The Control Data Model 9410 Finch Disk Drive is an eight-inch rigid disk drive that provides 8 or 24 megabytes of unformatted storage on fixed, lubricated media in a sealed recording environment.

The Model 9410 mounts vertically or horizontally in the same space as an eight-inch flexible disk drive. The Finch digital interface is intended to be attached to a single controller capable of controlling both a 9410 and a flexible disk drive.

Features

- Full data recovery circuitry
- Sealed disk, head and actuator chamber
- No preventive maintenance required
- LSI circuitry
- Low noise for office use
- Vertical or horizontal mounting
- Less than 350 BTU power dissipation
- Rotary voice coil actuator
- User-defined sectoring

Functional Description

The 9410 has one (8 megabytes) or two (24 megabytes) disks located in an environmentally sealed chamber; no unfiltered outside air is drawn into the unit. Air is recirculated within the disk/actuator chamber and passes through a filter to ensure a contamination-free environment. A rotary voice coil actuator provides rapid access and positioning accuracy.

The use of large scale integrated (LSI) circuitry and microprocessor control means that only three circuit boards are used. Phase-locked oscillator data recovery and reference clocking increases data integrity.

The 9410 can be configured with up to four drives in a star or daisy-chain configuration. The interface also allows the 9410 to be placed in a daisy-chain configuration with flexible disk drives.
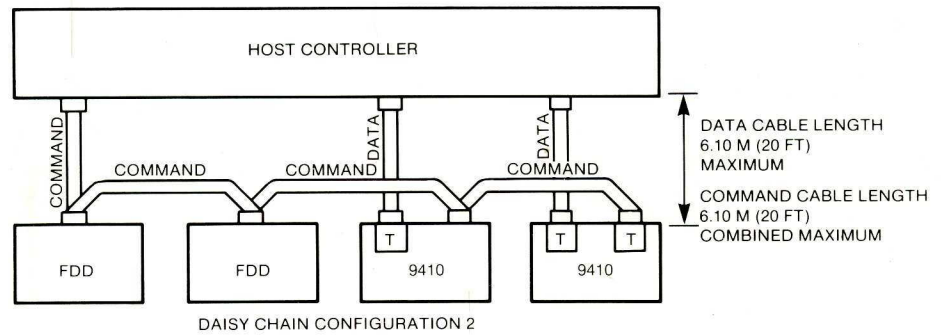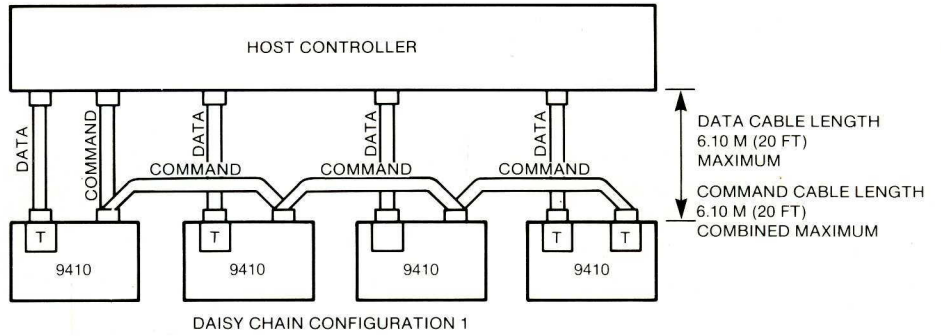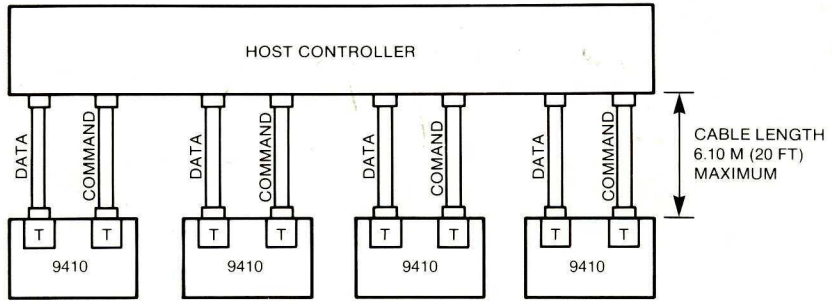
Applications

- Memory extension
- Word processing
- Small business systems
- Terminal systems
- Flexible disk drive system enhancement

Options/Accessories

- Shock mounts
- I/O cables
- Power supply
- Power cable
- Hardware maintenance manuals
- Suitcase tester

