a lead screw. Before reading or writing, a head-load command from the controller causes a foam pad to load against the envelope and another pad to load the medium against the head. This ensures reliable read/write operation. The tunnel-erase head is made of ceramic/ferrite and is designed to provide long, reliable operating life.

Applications

OEM customers will find the 9404's versatility advantageous in a growing number of applications. These include: key entry systems, point-of-scale transactions, data collection and logging, program loading, word processing, data storage for small-to-medium business, and other systems in an increasing number of industrial areas.

9404 Interface



The 9404 is capable of handling double-density recording, using MFM encoding, and allows for future expansion of data capacity. An optional write-protect feature is also available, which uses a phototransistor LED system to optically sense a hole in the disk jacket. If necessary, this function can be disabled by covering the hole with opaque tape.

Simplified Interface

Interfacing is bus oriented, using a single 50-pin, 3M-type I/O. A single ribbon cable with multiple connectors can be used to interconnect the drives. Four unit-select lines permit selection of the appropriate drive, which is programmed using DIP switches mounted on the printed-circuit board. Unit-ready lines are continuously available. The signal lines are terminated by a single DIP resistor module.

Standard Features

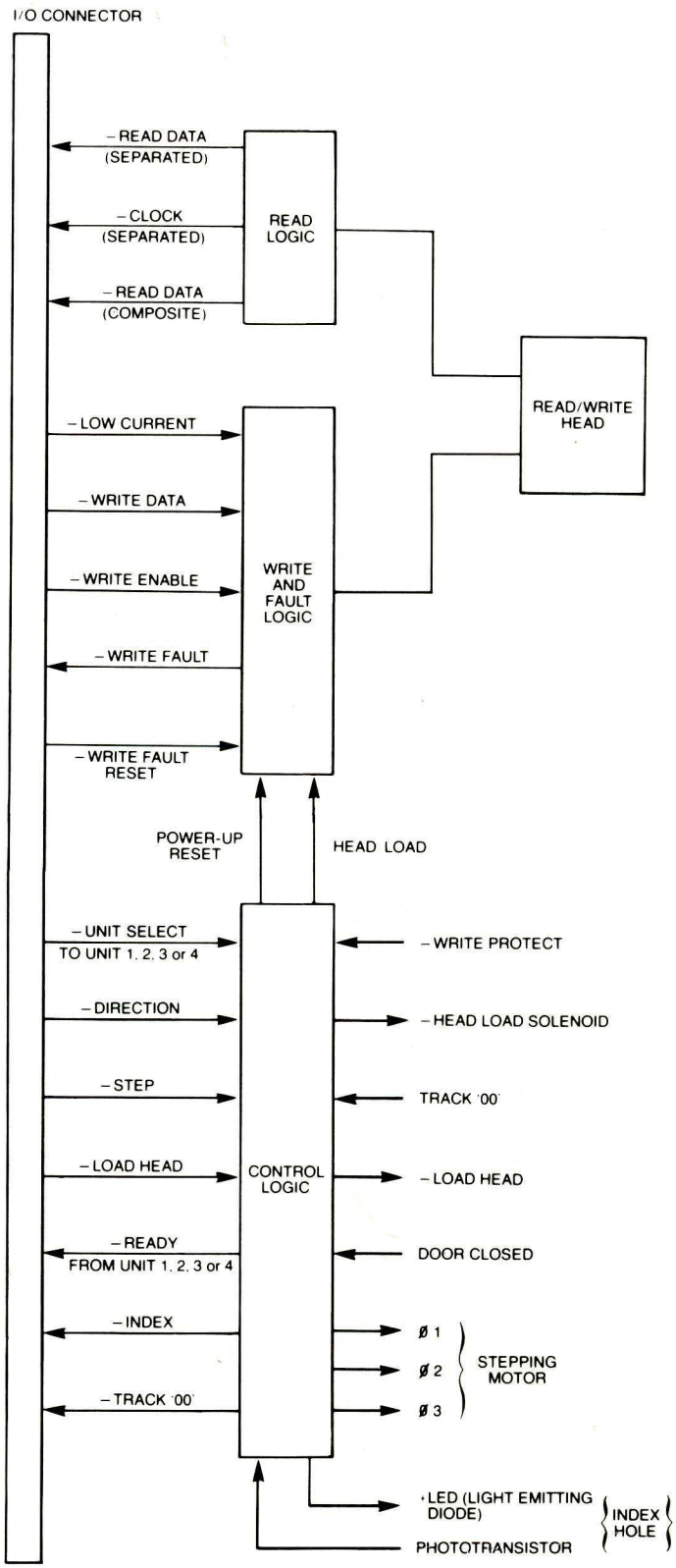
- Single/double-density capability is built into every 9404
- Ceramic read/write head, with industry standard tunnel erase design, ensures full IBM compatibility
- The 9404 can be connected in a four-unit daisy chain, using a 50-pin, 3M-type signal cable connector
- When the controller activates the appropriate line, the 9404 switches to low write current for improved read data resolution. This results in greatly improved data reliability
- Each unit in the daisy chain provides an interrupt to the controller when the unit has power applied, and the diskette is up to speed. The Unit Ready Interrupt status is available to the controller at all times.

