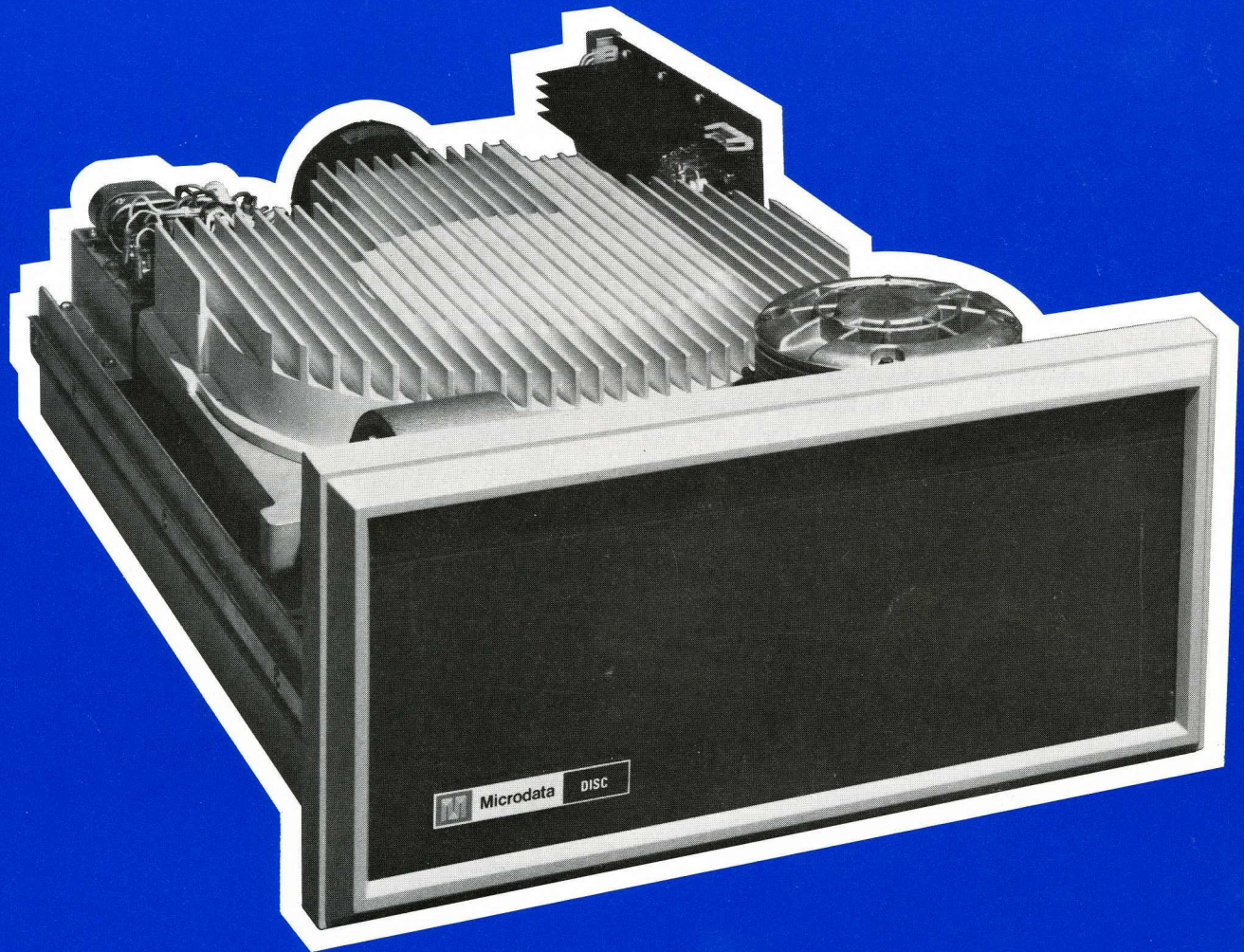# Microdata OEM Peripherals
Fixed-Media Disc Drive

Reflex™

FEATURES

- **Proven 'Winchester' Technology.**
- **Choice of Storage Capacities.** 12.5, 37.6 or 62.7 million bytes.
- **Fast Access.** 6 milliseconds track-to-track positioning. 3000 rpm disc rotation.
- **High Reliability.** 6500 hours MTBF. 35,000 hours between overhauls.
- **Maintainability.** No scheduled periodic maintenance. One hour MTTR.
- **Cost Effective.** Low initial cost per bit. Long operational life. Greatly reduced operational (maintenance) costs.
- **Fixed (Non-Removable Discs.** No operator handling of media. Significant cost savings.
- **Compact Package.** Drive with all options requires just 7 inches of vertical rack space.
- **Environmental Immunity.** Enclosed disc chamber is isolated from outside world. Closed-loop air filtration system continuously refilters air within chamber.

Reflex™ Fixed-Media Disc Drive

EXCEPTIONAL PERFORMANCE AND LONG TERM DEPENDABILITY

Microdata REFLEX™ is a fixed-media disc drive offering high storage capacity, very fast access times and data transfer rate, exceptional reliability and high immunity to external environments.

