



iSBC™ 215A/iSBC™ 215B/iSBC™ 215C WINCHESTER DISK CONTROLLER

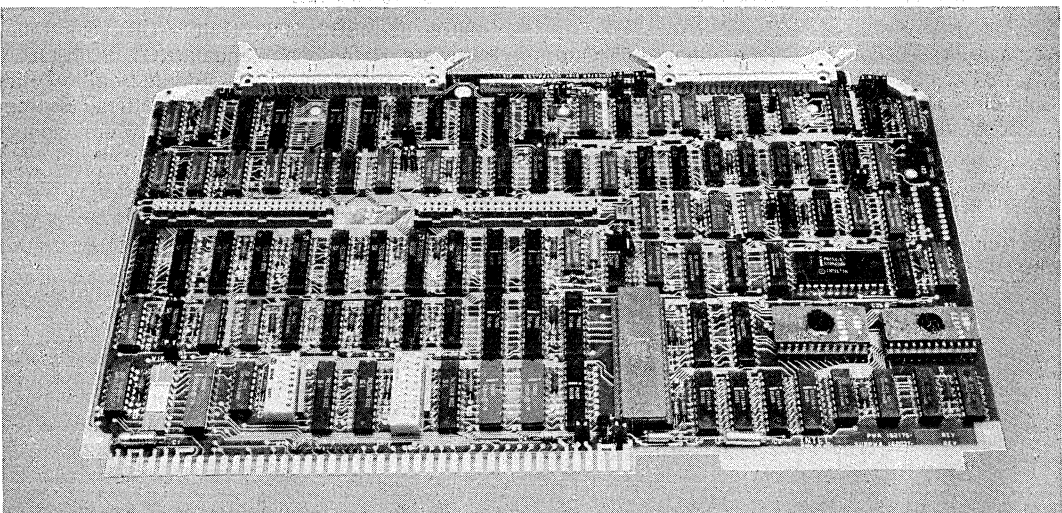
- Controls up to four 5¼", 8" or 14" Winchester disk drives
- Over 100 MB of storage per controller
- Two iSBX™ connectors on-board
- Removable back-up storage available through the iSBX™ 218 Flexible Disk Controller
- Provides ANSI 1226 standard interface
- Software drivers available for iRMX™ 86 and iRMX™ 88 operating systems
- Intel® 8089 I/O Processor provides DMA channels plus user-programmable intelligence
- On-board diagnostics and ECC
- Full sector buffering on-board
- Capable of addressing 1 MB of system memory

The iSBC 215 Winchester Disk Controller will enhance the mass storage capabilities of any iSBC 80, iSBC 88, or iSBC 86-based MULTIBUS system. The controller will interface to industry standard Winchester disk drives currently available in formatted capacity from 4.5 to 26.7 MB. Recording densities are expected to increase rapidly in the near future and the iSBC 215 controller has been designed to accommodate these increases.

The iSBC 215 board will control up to four 5¼", 8" or 14" drives. The iSBC 215A board controls open-loop drives; iSBC 215B board controls closed-loop drives; iSBC 215C board controls ANSI standard 1226 drives.

Two iSBX connectors are provided on the board to interface with the iSBX 218 Flexible Disk Controller, providing up to 4 MB of removable storage.

Increased computing power made available in the iSBC board products has led to a requirement for larger, more reliable mass storage subsystems. The Winchester disk controller provides a high capacity, low cost disk solution that is well matched to single board computer applications.



FUNCTIONAL DESCRIPTION

Programming

Programming the iSBC 215 controller is simplified by the use of memory-based parameter blocks. A linked list technique is used, allowing the user to perform multiple disk operations.

Full On-Board Buffer

The iSBC 215 controller contains enough on-board RAM for buffering one full data sector. The controller is designed to make use of this buffer in all transfers. The on-board sector buffer prevents data overrun errors and allows the iSBC 215 Winchester Disk Controller to occupy any priority slot on the MULTIBUS.

ECC

High data integrity is provided by on-board Error Checking Code (ECC) logic. When writing sector ID or data fields, a 32-bit Fire code, for burst error correction, is appended to the field by the controller. During a Read operation, the same logic regenerates the ECC polynomial and compares this second polynomial to the appended ECC. The ECC logic can detect an erroneous data burst up to 32 bits in length and using an 8089 algorithm can correct an erroneous burst up to 11 bits in length.

iSBX Interface

The software interface and data buffering capabilities used for Winchester drives are also available for both iSBX MULTIMODULE interfaces. Software developed for the iSBC 215 controller can also be used to transfer data to and from an iSBX-compatible I/O device.

Expanded I/O Capability

The iSBC 215 controller allows the user to execute user-written 8089 programs located in on-board or MULTIBUS system RAM. Thus the full capability of the 8089 I/O processor can be utilized for customer I/O requirements.

