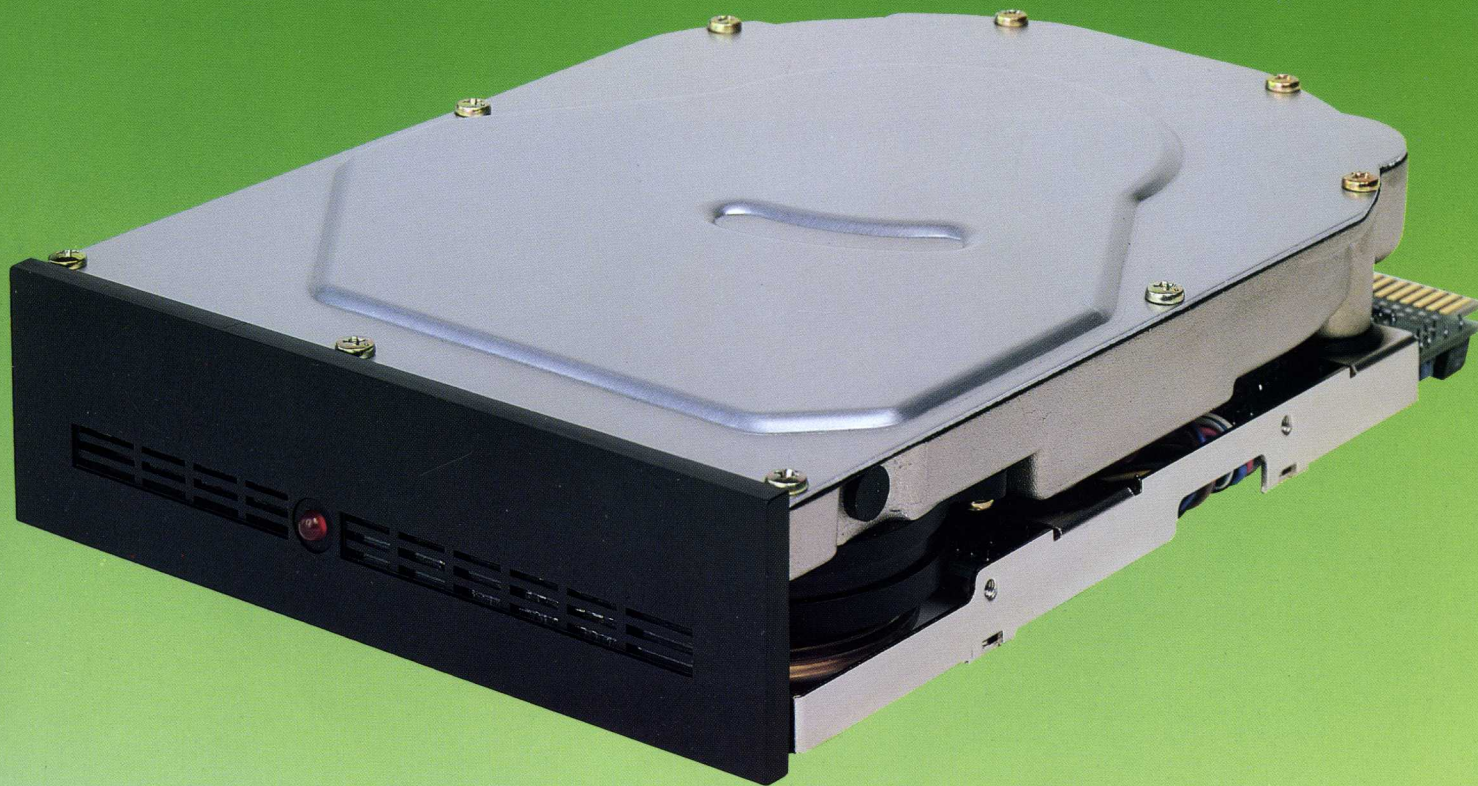


OEM MICRODISK DRIVES

# M2233AH/BH M2235AH/BH

MAR 30 1985

*Half-height 5¼-inch Winchester-type fixed disk drives  
with 13.3- and 26.7-megabyte storage capacities*