HOST CONTROLLER

DATA COMMAND DATA COMMAND DATA COMMAND DATA COMMAND

T T   T T   T T   T T

9410   9410   9410   9410

CABLE LENGTH
6.10 M (20 FT)
MAXIMUM

STAR CONFIGURATION

HOST CONTROLLER

DATA COMMAND DATA DATA DATA

COMMAND   COMMAND   COMMAND

T   T   T T

9410   9410   9410   9410

DATA CABLE LENGTH
6.10 M (20 FT)
MAXIMUM

COMMAND CABLE LENGTH
6.10 M (20 FT)
COMBINED MAXIMUM

DAISY CHAIN CONFIGURATION 1

HOST CONTROLLER

COMMAND DATA DATA

COMMAND   COMMAND   COMMAND

T   T T

FDD   FDD   9410   9410

DATA CABLE LENGTH
6.10 M (20 FT)
MAXIMUM

COMMAND CABLE LENGTH
6.10 M (20 FT)
COMBINED MAXIMUM

DAISY CHAIN CONFIGURATION 2

NOTE: T INDICATES TERMINATOR RESISTOR PACK.

8-31 UNC 2B
0.25 DEEP
4 PLACES

20.32 mm
0.80 in

203.2 mm
8.00 in

117.35 mm
4.62 in

117.35 mm
4.62 in

△1

△3

12.70 mm
0.50 in

63.25 mm
2.49 in

1.52 mm
0.06 in

△2

SHOCK MOUNTING
(OPTIONAL)
4 PLACES

8-32 UNC 2B (FOR SHOCK MOUNTING)
0.40 DEEP
4 PLACES

6.35 mm
0.25 in △1

355.6 mm
14.00 in

△1 125.42 mm
7.30 in

217.42 mm
8.56 in

I/O AND POWER
CONNECTORS

16.00 mm
0.63 in

52.07 mm
2.05 in

295.91 mm
11.65 in
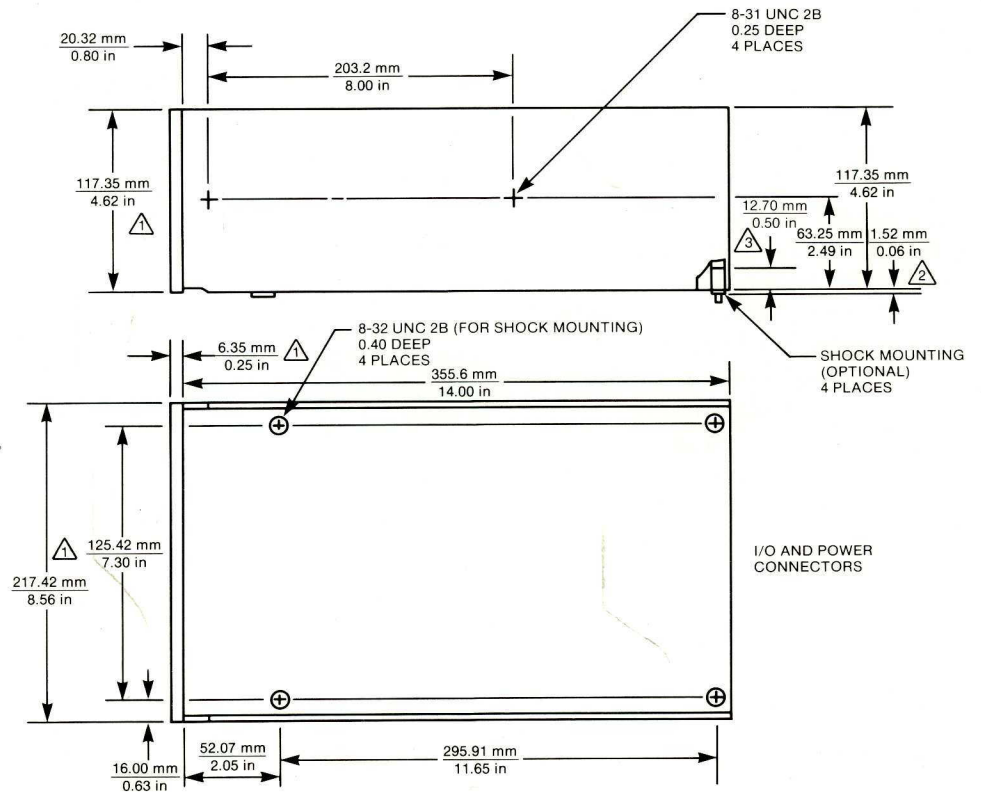
△1 OPTIONAL FRONT PANEL

