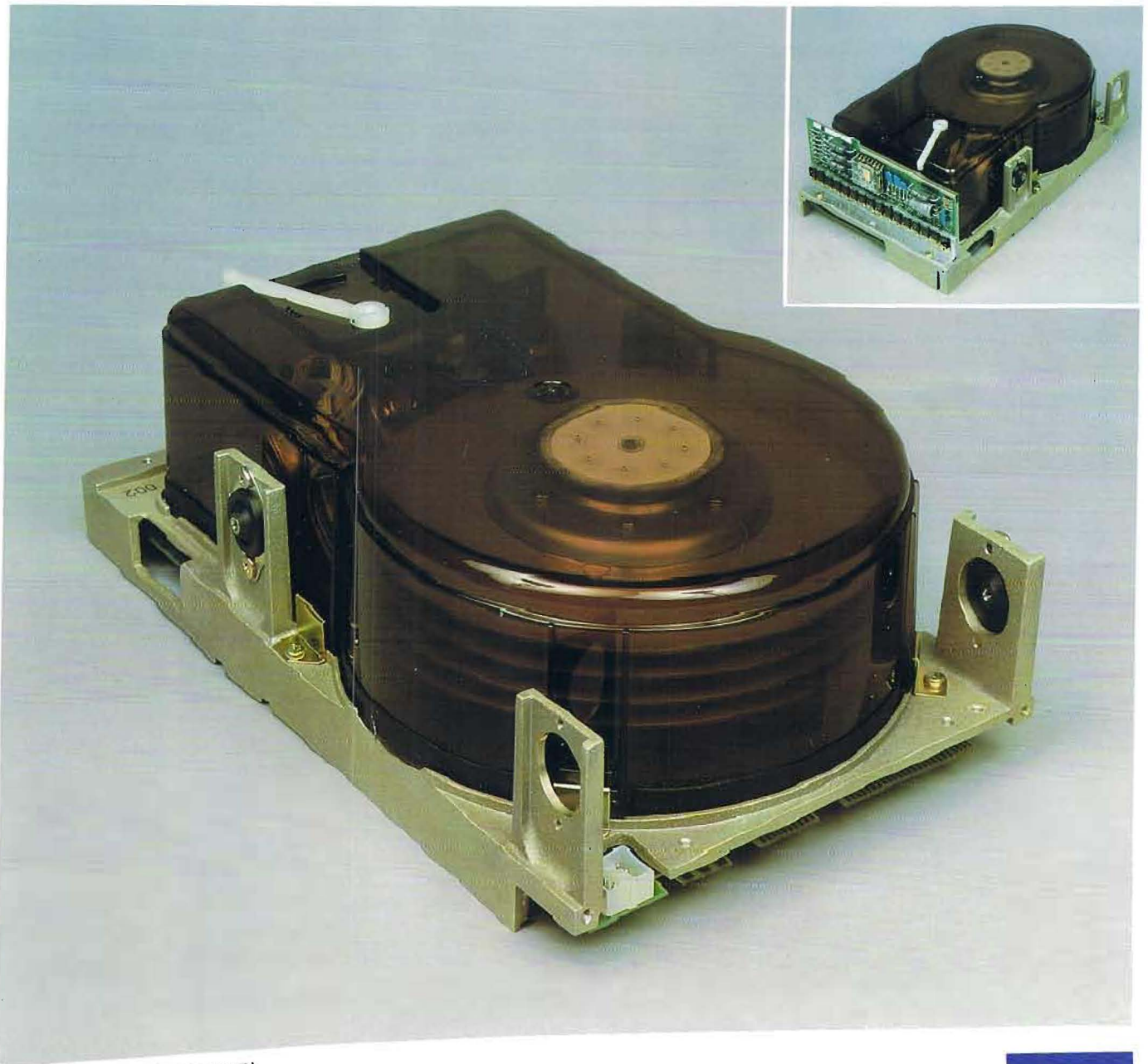


# OEM MICRODISK DRIVES

# M2301BE/KE M2302BE/KE M2303BE/KE

*8-inch Winchester-type fixed disk drives that provide 12,360 bpi recording density and 1.2-megabyte-per-second data transfer rate*



M2303KE)

**FUJITSU**

# OEM MICRODISK DRIVES

The M2301BE/KE, M2302BE/KE, and M2303BE/KE 8-inch Winchester-type fixed disk drives provide storage capacities ranging from 9.83 megabytes to 47.47 megabytes. All three feature new highs in recording density and data transfer rate, and are ideal for use in microcomputers, intelligent terminals, and word processing systems. The BE models (M2301BE, M2302BE, and M2303BE) have the SA4000 interface and the KE models (M2301KE, M2302KE, and M2303KE) have an LSI controller to provide a bidirectional data bus interface with the host CPU. The BE models comprise a disk enclosure and one printed circuit board; the KE models have two printed circuit boards. Drive logic for both is provided by LSI. The disk enclosure integrates Winchester-type contact start/stop heads and one disk (M2301BE/KE), two disks (M2302BE/KE) or four disks (M2303BE/KE), a linear actuator, a DC spindle motor, and a read preamplifier.