Reflex is available in three basic versions utilizing one, two or three discs on the spindle for unformatted storage capacities of 12.5, 37.6 or 62.7 million bytes. Head positioning time is just 6 milliseconds track-to-track, 30 milliseconds average. An extremely high recording density (5636 bits per inch) allows storage of nearly 18,000 bytes per track. This high capacity, coupled with two heads per recording surface, minimizes the number of head movements required to access a given amount of data. Reflex data transfer rate is 7.08 MHz over an I/O system which permits daisychaining up to four drives per controller.

The basic Reflex drive includes the frame, media and rotational drive system, data and positioning electronics, and a closed loop air filtration system. Options and enhancements include a front panel with operator controls and indicators, slides for rack mounting, internal power supply, and a high speed head-per-track 'scratch pad' storage option. A fully configured Reflex drive requires just 7 inches of vertical rack space.

'Winchester' Technology: The Key to High Capacity

Winchester technology, developed and proved by IBM, employs low mass, high compliance recording heads which can fly much closer to the recording surface than previous technologies would permit. Therefore, they can read and write at much higher data densities on tracks spaced much closer together. Reflex provides 5,636 bit-per-inch data re-cording and 300 tracks per inch. This allows storage of 17,920 bytes of unformatted data on each of 700 tracks for a total capacity of 12.5 million bytes per surface.

Reflex Models A, B and C are equipped with one, two and three discs, respectively. The bottom surface of the first disc contains the servo track, used to provide the required timing and sectoring information for formatting the data on the other disc surfaces. With the addition of a second disc, Reflex Model B stores 37.6 million bytes on 3 surfaces. Model C, with three discs (5 data surfaces total) has a capacity of 62.7 million bytes.
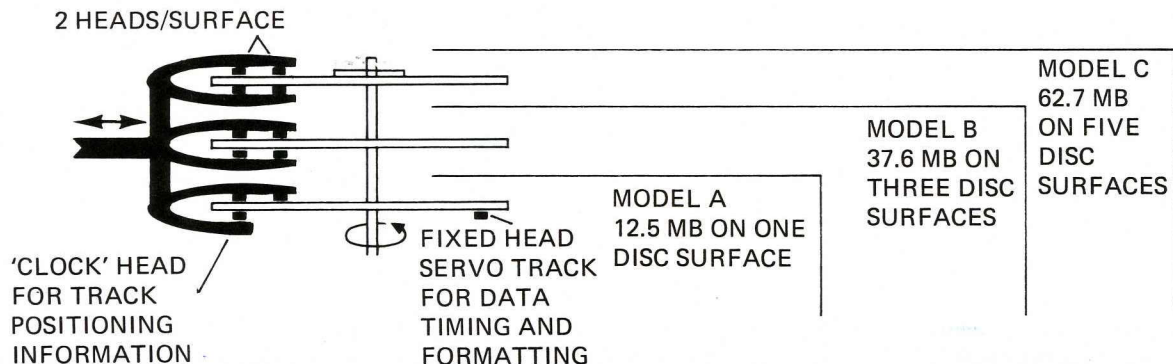
Fixed Media for Economy and Reliability

Another characteristic of Winchester technology is integration of the rotating discs, the recording heads and the head positioning mechanism into a single assembly. This arrangement in Reflex makes practical the high bit and track densities, and eliminates the need for head alignments and other periodic maintenance.

Reflex' media is non-removable, providing many economic and reliability benefits.

High Speed Head Positioning

Reflex uses two read/write heads per surface, effectively halving the average distance the heads must travel to access a given track. The heads are mounted on a low mass carriage rolling on precision bearings. The positioner is a voice coil design employing a radial line access stroke for maximum positioning speed. An electronic velocity transducer controls acceleration, speed and deceleration of the head carriage to minimize settling time and wear in the positioning system.

2 HEADS/SURFACE

'CLOCK' HEAD FOR TRACK POSITIONING INFORMATION

FIXED HEAD SERVO TRACK FOR DATA TIMING AND FORMATTING

MODEL A 12.5 MB ON ONE DISC SURFACE

MODEL B 37.6 MB ON THREE DISC SURFACES

MODEL C 62.7 MB ON FIVE DISC SURFACES

A Closed Air Filtration System

To achieve the very clean environment necessary with low flying heads — and to do so without external environmental restrictions — the media, heads and positioning mechanism are enclosed in an aluminum shroud which isolates the inside from the outside world.

The environment within the shroud is a closed loop circulation/filtration system. Recirculation and re-filtration of the same air, combined with positive internal pressure, ensures maximum purity within the shroud and virtually eliminates the possibility of head failure caused by environmental contaminants.

Troublefree Read/Write Heads

Reflex' dual read/write heads are similar to those used on the IBM 3348 Data Module. As in the IBM drive, the lightly loaded heads rest on a non-data portion of the disc surface during start and stop. A special coating on the disc surface protects both the heads and the oxide coating, extending the useful life of the media and heads approximately 100 times over uncoated media in similar applications.