M2235AH/BH



Fujitsu has increased the capacities of its half-height 5¼-inch Winchester disk drives. The M2233 has new 13.3 megabytes of unformatted capacity and the M2235 has 26.7 megabytes. Each model is available in two types. The AH type models have the ST412 interface and the BH type models have the SA4000 interface. Each model's disk enclosure is completely sealed, integrating one or two disks, two or four Whitney-type contact start/stop heads, a rotary stepper actuator, and a DC spindle motor. The M2233 and M2235 are ideal for increasing storage capacities on a wide variety of small office automation systems, such as personal computers, word processors, and terminal system.

### **Large capacity yet compact, lightweight**

The M2233 offers 13.3 megabytes and the M2235 offers 26.7 megabytes of storage. Yet each model has the same physical size as the industry standard half-height minifloppy disk drive. They can be mounted horizontally or vertically. Each model weighs only 1.5 kg (3.3 lb), and consumes a mere 30 watts. Noise and vibration have also been greatly reduced. These features make the drives the ideal choice for powerful yet small, desk-top office systems.

### **High performance**

The M2233 and M2235 combine large capacity and compactness with high performance. The average positioning time, including the settling time, is 95 milliseconds, and the data transfer rate is 625 kilobytes per second. The start time is less than 20 seconds, and a dynamic brake reduces the stop time to less than 15 seconds.



## Microprocessor controlled

Since the stepping motor of the M2233 and M2235 is controlled by a microprocessor, the drives' seek control circuits are greatly simplified, further increasing the reliability.

## Reliable, maintenance free

The completely sealed disk enclosure contains a breathing filter and recirculation filter to provide a contamination-free environment. Whitney-type contact start/stop heads eliminate moving parts for head loading and unloading. The head IC prevents read errors caused by external electrical noise, and the LSI drive logic further enhances the drives' reliability. As a result, these drives have a mean-time-between-failure (MTBF) of 20,000 power-on hours. No preventive maintenance is required, and mean-time-to-repair (MTTR) is less than 30 minutes.

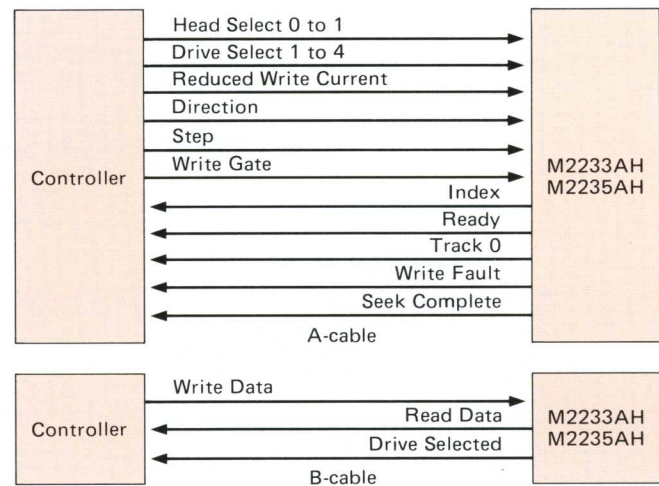
## ST412 and SA4000 interfaces

The AH type models have the ST412 interface, an internationally used modified floppy interface for 5¼-inch disk drives. The BH type models are provided with the SA4000 interface, a widely used modified floppy interface for 8- and 14-inch disk drives. The BH type models include Variable Frequency Oscillator (VFO) and Modified Frequency Modulation (MFM) circuits, making the job of designing controllers much easier. The BH type models also offer an optional control board for a bidirectional data bus interface and simplified host interface. Since the control board is the same size as the main printed circuit board, it can be mounted over the main board, making system design easy.