## Medium- to large-storage capacities

The M2301BE/KE, M2302BE/KE, and M2303BE/KE provide medium- to large-storage capacities. The M2301BE, M2302BE, and M2303BE provide unformatted capacities of 11.87 megabytes, 23.74 megabytes, and 47.47 megabytes, respectively. The M2301KE, M2302KE, and M2303KE provide formatted storage capacities of 9.83 megabytes, 19.66 megabytes, and 39.32 megabytes, respectively.

## 12,360 bpi recording density

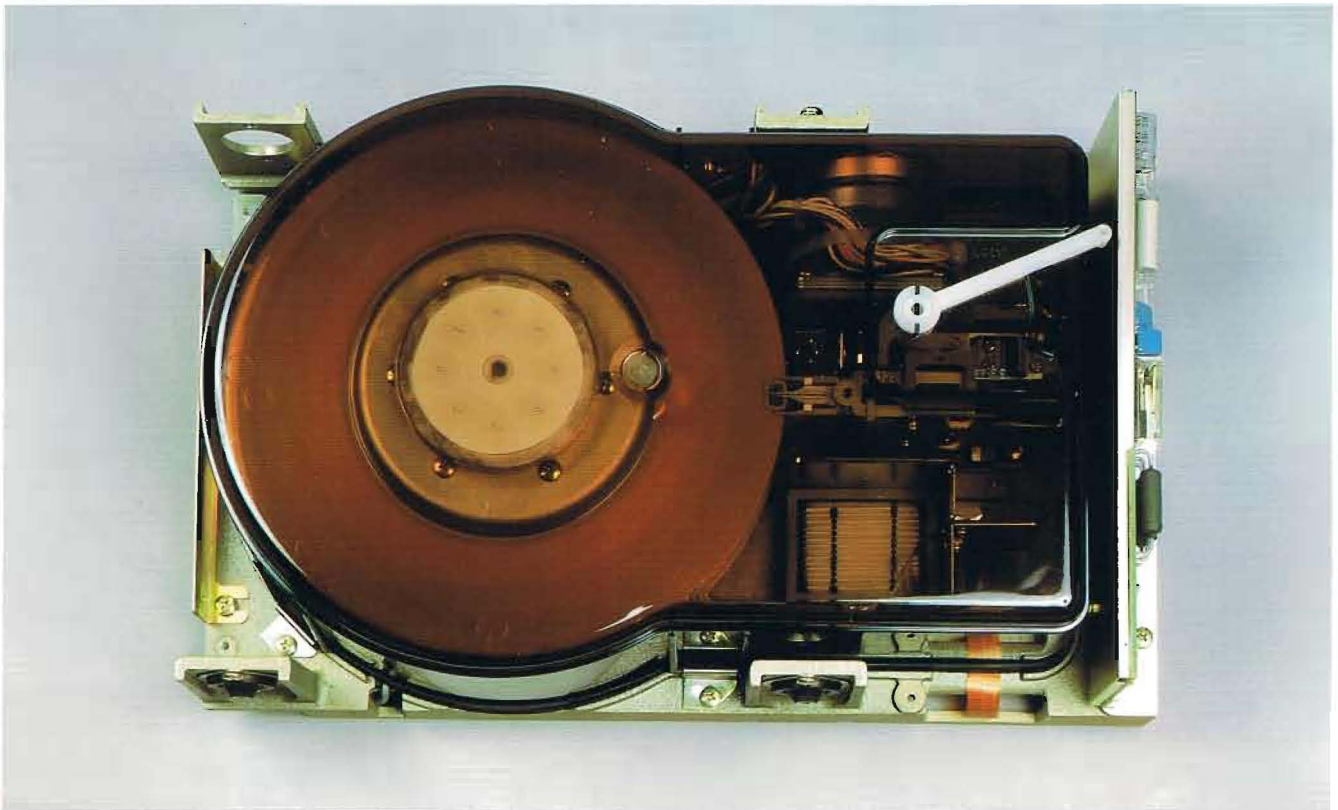
The sophisticated disk and head technology used in large-size disk drive has been applied in the M2301BE/KE, M2302BE/KE, and M2303BE/KE to achieve a superior recording density of 12,360 bits per inch, twice that of their predecessors, M2301B/K and M2302B/K.

