

OEM MICRODISK DRIVES

M2231 A/B M2232A/B

5 1/4-inch Winchester-type fixed disk drives from Fujitsu



M2232A

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The M2231 and M2232 microdisk drives are 5¼-inch Winchester-type fixed disk drives ideal for office applications, including small business computers, word processing systems and terminal systems. The M2231 provides 6.66 megabyte (unformatted) or 5.24 megabyte (formatted) storage capacity, and the M2232 offers 10 megabyte (unformatted) or 7.86 megabyte (formatted) storage. Each model is available in two types. The type A (M2231A/M2232A) has the Seagate interface, the type B (M2231B/M2232B) has the SA4000 interface. The type A comprises mainly a disk enclosure and three printed circuit boards, and the type B includes a disk enclosure and two printed circuit boards. The disk enclosure is completely sealed, integrating two disks (M2231) or three disks (M2232), Winchester-type contact start/stop heads, a rotary actuator, and a DC spindle motor.

Compact disk drives

The M2231 and M2232 use 5¼-inch (130 mm) disks and a direct DC spindle motor. The unit is very compact, measuring only 83 mm (3.27 inches) in height, 146 mm (5.75 inches) in width, and 203 mm (8 inches) in depth. These disk drives can be mounted either horizontally and vertically, and since they are the same physical size as mini-floppy disk drives, they can be installed in mini-floppy disk drive cabinets for increased storage capacity. Noise and vibration have been significantly reduced, making these devices ideal for use in the office.

Max. 10 megabyte capacity

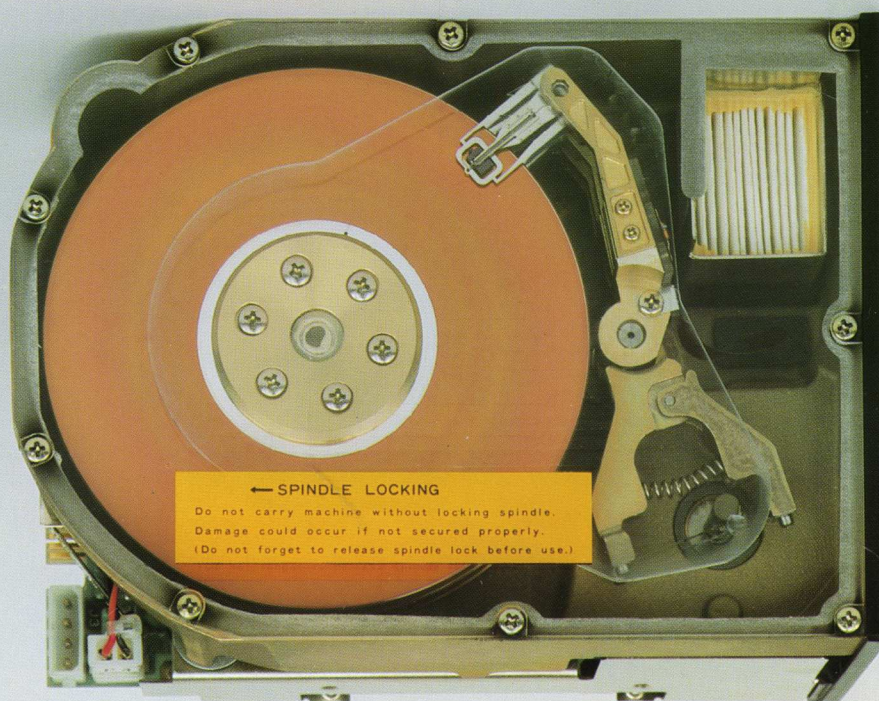
The M2231 and M2232 provide large storage capacities in a small, inexpensive package. The M2231 provides 6.66 megabytes (unformatted) or 5.24 megabytes (formatted); the M2232 has 10 megabytes (unformatted) or 7.86 megabytes (formatted).

Economical operation

A stepping motor greatly simplifies the head positioning mechanism and enhances reliability and economy. Each disk drive consumes only 30 watts and can operate over a wide range of ambient temperatures from 5°C to 45°C (41°F to 113°F).

