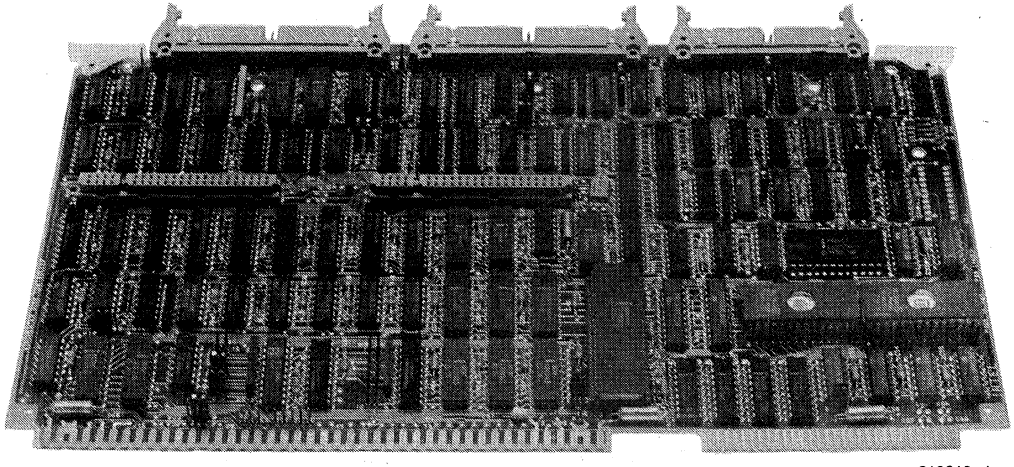
iSBC® 215
GENERIC WINCHESTER CONTROLLER

- **Controls up to Four 5¼", 8" or 14" Winchester Disk Drives from Over Ten Different Vendors**
- **Compatible with Industry Standard MULTIBUS® (IEEE 796) Interface**
- **Supports ANSI X3T9/1226 Standard Interface**
- **Software Drivers Available for iRMX™ 86, iRMX 88 and Xenix* Operating Systems**
- **Intel 8089 I/O Processor Provides Intelligent DMA Capability**
- **On-Board Diagnostics and ECC**
- **Full Sector Buffering On-Board**
- **Capable of Directly Addressing 16 MB of System Memory**
- **Removable Back-up Storage Available Through the iSBX™ 218A Flexible Disk Controller and the iSBX 217C ¼" Tape Interface Module**

Using VLSI technology, the iSBC 215 Generic Winchester Controller (GWC) combines three popular Winchester controllers onto one MULTIBUS board: the iSBC 215A open loop controller, the iSBC 215B closed loop controller, and an ANSI X3T9/1226 standard interface controller. The combined functionality of the iSBC 215 Generic Controller supports up to four 5¼", 8" or 14" Winchester drives from over 10 different drive vendors. Integrated back-up is available via two iSBX MULTIMODULE boards; the iSBX 218A module for floppy disk drives and the iSBX 217C module for ¼" tape units.

From the MULTIBUS side, the iSBC 215 GWC appears as one standard software interface, regardless of the drive type used. In short, the iSBC 215 GWC allows its user to change drive types without rewriting software. The iSBC 215 Generic Controller is totally downward compatible with its predecessors, the iSBC 215A and 215B controller; allowing existing iSBC 215A and 215B users to move quickly to the more powerful iSBC 215 Generic Winchester Controller. In addition, the iSBC 215 GWC directly addresses up to 16 megabytes of system memory.



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Xenix is a trademark of Microsoft Corp.

October 1986
Order Number: 210618-002

FUNCTIONAL DESCRIPTION

Disk Interface

The iSBC 215 Generic Winchester Controller can interface to over 10 different disk drives. To change drive types the user need only reconfigure a minimal number of board jumpers and, if required, insert the proper formatting information into the command parameter blocks.

The ANSI X3T9/1226 standard interface is a simple one-for-one flat cable connection from drive to controller.

Full On-Board Buffer

The iSBC 215 Generic 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 Generic Winchester 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 ECC, for burst error correction, is appended to the field by the controller. During a read operation, the same logic regenerates the ECC 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

Two iSBX bus connectors provide I/O expansion capability for the iSBC 215 GWC. With the optional addition of the iSBX 218A Flexible Disk Controller MULTIMODULE™ and or the iSBC 217C ¼" Tape Interface Module, the iSBC 215 GWC can be configured into one of four types of peripheral subsystems, see Table 1.