Rugged, Modular Construction

Reflex is designed for an operating life of over 35,000 hours between overhauls, with no scheduled preventive maintenance. Mean time between failures (MTBF) is rated at over 6500 hours. In event of a failure, the drive is easily repaired by replacing one of the following modules:

- ☐ disc chamber with linear drive motor and head carriage
- ☐ disc rotation drive motor and belt
- ☐ logic/interface circuit board
- ☐ power regulator/amplifier circuit board
- ☐ servo electronics circuit board
- ☐ read/write/control electronics circuit board
- ☐ ac control module
- ☐ dc power supply (optional)

Data Reliability

Reflex has a soft (recoverable) error rate of one bit in 10^{10}, with only one bit in 10^{13} nonrecoverable. Design features that make this performance possible include the precise head positioning system, advanced design read/write electronics and effective internal ground isolation to protect data from errors caused by heavy power line transients.

Reflex will automatically attempt to recover an error by repeated combinations of track offset and data strobe timing.

Media Safety

The inherent data-safety features of the Reflex closed disc chamber are extended by electrical interlocks that protect data from the effects of power failure, internal malfunctions and improper interface commands.

Rotational Drive

Disc rotation speed is 2964 rpm, regulated to within $\pm5\%$, to provide an average rotational latency of approximately 10 milliseconds.

Compact Package

Reflex allows you to store up to 62.7 million bytes in a rack mountable package only 7 inches high.

Head-Per-Track 'Scratch Pad' Storage (Optional)

Reflex is available with up to 0.54 million bytes of head-per-track storage for use as a scratch pad memory or for other applications requiring super-fast access. Since the heads are fixed, access time is determined only by rotational latency of the discs— 10.12 milliseconds average at Reflex' 2964 rpm.

Control Panel (Optional)

The optional front panel includes the following controls and indicators:
ON LINE switch/indicator.
PROTECT switch/indicator.
READY indicator.
STATUS indicators (four light-emitting diodes which display various Reflex operational status conditions).

Power Requirements

Reflex uses 115 Vac line power for rotational drive. Dc requirements are $\pm9V$ and $\pm18V$, which may either be provided by your system power supplies or by the optional Reflex internal power supply. With the internal supply, Reflex can be powered by 100 to 240 Vac, 50 or 60 Hz.

REFLEX SPECIFICATIONS

Number of Discs	1, 2 or 3.
Number of Data Cylinders .	350.
Data Tracks per Surface . .	700.
Data Bytes per Track . . .	17,920.
Data Capacity	12.5, 37.6, or 62.7 million bytes.
Data Bit Density	5,636 bits per inch at 8.1 inch diameter track.
Data Bit Cell Time	140 nanoseconds.
Disc Rotation Speed . . .	2,964 rpm.
Rotational Latency	10.12 milliseconds average.
Data Bit Transfer Rate . . .	7.08 MHz
Servo Bytes per Track . . .	8,960.
Servo Track Density . . .	300 bpi.
Full Stroke Position Time . .	55 milliseconds.
Average Stroke Position Time.	30 milliseconds.
Single Track Position Time .	6 milliseconds.
Head Positioning Error Rate .	Less than 0.5×10^{-6}
Mean Time Between Failure (MTBF)	6500 hours.
Mean Time To Repair (MTTR)	One hour.
Recoverable Error Rate . .	Less than one bit in 10^{10} bits.
Non-recoverable Error Rate .	Less than one bit in 10^{13} bits.
Air Filter	0.3 micron, within sealed chamber.
Dc Power Requirements (nominal)	+9V ($\pm$1V) at 1A min, 3A max; -9V ($\pm$1V) at 0.5A min 2A max; +18V ($\pm$1.5V) at 1A min, 3.5A max; -18V ($\pm$1.5V) at 1A min, 3.5A max.
Ac Power (for optional dc supply)	100, 120 (std), 190, 208, 220 or 240 Vac (+10%, -15%), single phase, 60 Hz (50 Hz optional) at 400 watts max. Start surge current 20A for 5 sec.
Dimensions	19 in. wide, 7 in. high, 28 in. deep
Weight	90 pounds
Operating Environment: Temperature	+15°C to +41°C at front inlet
Relative Humidity . .	10% to 80%, without condensation.

MICRODATA SUPPORT

Documentation and Technical Support

Microdata Corporation, a leading supplier of computers and peripherals to the OEM systems manufacturer, offers complete customer support. Documentation is available to help you integrate Reflex into your product line. Manuals for interfacing, operating and maintaining the unit are supplied with the drive. And Microdata's staff is always available to provide technical and marketing assistance.

Training

Operation and maintenance training courses are available on Reflex and other Microdata peripherals. Courses are conducted at Microdata's training center in Irvine, California, or at the customer's facility.

Maintenance

Microdata customer service and parts centers are located in major cities throughout the United States. The centers are staffed with experienced field service engineers trained on all Microdata peripheral equipment.

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