High performance

The M2231 and M2232 combine compactness and high performance. The stepping motor's viscous damper shortens settling time, and ROM circuits control the speed of



M2232A

the stepping motor to produce an optimum pulse train for the fastest possible access time. The result is a 96 milliseconds average positioning time. The 3,600 rpm direct drive DC spindle motor provides a high data transfer rate of 625 kilobytes per second. The start time is only 20 seconds, and a dynamic brake reduces the stop time to 15 seconds.

Superior reliability

Completely sealed disk enclosures with an absolute air filtration system made up of a breathing filter and recirculation filter assure a contamination-free environment. Winchester-type contact start/stop heads eliminate moving parts for head loading and unloading. The type B models use LSI drive logic. No wonder then that the mean-time-between-failures (MTBF) of the M2231 and M2232 is more than 10,000 power-on-hours.

Maintenance free

With the completely sealed disk enclosure, the DC spindle motor and state-of-the-art printed circuit board technology, maintenance of the M2231 and M2232 is reduced to the bare minimum. No preventive maintenance is required, and mean-time-to-repair (MTTR) is less than 30 minutes.

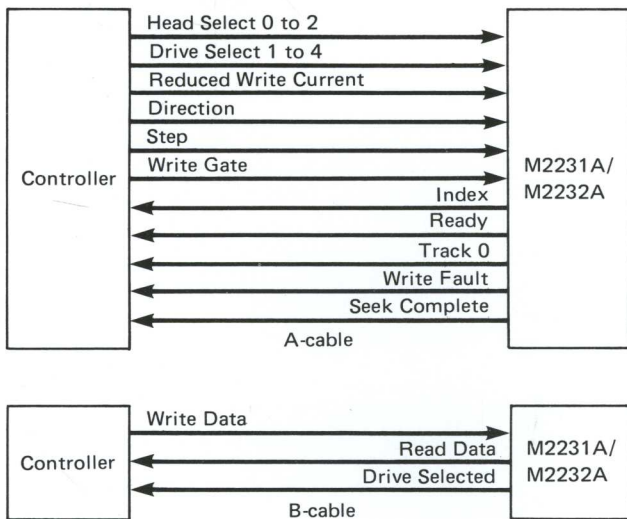
Seagate and SA4000 interfaces

The M2231A and M2232A have the Seagate interface, an internationally used modified floppy interface for 5¼-inch disks. The M2231B and M2232B are provided with the SA4000 interface, a widely used modified floppy interface for 8-inch disks. The SA4000 interface incorporates a Variable Frequency Oscillator (VFO) and Modified Frequency Modulation (MFM) circuits, making the job of designing controllers for the M2231B and M2232B an easy one. The M2231B and M2232B also offer a control board as an option for a bidirectional data bus interface, a simplified host interface. Since the control board is the same size as the main printed circuit board, it can be mounted over the main printed circuit board. These features greatly facilitate system design for these machines.

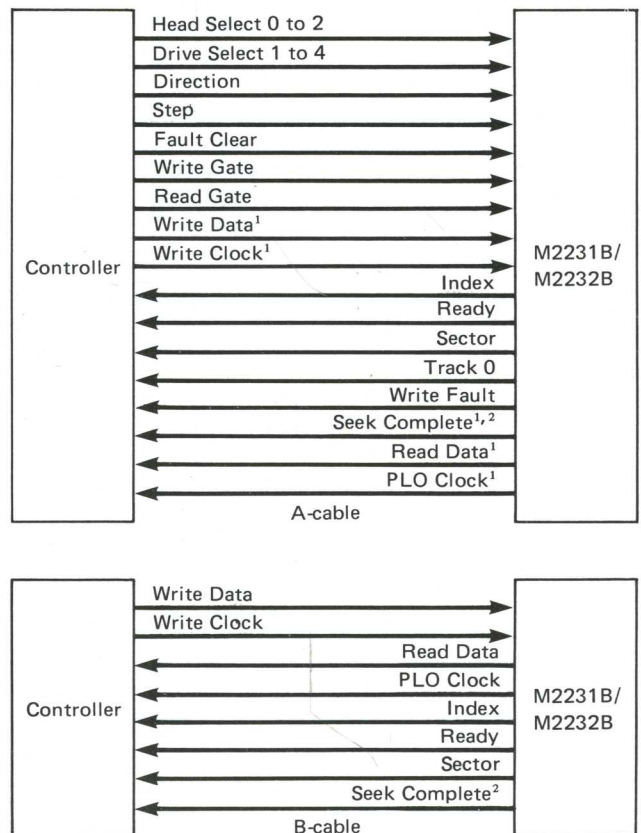
Internationally compatible

The M2231 and M2232 use low-voltage DC power of +12 and +5V, permitting international application and freedom from the effects of power line fluctuations. The Seagate and SA4000 interfaces enhance international compatibility.

