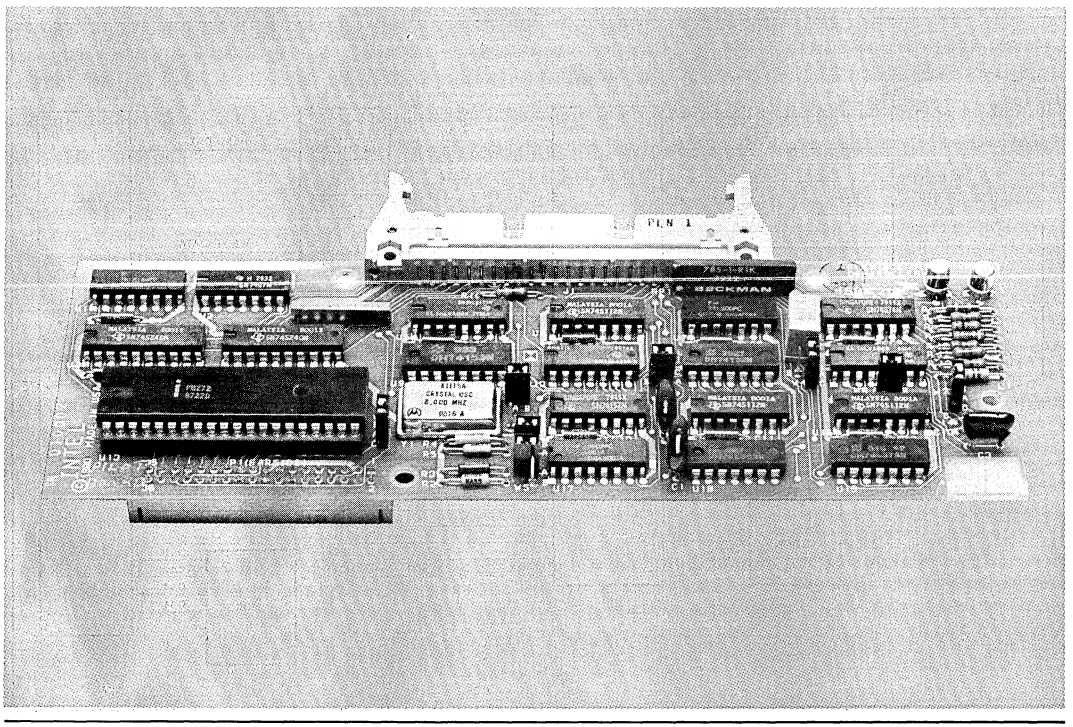
iSBX 218
FLEXIBLE DISK CONTROLLER

- **iSBX MULTIMODULE controller provides flexibility at low cost**
- **Controls most single and double density diskette drives**
- **User-programmable drive parameters allow wide choice of drives**
- **Phase lock loop data separator assures maximum data integrity**
- **Read and write on single or multiple sectors**
- **Single +5V supply**

The Intel iSBX 218 Flexible Disk Controller is a double-wide iSBX board diskette controller capable of supporting virtually any soft-sectored, double density or single density diskette drive. The standard controller can control up to four drives with up to eight surfaces. In addition to the standard IBM 3740 formats and IBM System 34 formats, the controller supports sector lengths of up to 8192 bytes. The iSBX 218 board's wide range of drive compatibility is achieved without compromising performance. The operating characteristics are specified under user program control. The controller can read, write, verify, and search either single or multiple sectors.



FUNCTIONAL DESCRIPTION

Intel's 8272 Floppy Disk Controller (FDC) chip is the heart of the iSBX 218 Controller. On-board data separation logic performs standard MFM (double density) and FM (single density) encoding and decoding, eliminating the need for external separation circuitry at the drive. Data transfers between the controller and memory are managed by the intelligent device (usually an Intel 8-bit or 16-bit CPU chip) on the host board. A block diagram of the iSBX 218 Controller is shown in Figure 1.