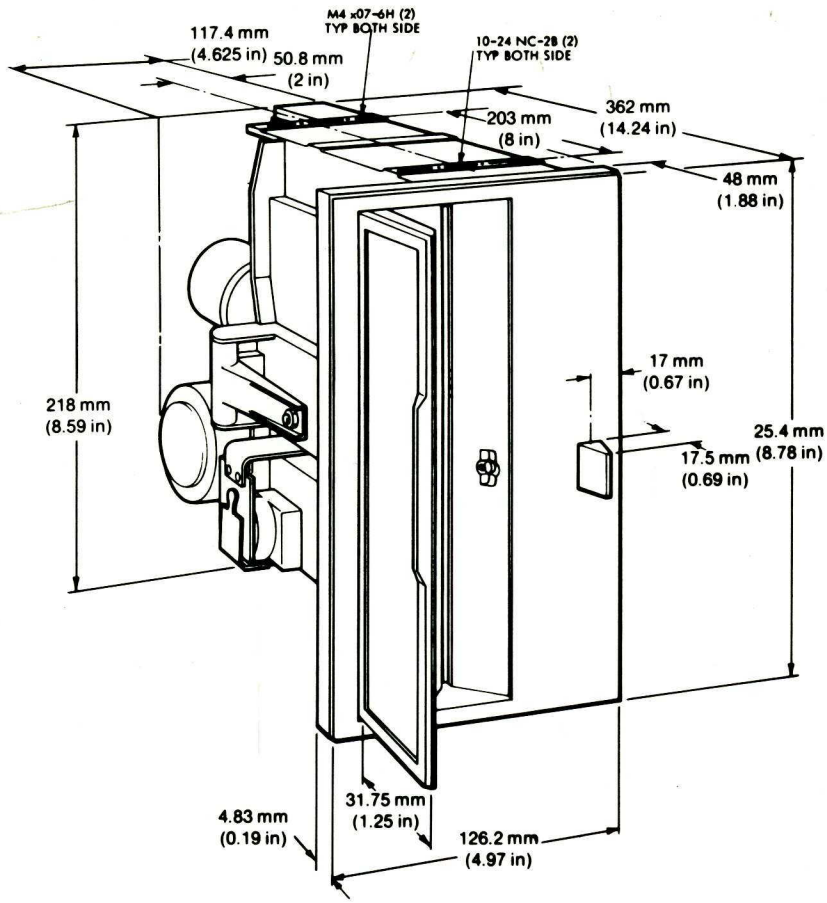
- Two units arranged horizontally, or up to three units vertically inclined, can be mounted in a standard 483-millimeter (19-inch) RETMA rack for flexibility of installation
- Solid die-cast construction ensures a stable surface for the diskette-centering cone and head-loading mechanisms
- Current is reduced to the stepper motor when not stepping (reading, writing or standby mode) with a resultant reduction in power consumption
- No negative DC voltage required, thus reducing power requirement of controller