Seagate interface



SA4000 interface



1. Signal lines are connected by turning on the corresponding switches on the printed circuit boards.
2. Settling time may be included or omitted by setting relevant switches on the printed circuit boards.

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FUNCTIONAL SPECIFICATIONS

	M2231A	M2232A	M2231B	M2232B
Storage capacity Unformatted Formatted	6.66 megabytes 5.24 megabytes	10 megabytes 7.86 megabytes	6.66 megabytes 5.24 megabytes	10 megabytes 7.86 megabytes
Disks	2	3	2	3
Heads (read/write)	4	6	4	6
Bytes per track Unformatted Formatted	10,416 8,192			
Cylinders	160			
Sectors	32		16 or 32	
Positioning time Track-to-track Average Maximum	18 milliseconds 95 milliseconds 215 milliseconds			
Average latency time	8.3 milliseconds			
Rotational speed	3,600 rotations/minute			
Recording density	8,020 bits/inch			
Track density	254 tracks/inch			
Data transfer rate	625 kilobytes/second			
Recording code	Modified Frequency Modulation (MFM)			
Interface code	Modified Frequency Modulation (MFM)		Non-Return-to-Zero (NRZ)	
Interface	Modified Floppy (Seagate interface)		Modified Floppy (SA4000 interface) Option: control board	
Start time	Less than 20 seconds			
Stop time	Less than 15 seconds			

RELIABILITY SPECIFICATIONS

	M2231A/B M2232A/B
Mean-time-between-failures (MTBF)	More than 10,000 power-on hours
Mean-time-to-repair (MTTR)	Less than 30 minutes
Component life	5 years
Error rates	
Recoverable errors	10 per 10 ¹¹ bits read
Unrecoverable errors	10 per 10 ¹³ bits read
Seek errors	10 per 10 ⁷ seeks

PHYSICAL SPECIFICATIONS

	M2231A/M2232A	M2231B/M2232B
Power requirements	12 VDC ± 10 %, 1.8 A (max. 4.5 A) 5 VDC ± 5 %, 1 A	12 VDC ± 10 %, 1.8 A (max. 4.5 A) 5 VDC ± 5 %, 1.6 A
Dimensions and weight Height Width Depth Weight	83 mm (3.3 in) 146 mm (5.7 in) 203 mm (8.0 in) 2.5 kg (5.5 lb)	
Ambient temperature Operating Not operating Gradient	5 °C to 45 °C (40 °F to 113 °F) -40 °C to 60 °C (-40 °F to 140 °F) Less than 15 °C (27 °F)/hour	
Relative humidity Operating Not operating	20 % to 80 % (non condensing) 5 % to 95 %	
Vibration Operating Not operating In storage or transport	Max. 0.2G (3 Hz to 60 Hz), shock: max. 2G (max. 10 ms) Max. 0.4G (3 Hz to 60 Hz), shock: max. 3G (max. 10 ms) Max. 3G, shock: max. 5G (max. 30 ms)	
Altitude Operating Not operating	3,000 m (10,000 ft) 12,000 m (40,000 ft)	

Specifications are subject to change without notice. For the latest information, contact your local Fujitsu representative.
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North American contact:

FUJITSU AMERICA INC. 2945 Oakmead Village Court, Santa Clara, CA 95051, USA Phone: (1-408)-727-4300 Telex: 230-171182 TWX: 910-338-0047

European contact:

FUJITSU EUROPE LTD. 1st Floor, Royal Trust House, 54 Jermyn St., London, S.W. 1, England Phone: (44-1)493-1138 Telex: 51-263871

FUJITSU LIMITED
Communications and Electronics

6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100, Japan

Phone: National (03) 216-3211 International (Int'l Prefix) 81-3-216-3211 Telex: J22833 Cable: "FUJITSULIMITED TOKYO"

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