Table 1. Peripheral Subsystem Configurations

	iSBC® 215	iSBX™ 218A	iSBX™ 217C
Winchester Only	✓		
Winchester + Floppy	✓	✓	
Winchester + ¼" Tape	✓		✓
Winchester + Floppy + ¼" Tape	✓	✓	✓

Expanded I/O Capability

The iSBC 215 GWC controller allows the execution of 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 custom I/O requirements.

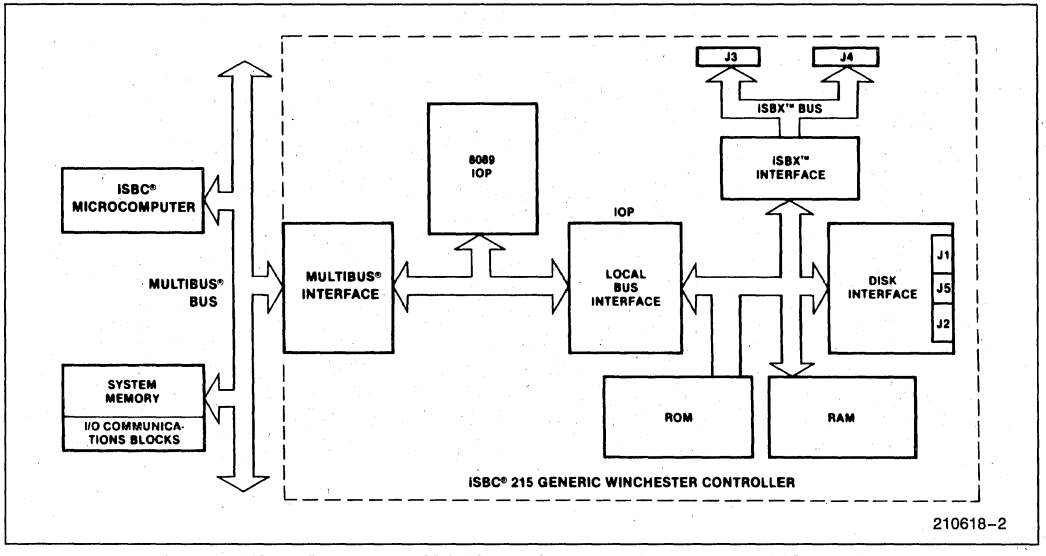
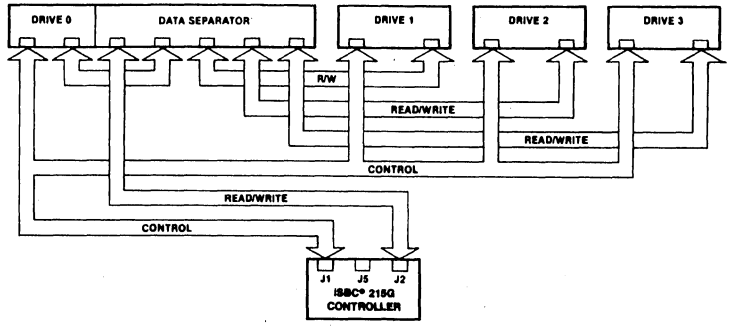


Figure 1. Block Diagram of iSBC® 215 Generic Winchester Disk Controller

Interface with Shugart/Quantum/RMS Drives



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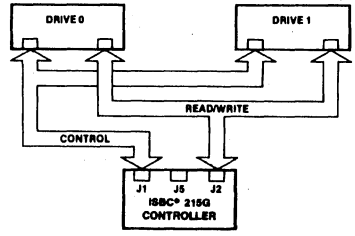
NOTE:
1. Shugart SA1000 or RMS Data Express.* *Data Express is a trademark of Rotating Memory Systems.

Interface with Memorex/Shugart Drives



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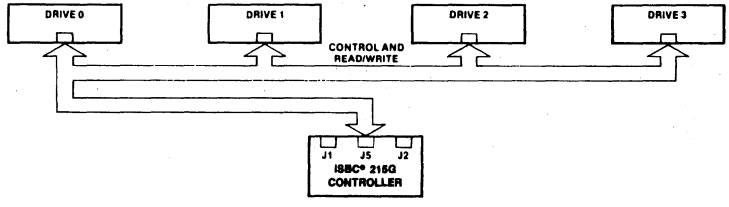
Interface with ANSI Drive



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Interface with PRIAM Drives

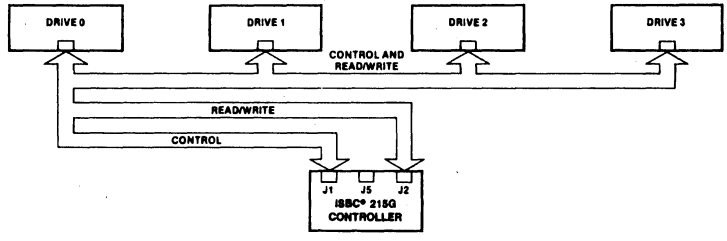

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Figure 2. Controller to Drive Interfacing