△2 NOMINAL MOUNTING, NO SHOCKS,
RIGHT SIDE ONLY

△3 NOMINAL SHOCK MOUNTING
PROTRUSION

Command Cable Interface
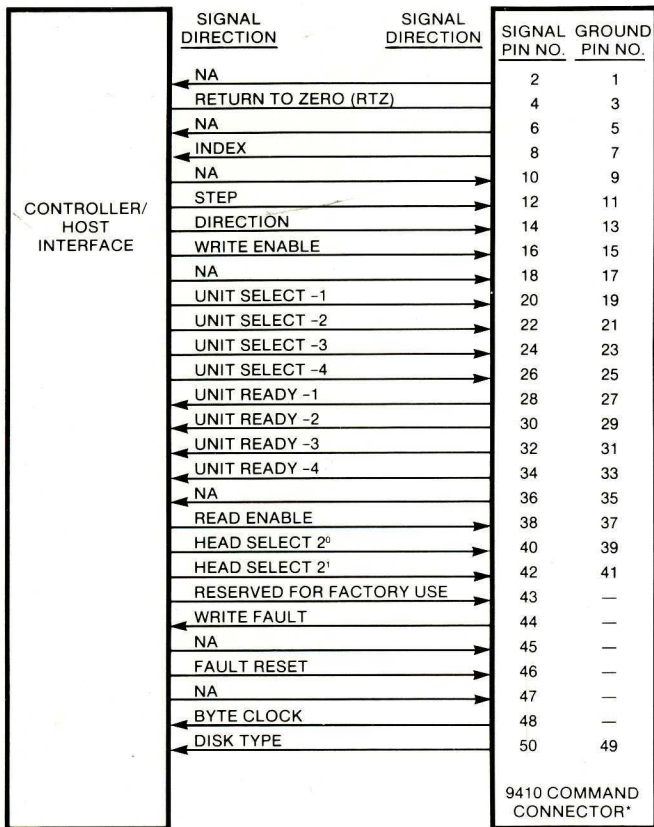
DASH 1 INTERFACE

CONTROLLER/HOST INTERFACE

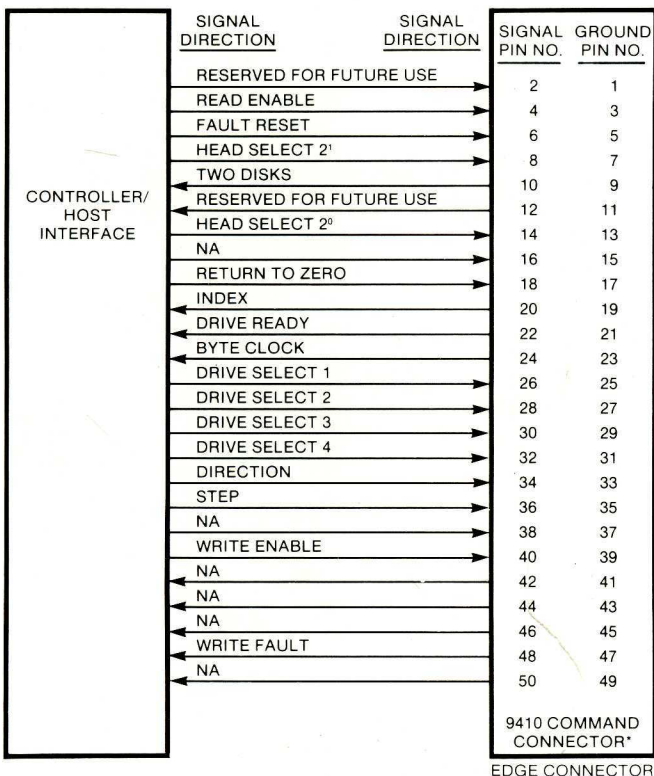| SIGNAL	SIGNAL PIN NO.	GROUND PIN NO.
NA	2	1
RETURN TO ZERO (RTZ)	4	3
NA	6	5
INDEX	8	7
NA	10	9
STEP	12	11
DIRECTION	14	13
WRITE ENABLE	16	15
NA	18	17
UNIT SELECT -1	20	19
UNIT SELECT -2	22	21
UNIT SELECT -3	24	23
UNIT SELECT -4	26	25
UNIT READY -1	28	27
UNIT READY -2	30	29
UNIT READY -3	32	31
UNIT READY -4	34	33
NA	36	35
READ ENABLE	38	37
HEAD SELECT 2^0	40	39
HEAD SELECT 2^1	42	41
RESERVED FOR FACTORY USE	43	—
WRITE FAULT	44	—
NA	45	—
FAULT RESET	46	—
NA	47	—
BYTE CLOCK	48	—
DISK TYPE	50	49