Universal Drive and iSBX 218 Controller

Because the iSBX 218 Controller has universal drive compatibility, it can be used to control virtually any standard- or mini-sized diskette drive. Moreover, the iSBX 218 Controller fully supports the iSBX bus and can be used with any single board computer which furnishes this bus. Because the iSBX 218 Controller is programmable, its performance is not compromised by its universal drive compatibility. The track-to-track access, head-load, and head-unload characteristics of the selected drive model are program specified. Data may be organized in sectors up to 8192 bytes in length.

Interface Characteristics

The standard iSBX 218 Controller includes an Intel 8272 Floppy Disk Controller chip which supports up to four drives, single or double sided.

SIMPLIFIED INTERFACE—The cables between the iSBX 218 Controller and the drive(s) may be low cost, flat ribbon cable with mass termination connectors. The mechanical interface to the board is a right-angle header with locking tabs for security of connection.

PROGRAMMING — The powerful 8272 FDC circuit is capable of executing high-level commands that simplify system software development. The device can read and write both single and multiple sectors. CRC characters are generated and checked automatically. Recording density is selected at each Read and Write to support the industry standard technique of recording basic media information on Track 0 of Side 0 in single density, and then switching to double density (if necessary) for operations on other tracks.

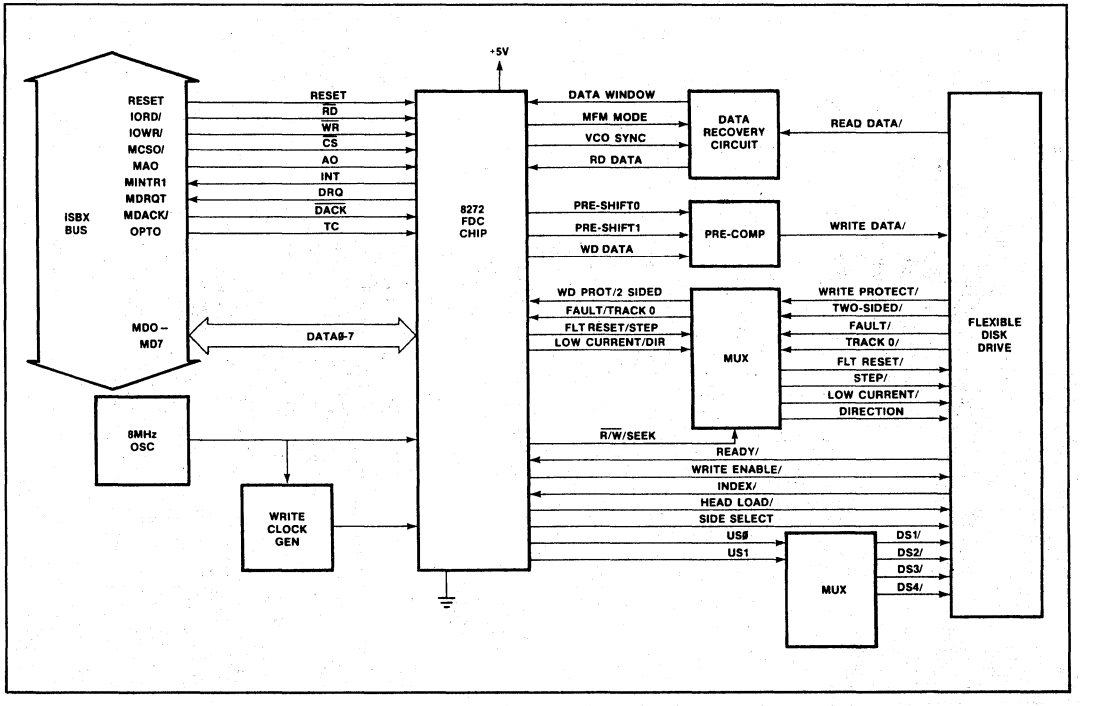


Figure 1. Block Diagram of iSBX 218 Board

PROGRAM INITIATION—All diskette operations are initiated by standard iSBX bus input/output (I/O) operations through the host iSBC single board computer. System software first initializes the controller with the operating characteristics of the selected drive. The diskette is then formatted under program control. Data transfers occur in response to commands output by the CPU.