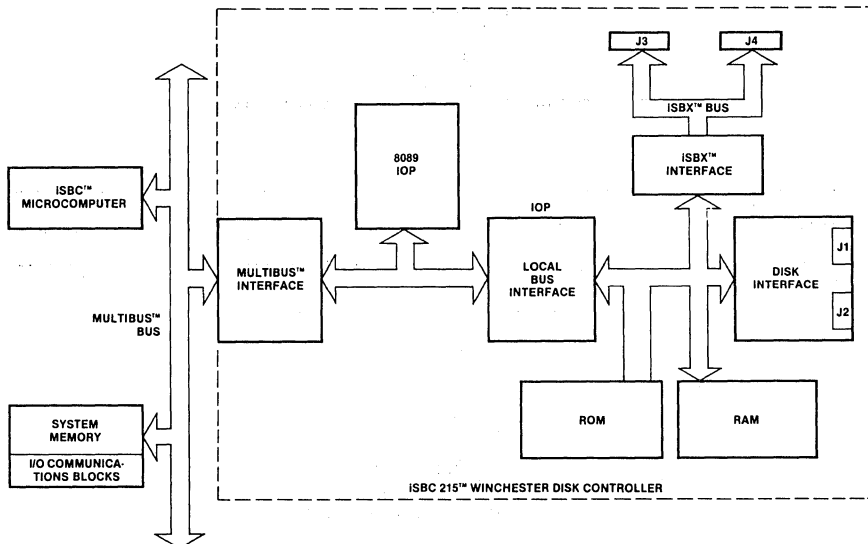
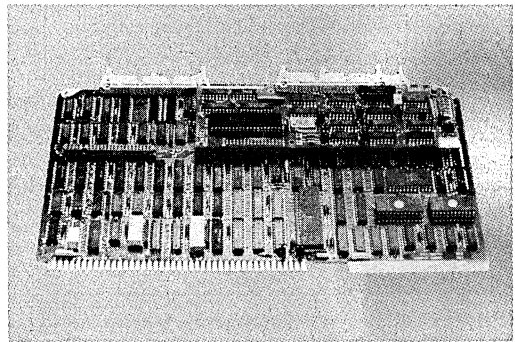
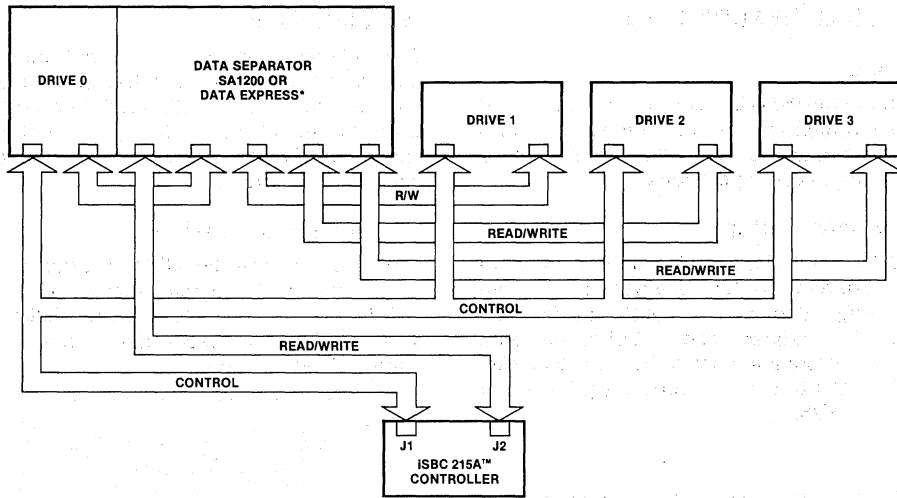
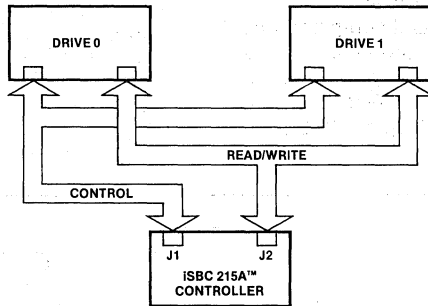


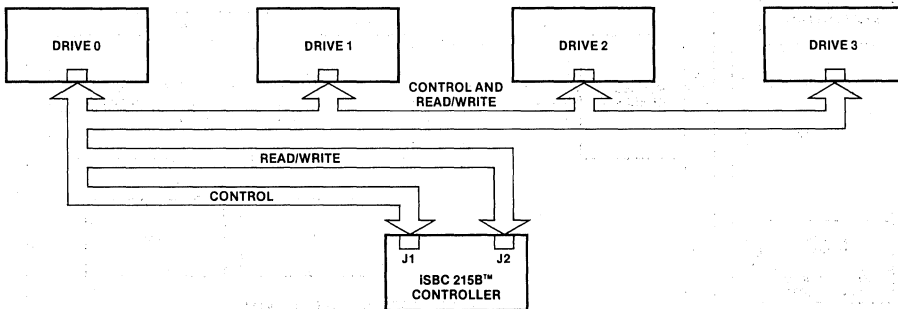
Figure 1. Block Diagram of iSBC 215™ Winchester Disk Controller



INTERFACE WITH SHUGART 8"/QUANTUM/RMS DRIVES



INTERFACE WITH MEMOREX/SHUGART 14"/CDC/FUJITSU DRIVES



INTERFACE WITH PERTEC AND PRIAM DRIVES

* Data Express is a trademark of Rotating Memory Systems Inc.