9410 COMMAND CONNECTOR*
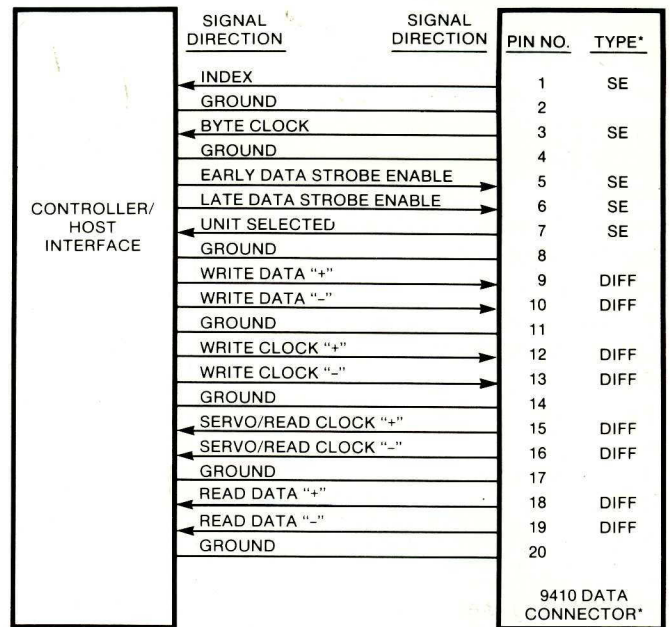
NA— NOT APPLICABLE TO THE 9410 BUT IS USED BY THE FDD.
* — ALL SIGNALS IN THE COMMAND CABLE ARE SINGLE-ENDED SIGNALS.

Data Cable Interface
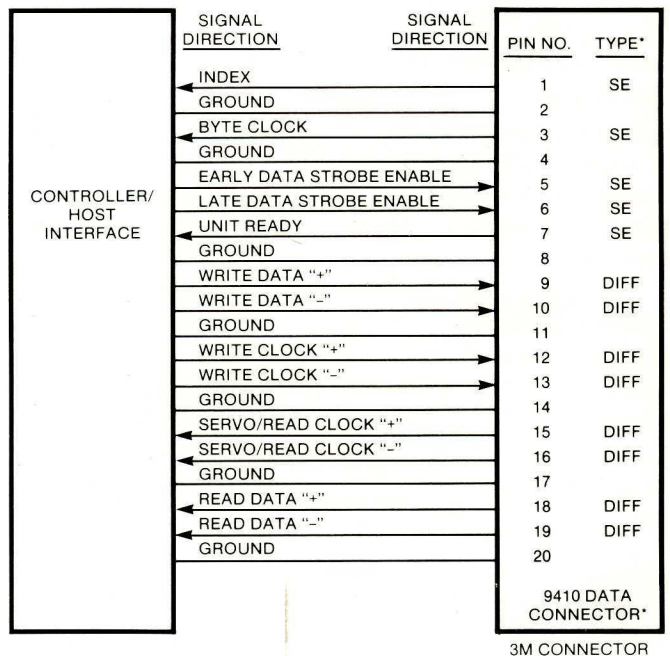
DASH 1 INTERFACE

CONTROLLER/HOST INTERFACE

SIGNAL	PIN NO.	TYPE*
INDEX	1	SE
GROUND	2	
BYTE CLOCK	3	SE
GROUND	4	
EARLY DATA STROBE ENABLE	5	SE
LATE DATA STROBE ENABLE	6	SE
UNIT SELECTED	7	SE
GROUND	8	
WRITE DATA "+"	9	DIFF
WRITE DATA "–"	10	DIFF
GROUND	11	
WRITE CLOCK "+"	12	DIFF
WRITE CLOCK "–"	13	DIFF
GROUND	14	
SERVO/READ CLOCK "+"	15	DIFF
SERVO/READ CLOCK "–"	16	DIFF
GROUND	17	
READ DATA "+"	18	DIFF
READ DATA "–"	19	DIFF
GROUND	20	