DATA TRANSFER—Once a diskette transfer operation has been initiated, the controller will require a data transfer every 13 microseconds (double density) or 26 microseconds (single density). Most CPUs will operate in a polled mode, checking controller status and transferring bytes when the controller is ready. Boards utilizing the Intel 8080 chip, such as the iSBC 80/10B board, will be restricted to single density operation with the iSBX 218 Controller, due to these speed requirements. A programming example illustrating the iSBC 80/10B handler is contained in the Hardware Reference Manual.

SPECIFICATIONS

Compatibility

CPU—Any iSBC single board computer or I/O board compatible with the MULTIBUS system bus *and* implementing the iSBX bus and connector.

Devices—Double or single density standard (8″) and mini (5¼″) flexible disk drives. The drives may be single or double sided. Drives known to be compatible are:

Standard (8″)		Mini (5¼″)	
Caldisk	143M	Shugart	450/400
Remex	RFD 4000	Micropolis	1015-IV
Memorex	550	Pertec	250
MFE	700	Siemens	200-5
Siemens	FDD 200-8	Tandon	TM-100
Shugart	SA 850/800	CDC	9409
Pertec	FD 650	MPI	51/52/91/92
CDC	9406-3		

Diskette—Unformatted IBM Diskette 1 (or equivalent single-sided media); unformatted IBM Diskette 2D (or equivalent double-sided).

Equipment Supplied

iSBX 218 Controller
Reference Schematic
Controller-to-drive cabling and connectors are not supplied with the controller. Cables can be fabricated with flat cable and commercially-available connectors as described in the iSBX 218 Hardware Reference Manual.
Nylon Mounting Bolts

Physical Characteristics

Width—2.85 inches (7.24 cm)
Height—0.5 inches (1.27 cm)
Length—7.5 inches (19.05 cm)
Shipping Weight—1 pound (0.46 Kg)
Mounting—Occupies one double-wide iSBX MULTIMODULE position on boards; increases board height (host plus iSBX board) to 1.13 inches (2.87 cm).

Data Organization and Capacity

Standard Size Drives

	Double Density						Single Density					
	IBM System 34			Non-IBM			IBM System 3740			Non-IBM		
Bytes per Sector	256	512	1024	2048	4096	8192	128	256	512	1024	2048	4096
Sectors per Track	26	15	8	4	2	1	26	15	8	4	2	1
Tracks per Diskette	77			256			77			256		
Bytes per Diskette (Formatted, per diskette surface)	512,512 (256 bytes/sector) 591,360 (512 bytes/sector) 630,784 (1024 bytes/sector)			630,784			256,256 (128 byte/sector) 295,680 (256 bytes/sector) 315,392 (512 bytes/sector)			315,392		

Drive Characteristics

	Standard Size	Mini Size
	Double/Single Density	Double/Single Density
Transfer Rate (K bytes/sec)	62.5/31.25	31.25/15.63
Disk Speed (RPM)	360	300
Step Rate Time (Programmable)	1 to 16 msec/track in 1 msec increments	2 to 32 msec/track in 2 msec increments
Head Load Time (Programmable)	2 to 256 msec in 2 msec increments	4 to 512 msec in 4 msec increments
Head Unload Time (Programmable)	0 to 240 msec in 16 msec increments	0 to 480 msec in 32 msec increments

Electrical Characteristics

Power Requirements— +5 VDC @ 0.81A

Environmental Characteristics

Temperature—0°C to 55°C (operating); −55°C to +85°C (non-operating).

Humidity—Up to 90% Relative Humidity without condensation (operating); all conditions without condensation or frost (non-operating).

Reference Manual

121583-001—iSBX 218 Flexible Disk Controller Hardware Reference Manual (NOT SUPPLIED).

Reference manuals may be ordered from any Intel sales representative, distributor office, or from Intel Literature Department, 3065 Bowers Avenue, Santa Clara, CA 95051.

ORDERING INFORMATION

Part Number	Description
SBX 218	Flexible Disk Controller