## 1.2 megabyte-per-second transfer rate

The 12,360 bpi recording density and the 2,964 rpm direct DC spindle motor provide a high data transfer rate of 1.2 megabytes per second. When connected with a low-speed controller, the KE models permit lower data transfer rates of 0.6 megabytes per second maximum and 0.33 megabytes per second average. These lower data transfer rates are possible by operating the KE models in buffer mode. They provide 1.2-megabyte-per-second data transfer rate when used in direct mode.

## Compact design

The M2301BE/KE, M2302BE/KE, and M2303BE/KE microdisk drives are compact: 111 mm (4.37 inches) high, 217 mm (8.54 inches) wide, 356 mm (14.0 inches) deep.



M2303KE

They can be mounted either horizontally or vertically in a standard 19-inch rack or in a system cabinet. They are the same size as floppy disk drives and can be installed in floppy disk cabinets for increased storage capacity. The drives are quiet and have little vibration, making them ideal for office application.

#### Reduced operating costs

Because recording density of the M2301BE/KE, M2302BE/KE, and M2303BE/KE models is so high, they require fewer disks than did their predecessors, reducing the initial outlay for heads and disks. The positioning mechanism, which employs a stepping motor with steel band, is a simple design. Each model consumes only 70 watts when seeking, and 60 watts otherwise.

#### Faster access, reduced start/stop times

Stepping motor speed is controlled by programs stored in ROM, producing the optimum pulse train for the fastest possible access. And settling time is minimized by the stepping motor's viscous damper. The result is 30 milliseconds track-to-track, 70 milliseconds average, and 140 milliseconds maximum positioning time. The start time is only 25 seconds, and a dynamic brake reduces the stop time to 25 seconds.

#### Superb reliability

A completely sealed disk enclosure with an absolute air filtration system comprising 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. A read preamplifier on each head arm assembly, called the head IC, amplifies small signals to increase read data reliability. Printed circuit boards incorporate advanced LSI semiconductors. With these advanced features, the M2301BE/KE, M2302BE/KE,

and M2303BE/KE assure a mean-time-between-failure (MTBF) of 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 these machines is reduced to the bare minimum. No preventive maintenance is required, and mean-time-to-repair (MTTR) is less than 30 minutes.

#### Industry standard interface (M2301BE, M2302BE, and M2303BE)

The BE models have an industry standard modified floppy interface, the SA4000 interface. The SA4000 interface incorporates a Variable Frequency Oscillator (VFO) and Modified Frequency Modulation (MFM) circuits for easy design of controllers for these machines.

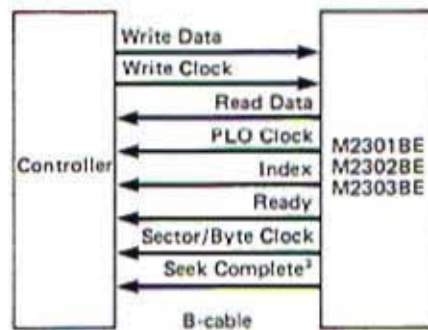
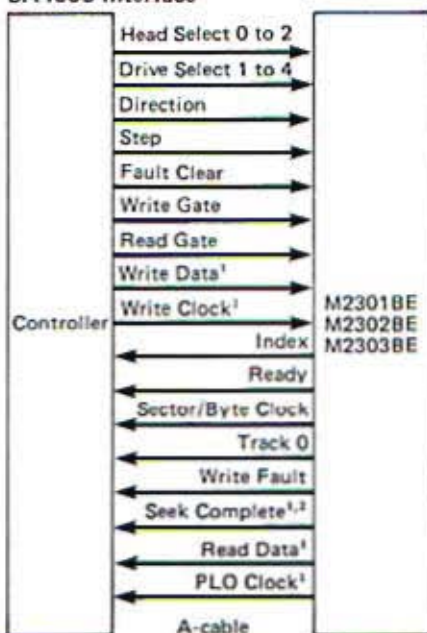
#### Simplified host interface (M2301KE, M2302KE, and M2303KE)

The KE models have an LSI controller to provide a bidirectional data bus interface. This type of interface provides powerful commands for simplifying interface with the host computer. Formatting and self-diagnostic commands are also provided, and defective records are automatically routed to good ones so that all sectors are always available. This simplified interface greatly reduces the load on the host, making it very easy to design a system which incorporates these drives.