Figure 2. Controller to Drive Interfacing

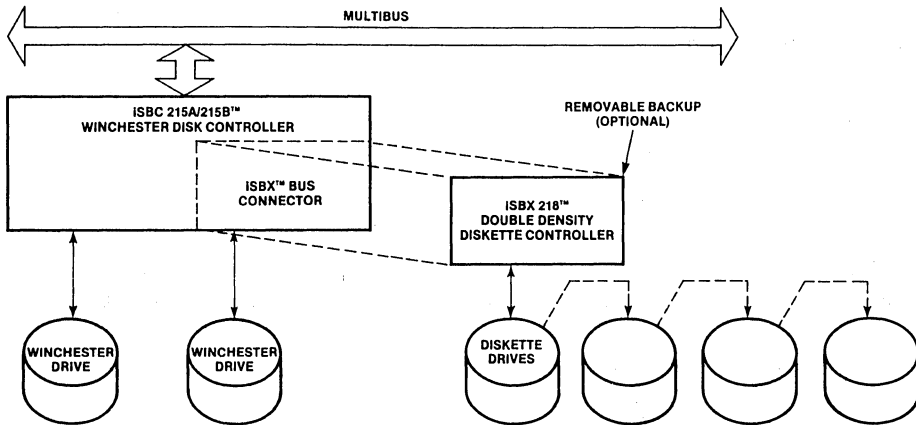


Figure 3. System Configuration (with Optional Diskette Backup)

SPECIFICATIONS

Compatibility

CPU — Any iSBC MULTIBUS computer or system mainframe

Disk Drives — Winchester Disk Drives; both open-loop and closed-loop head positioner types. The following drives are known to be compatible:

Open-Loop (iSBC 215A)
Shugart SA 1000 Series Shugart SA 4000 Series Memorex 100 Series Quantum Q2000 Series Fujitsu 2301, 2302 CDC 9410 RMS 5¼" Series
Closed-Loop (iSBC 215B)
Pertec D8000 Series Priam 8" and 14" Drive Series
ANSI (iSBC 215C)
3M 8430 Series BASF 6170 Series IMI 7700 Series Kennedy 7300 Series Pertec D800 Series Priam 8" Series SLI Cheyenne
iSBX MULTIMODULE Boards
iSBX 218 Flexible Disk Controller iSBX 350 Parallel I/O iSBX 351 Serial I/O iSBX 311 Analog Input iSBX 328 Analog Output

Equipment Supplied

iSBC 215 Winchester Disk 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 iSBC 215 Hardware Reference Manual.

Physical Characteristics

Width — 6.75 in. (17.15 cm)

Height — 0.5 in. (1.27 cm)

Length — 12.0 in. (30.48 cm)

Shipping Weight -- 19 oz (54 kg)

Mounting — Occupies one slot of iSBC system chassis or cardcage/backplane

With an iSBX MULTIMODULE board mounted, vertical height increases to 1.13 in. (2.87 cm).

Electrical Characteristics

Power Requirements

- + 5 VDC @ 3.25A max
- 5 VDC @ 0.15A max¹
- + 12 VDC @ 0.15A max²
- 12 VDC @ 0.03A max²

Notes:

1. On-board regulator and jumper allows + 12 VDC usage from MULTIBUS.
2. Required for some iSBX MULTIMODULE boards.

Drives per Controller

5¼" Winchester Disk Drives — Up to four RMS drives.



8" Winchester Disk Drives — Up to four ANSI, Shugart, Pertec, Quantum or Priam drives; up to two Memorex, CDC, or Fujitsu drives.

14" Winchester Disk Drives — Up to four Priam drivers; up to two Shugart drives.

Flexible Disk Drives — Up to four drives through the optional iSBX 218 Flexible Disk Controller connected to the iSBC 215 board's iSBX connector.

Environmental Characteristics

Temperature — 0° 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

121593-002 — iSBC 215 Winchester 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

Data Organization and Capacity

Sectors/Track¹

Bytes/Sector	Priam 8"	Priam 14"	RMS/Shugart/Quantum	Memorex	Pertec
128	70	104	54	64	69
256	42	62	31	38	42
512	23	34	17	21	24
1024	12	18	9	11	12

Note 1. Maximum allowable for corresponding selection of bytes per sector.

Formatted Capacity/Drive²

Bytes/Sector	Shugart	Quantum	Pertec	Priam	Memorex	RMS
128	7.08 MB	7.08 MB	12.35 MB	23.29 MB	7.99 MB	8.40 MB
256	8.12	8.12	15.03	27.94	9.49	9.65
512	8.91	8.91	17.17	30.62	10.49	10.58
1024	9.43	9.43	17.18	31.95	10.98	11.21

Note 2. Shugart SA 1004, Quantum Q2010, Priam 3450, Pertec D8000, Memorex 101, RMS 512

ORDERING INFORMATION

Part Number	Description
SBC 215A	Winchester Disk Controller (open-loop)
SBC 215B	Winchester Disk Controller (closed-loop)
SBC 215C	Winchester Disk Controller (ANSI interface)