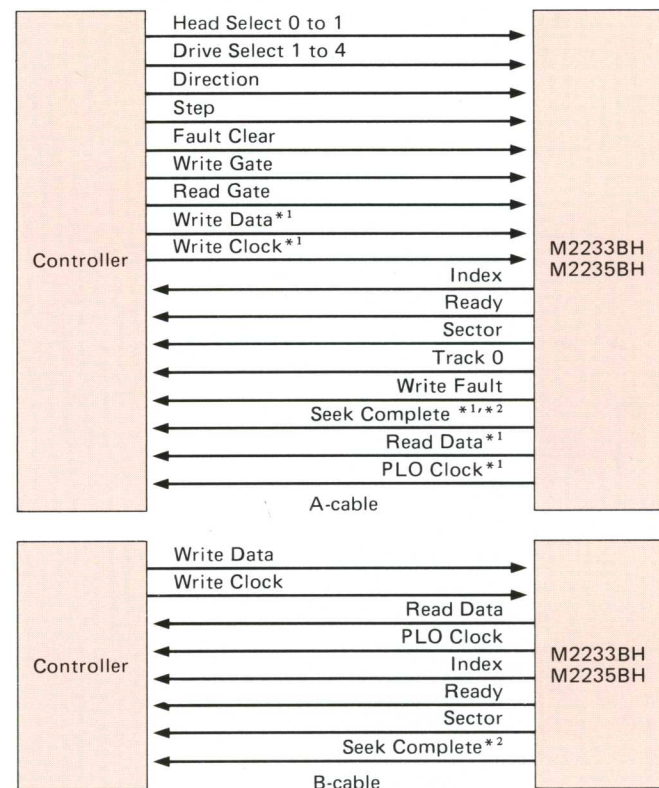
## Internationally compatible

These large capacity 5¼-inch disk drives use low-voltage DC power of +12V and +5V, permitting international applications and freedom from the effects of power line fluctuations.

### ST412 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.

## FUNCTIONAL SPECIFICATIONS

		M2233AH	M2235AH	M2233BH	M2235BH
Storage capacity	Unformatted	13.33 megabytes	26.66 megabytes	13.33 megabytes	26.66 megabytes
	Formatted	10.48 megabytes	20.97 megabytes	10.48 megabytes	20.97 megabytes
Disks (5¼-inch)		1	2	1	2
Heads (read/write)		2	4	2	4
Track capacity	Unformatted	10,416 bytes			
	Formatted	8,192 bytes (32 sectors)			
Tracks per cylinder		2	4	2	4
Cylinders		640			
Sectors		32		16 or 32	
Positioning time (including settling time)	Track-to-track	18 milliseconds			
	Average	95 milliseconds			
	Maximum	245 milliseconds (640 cylinders)			
Average latency time		8.4 milliseconds			
Rotational speed		3,546 rotations/minute			
Recording density		10,200 bits/inch			
Track density		600 tracks/inch			
Data transfer rate		625 kilobytes/second			
Recording code		MFM (Modified Frequency Modulation)			
Interface code		MFM (Modified Frequency Modulation)		NRZ (Non-Return-to-Zero)	
Interface		Modified Floppy (ST412 interface)		Modified Floppy (SA4000 interface) Option: control board	
Start time		Less than 20 seconds			
Stop time		Less than 15 seconds			

## RELIABILITY SPECIFICATIONS

		M2233AH/BH, M2235AH/BH
Mean-time-between-failures (MTBF)		20,000 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

		M2233AH M2235AH	M2233BH M2235BH
Power requirements		12VDC±5% 1.8A (max. 4.0A) 5VDC±5%, 1A	12VDC±5% 1.8A (max. 4.0A) 5VDC±5%, 1.6A
Dimensions	Height	41 mm (1.6 in)	
	Width	146 mm (5.7 in)	
	Depth	203 mm (8.0 in)	
Weight		1.5 kg (3.3 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)/hour	
Relative humidity	Operating	20% to 80% (non condensing)	
	Not operating	5% to 95% (non condensing)	
Vibration and shock resistance	Operating	Max. 0.2G (3Hz to 100Hz) Shock: max. 2G (max. 10 ms)	
	Not operating	Max. 0.4G (3Hz to 100Hz) Shock: max. 20G (max. 10 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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