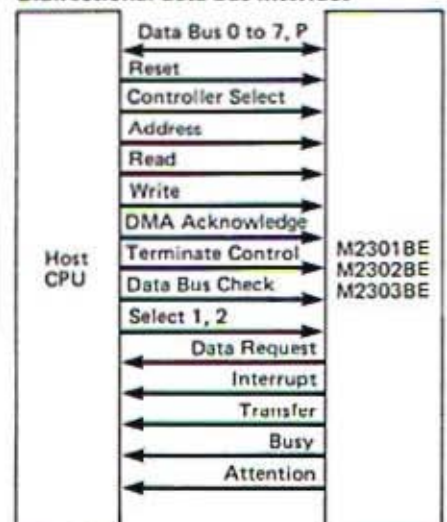
#### Internationally compatible

The M2301BE/KE, M2302BE/KE, and M2303BE/KE use low-voltage DC power of +24V, +5V, and -12V, permitting international application and freedom from the effects of power line fluctuations. The SA4000 interface enhances international compatibility.

#### SA4000 interface



#### Bidirectional data bus 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 turning relevant switches on the printed circuit boards on or off.

# OEM MICRODISK DRIVES

## FUNCTIONAL SPECIFICATIONS

	M2301BE	M2302BE	M2303BE	M2301KE	M2302KE	M2303KE
Storage capacity	11.87 megabytes (unformatted)	23.74 megabytes (unformatted)	47.47 megabytes (unformatted)	9.83 megabytes (formatted)	19.66 megabytes (formatted)	39.32 megabytes (formatted)
Disk	1	2	4	1	2	4
Heads						
Read/write	2	4	8	2	4	8
Clock	1	1	1	1	1	1
Bytes per track	24,320 (unformatted)			20,480 (formatted)		
Tracks per cylinder	2	4	8	2	4	8
Cylinders	244			240 + 3 (alternate) + 1 (diagnostic)		
Sectors	2 or more			80		
Positioning time						
Track-to-track	30 milliseconds					
Average	70 milliseconds					
Maximum	140 milliseconds					
Average latency time	10.1 milliseconds					
Rotational speed	2,964 rotations/minute					
Recording density	12,360 bits/inch					
Track density	195 tracks/inch					
Data transfer rate	1.2 megabytes/second			Direct mode: 1.2 megabytes/second Buffer mode: max. 0.6 megabytes/second average 0.33 megabytes/second		
Recording code	MFM (Modified Frequency Modulation)					
Interface code	NRZ (Non-Return-to-Zero)			8-bit parallel		
Interface	Modified Floppy (SA4000 interface)			Bidirectional data bus interface		
Start time	25 seconds					
Stop time	25 seconds					

## RELIABILITY SPECIFICATIONS

	M2301BE/KE M2302BE/KE M2303BE/KE
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 <sup>11</sup> bits read
Unrecoverable errors	10 per 10 <sup>13</sup> bits read
Seek errors	10 per 10 <sup>7</sup> seeks

## PHYSICAL SPECIFICATIONS

	M2301BE/KE, M2302BE/KE, M2303BE/KE
Power requirements	24VDC±10%, 1.8A (max. 6A) 5VDC± 5%, 4.1A (max. 6A) -12VDC± 5%, 1.0A (max. 1A)
Dimensions	
Height	111 mm ( 4.4 in)
Width	217 mm ( 8.5 in)
Depth	356 mm (14.0 in)
Weight	6.3 kg (13.9 lb)
Ambient temperature	
Operating	5°C to 45°C ( 41°F to 113°F)
Not operating	-40°C to 60°C (-40°F to 140°F)
Gradient	Less than 15°C (27°F)/hr
Relative humidity	
Operating	20% to 80% (non condensing)
Not operating	5% to 95%
Vibration	
Operating	Max. 0.2G (3Hz to 60Hz), shock: max. 2G (max. 10 ms)
Not operating	Max. 0.4G (3Hz to 60Hz), shock: max. 3G (max. 10 ms)
In storage or transport	Max. 3G, shock: max. 5G (max. 30 ms)
Altitude	
Operating	3,000 m (10,000 ft)
Not operating	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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