MULTIBUS® Interface

The iSBC 215 Generic Controller interfaces to the system CPU(s) through MULTIBUS memory. The iSBC 215 Generic controller directly addresses 16 megabytes of system memory. Commands are passed to and from the iSBC 215 GWC via memory based parameter blocks. These parameter blocks are executed directly by the iSBC 215 GWC thus off-loading the system CPU(s). Data transfers to and from the iSBC 215 GWC are done via the high speed DMA capability of the Intel 8089 I/O processor.

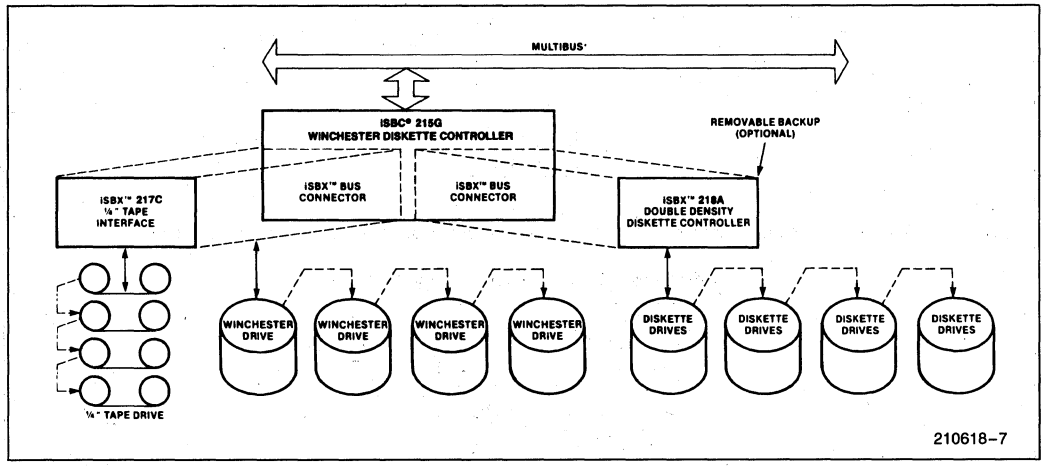

Figure 3. Subsystem Configuration (with Optional Diskette Backup)

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
Shugart SA 1000 Series
Shugart SA 4000 Series
Memorex 100 Series
Quantum Q2000 Series
Fujitsu 2301, 2302
CDC 9410
RMS 5¼" Series
Rodine 5¼" Series
Ampex 5¼" Series
CMI 5¼" Series
Closed-Loop
Priam 8" and 14" Drive Series
ANSI
3M 8430 Series
Kennedy 6170 Series
Micropolis 8" Series
Pertec Trackstar Series
Priam 8" Series
Megavault (SLI) 8" Series
iSBX™ MULTIMODULE™ Boards
iSBX™ 218A Flexible Disk Controller
iSBX™ 217C ¼" Tape Interface

Equipment Supplied

iSBC 215 Generic Winchester 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 215G 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. (0.54 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@4.52A max
−5 VDC@0.015A max[1]
+12 VDC@0.15A max[2]
−12 VDC@0.055A max[1,2]

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

Data Organization

Bytes/Sector	Sectors/Track(1) 128	256	512	1024
Priam 8″	72	42	23	12
Priam 14″	107	63	35	18
RMS/Shugart 8″ /Quantum/Ampes/Rodine/CM1	54	31	17	9
Fujitsu/Memorex	64	38	21	11
Shugart 14″	96	57	31	16
CDC Finch	64	41	23	12
3M (ANSI)	82	51	29	16
Megavault (ANSI)	73	43	21	12
Kennedy (ANSI)	74	43	23	12
Micropolis (ANSI)	71	44	25	13
Pertec (ANSI)	85	52	29	15

NOTE:
1. Maximum allowable for corresponding selection of bytes per sector.

Drives per Controller

5¼″ Winchester Disk Drives—Up to four RMS, CMI, Rodine or Ampex drives.

8″ Winchester Disk Drives—Up to four ANSI, Shugart, 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 218A Flexible Disk Controller connected to the iSBC 215 GWC board's iSBX connector.

¼″ Tape Drives—Up to four drives through the optional iSBX 217C ¼″ Tape Interface Module connected to the iSBC 215 GWC 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

144780—iSBC 215 Generic Winchester 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
SBC 215G	Generic Winchester Controller