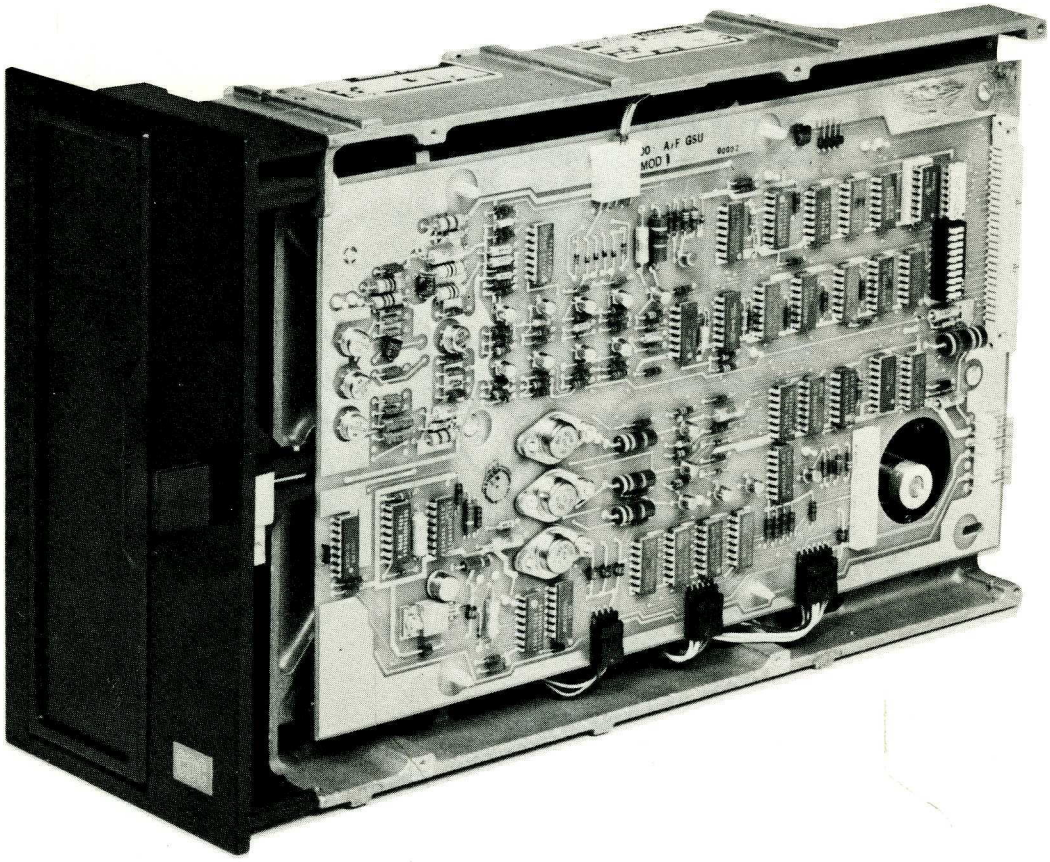
Optional Features

- A photo-optical sensor detects the presence of a Write Protect hole in the diskette jacket. this feature prohibits the controller from accidentally writing on a protected diskette
- A low-heat dissipation AC spindle motor is available, which reduces power dissipation by approximately 50 percent
- The 9404's front panel is designed to accept custom color inserts and special logos
- A universal 50/60 Hz spindle motor allows universal installation of the 9404
- Write fault detection circuits monitor the correct operation of the write-interface and head-load circuits, and alert the controller when a data-damaging malfunction occurs

9404 Block Diagram




M4 x07-6H (2)
TYP BOTH SIDE
10-24 NC-2B (2)
TYP BOTH SIDE
117.4 mm
(4.625 in)
50.8 mm
(2 in)
362 mm
(14.24 in)
203 mm
(8 in)
48 mm
(1.88 in)
17 mm
(0.67 in)
218 mm
(8.59 in)
25.4 mm
(8.78 in)
17.5 mm
(0.69 in)
4.83 mm
(0.19 in)
31.75 mm
(1.25 in)
126.2 mm
(4.97 in)



Specifications

Performance	Single Density	Double Density
Transfer Rate	249984 bits/s	499968 bits/s
Spindle Speed	360 r/min	360 r/min
Average Latency	83.3 ms	83.3 ms
Access Time		
Track-To-Track	10 ms	10 ms
Head Settling	10 ms	10 ms
Random Average	260 ms	260 ms
Max Full Stroke	770 ms	770 ms
Functional Capacity, Unformatted		
Per Disk	3208128 bits	6416256 bits
Per Track	41644 bits	83328 bits
IBM Compatible Format		
Per Disk	1943552 bits	N/A
Per Track	26624 bits	N/A
Per Sector	1024 bits	N/A
Recording Density (inside track)	3268 bits/in	6536 bits/in
Track Density	48 tracks/in	48 tracks/in
Tracks Per Surface	77	77
Recording Method	FM	MFM
Positioning Method	Stepper motor	Stepper motor
Media	CDC 9821 or equivalent	CDC 9823 or equivalent
Track Width	0.356 mm (0.014 in)	0.356 mm (0.014 in)

Physical

Operating Temperature	+50°F to +100°F (+10°C to +38°C)
Nonoperating Temperature	-30°F to +150°F (-33°C to +65°C)

Power Requirements

AC	100 V (±10%), 50/60 Hz (±2%) 120 V (±10%), 60 Hz (±2%) 220 V (±10%), 50 Hz (±2%) 240 V (±10%), 50 Hz (±2%)
DC	+24 V (±10%), 1.66 A +5 V (±5%), 1.0 A
Heat Dissipation	92 Wh (314 Btu/h), 44 Wh (150 Btu/h) with optional AC motor

Mechanical Dimensions (including front panel)

Height	126 mm (4.97 in)
Width	223 mm (8.78 in)
Depth	356 mm (14 in)
Weight	5.4 kg (12 lb)

Reliability

MTBF (design)	8000 hours
MTTR (typical)	30 minutes
Service Life	5 years or 31,000 hours

Data Reliability

Soft (recoverable)	1 in 10^9 bits transferred
Hard (unrecoverable)	1 in 10^{12} bits

Specifications subject to change without notice

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

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