9410 DATA CONNECTOR*

*SE = SINGLE-ENDED SIGNAL
DIFF = DIFFERENTIAL SIGNAL

Command Cable Interface

DASH 3 INTERFACE

CONTROLLER/HOST INTERFACE

SIGNAL	SIGNAL PIN NO.	GROUND PIN NO.
RESERVED FOR FUTURE USE	2	1
READ ENABLE	4	3
FAULT RESET	6	5
HEAD SELECT 2^1	8	7
TWO DISKS	10	9
RESERVED FOR FUTURE USE	12	11
HEAD SELECT 2^0	14	13
NA	16	15
RETURN TO ZERO	18	17
INDEX	20	19
DRIVE READY	22	21
BYTE CLOCK	24	23
DRIVE SELECT 1	26	25
DRIVE SELECT 2	28	27
DRIVE SELECT 3	30	29
DRIVE SELECT 4	32	31
DIRECTION	34	33
STEP	36	35
NA	38	37
WRITE ENABLE	40	39
NA	42	41
NA	44	43
NA	46	45
WRITE FAULT	48	47
NA	50	49

9410 COMMAND CONNECTOR*
EDGE CONNECTOR

*— ALL SIGNALS IN THE COMMAND CABLE ARE SINGLE-ENDED SIGNALS.

Data Cable Interface

DASH 3 INTERFACE

CONTROLLER/HOST INTERFACE

SIGNAL	PIN NO.	TYPE*
INDEX	1	SE
GROUND	2	
BYTE CLOCK	3	SE
GROUND	4	
EARLY DATA STROBE ENABLE	5	SE
LATE DATA STROBE ENABLE	6	SE
UNIT READY	7	SE
GROUND	8	
WRITE DATA "+"	9	DIFF
WRITE DATA "–"	10	DIFF
GROUND	11	
WRITE CLOCK "+"	12	DIFF
WRITE CLOCK "–"	13	DIFF
GROUND	14	
SERVO/READ CLOCK "+"	15	DIFF
SERVO/READ CLOCK "–"	16	DIFF
GROUND	17	
READ DATA "+"	18	DIFF
READ DATA "–"	19	DIFF
GROUND	20	

9410 DATA CONNECTOR*
3M CONNECTOR

*SE = SINGLE-ENDED SIGNAL
DIFF = DIFFERENTIAL SIGNAL

Specifications

Performance

Transfer Rate	6.45 Mbits/s
Spindle Speed	3,600 r/min

Access Time (at 50 kHz step pulse rate)

Maximum, Full Stroke	100 ms
Average	50 ms
Maximum, One Track	10 ms

Functional

	9410-8	9410-24
Number of Disks	1	2
Total Surfaces	2	4
Data Surfaces	1	3
Servo Surfaces	1	1
Capacity, Unformatted	8 Mb	24 Mb
Per Surface	8 Mb	8 Mb
Per Track	13,440 bytes	13,440 bytes
Recording		
Track Density	554 Tracks per/in	554 Tracks per/in
Tracks Per Surface	605	605
Recording Method	NRZ at interface, MFM on disk	NRZ at interface, MFM on disk
Positioning Method	Rotary voice coil actuator	Rotary voice coil actuator

Reliability	
MTBF	10,000 hours
Service Life	5 years or 30,000 hours
Preventive Maintenance	None
Adjustments	None
Data Reliability	
Recoverable Read Errors	Less than 1 in 10^{10} bits transferred
Unrecoverable Read Errors	Less than 1 in 10^{12} bits transferred
Seek Errors	Less than 1 in 10^{6} seek operations

Power Requirements

AC	None
DC	+5 V ($\pm$2%), 1.1A
	−5.2 V ($\pm$2%), 2.0A
	+24 V ($\pm$10%), 2.8A (4.5A peak)
Power Dissipation	Less than 102.55 W (350 BTU)

Environmental

Operating Temperature	10°C to 40°C (50°F to 104°F)
Non-Operating Temperature	−40°C to 60°C (−40°F to 158°F)
Operating Humidity	20% to 80% RH
Non-Operating Humidity	5% to 95% RH
Altitude, Sea Level Ref.	
Operating	−300 to +2000 m (−983 to +6560 ft)
Non-Operating	−300 to +3000 m (−983 to +9850 ft)

Physical Characteristics

Height	106 mm (4.16 in)
Width	218 mm (8.57 in)
Depth	362 mm (14.25 in)
Weight	9.53 kg (21 lb)

Specifications subject to change without notice.

CDC®