

# POINT 4'S LOTUS 710 DISK CONTROLLER: COST-EFFICIENT, HIGH-PERFORMANCE

POINT 4 Data Corporation's LOTUS 710 Disk Controller offers a cost-efficient, high-performance storage module disk interface for POINT 4 computers. The single board design uses low-power Schottky logic providing high-performance and reliability. The controller occupies one slot in the processor chassis and connections to up to four drives are made directly from the board.

## FEATURES

- POINT 4 and similar computer I/O bus-compatible
- Interfaces up to four storage module drives in any combination
- Data transfer rate of 1.209 Megabytes/sec
- IRIS®-compatible I/O instructions
- Whole track transfer in a single operation
- Overlapped seek hardware support
- 32-bit ECC error detection and provision for software correction
- Bad and alternate sectoring flags

- Format routine included in controller logic
- Dual port capability (optional)
- Built-in reliability and maintenance features
- Disk utility and diagnostic programs
- Reads MARK 3 SMD/CMD format (read-regardless mode)
- Supports dual port drives interfacing to two computers

The LOTUS 710 Controller interfaces up to four storage module type drives, at transfer rates up to 1.2M bytes per second. Drives supported include: the CDC 9448, 9730, 9760 and LARK series as well as Ampex, Century Data, Okidata, Kennedy and Fujitsu. The four drives interfaced may be a mixture of any of the drives supported.

The LOTUS 710 Controller is software compatible with the IRIS (Interactive Real-time Information System) Operating System used on POINT 4 computers. Four "data-out" instructions supply the controller with information required to perform any operation. Sixteen operations (including read/write/verify, seek

and disk formatting) may be specified using controller commands. Seven "data-in" instructions obtain status information from the controller. Disk utility and diagnostic programs are provided, as well as extensive operations and maintenance documentation.

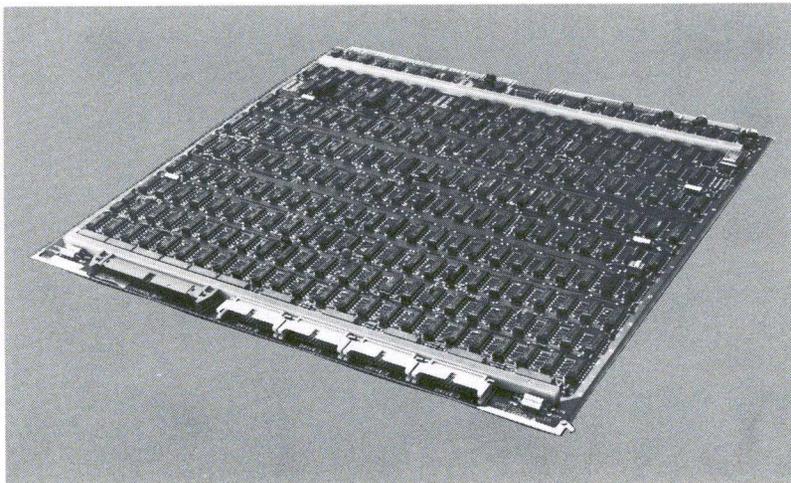
## OPERATION

Data to or from computer memory is transferred in two-byte words using the DMA Data Channel. The 9.67MHz Controller/Drive transfer rate becomes 1.209 Megabytes/sec or 1.65 microseconds/DMA cycle transfer rate at the computer (a rate which the computer must be able to support). The 18-word FIFO buffer is used to prevent "data late" conditions.

Addressing capacity per drive is 1024 tracks, 32 surfaces and 32 sectors. Each sector contains 512K bytes of data. Up to 32 consecutive sectors may be transferred per operation with the cylinder boundary being crossed if necessary.

Hardware alternate sectoring and automatic re-try are jumper-selectable. Bad sector and alternate sector flags are provided to point out sectors known to be faulty. These flags are set during disk formatting. If the alternate sector flag is set, the alternate sector address is specified in the sector header. Alternate sectoring is performed with the necessity of program intervention. A "read-regardless" capability is included on the board which enables the LOTUS 710 in conjunction with a MARK 5 or 8 computer to read a disk that has been formatted and created on a MARK 3.

Overlapped seek allows simultaneous seek and data transfer on multi-drive systems. Once a seek



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command has been issued to the drive, the LOTUS 710 is ready to accept another command from the CPU. When the data transfer command is completed a program interrupt request is issued to alert the CPU of the completed transfer.

Additional features include a 32-bit ECC error detection code for read and write operations and provision for software data correction. In addition, system flexibility is increased by use of a jumper programmable device code. A dual port capability, which allows one disk drive (equipped with a dual port feature) to be accessed by two independent computer systems, can be included as an option on the board.

## LOTUS 710 PACKAGE INCLUDES

- 710 Disk Controller Board
- Cable set to first drive
- Diagnostics and Formatter Software
- Disk Controller and Utilities Manual
- Disk Controller User Manual

## I/O INTERFACE

### COMPUTER INTERFACE

#### I/O Bus:

POINT 4 Computer I/O bus-compatible

#### Backplane wiring:

None required with POINT 4 chassis

#### I/O bus loading:

Single 7400-type input load  
Single 75453-type output driver

#### Device code:

Selectable (default is 27 octal)

#### Priority mask bit:

(7; 8 is optional)

#### DMA transfer rate:

1.209 Megabytes/sec\*  
(1.65 microsecond/DMA cycle)

#### FIFO buffer size:

18 words

\*From SMD Specification

## DISK DRIVE INTERFACE

#### Drives per controller:

4 maximum

#### Drive type and size:

Any mixture

#### Number of surfaces per drive:

32 maximum

#### Number of tracks per surface:

1024 maximum

#### Number of sectors per track:

32 maximum

#### Access time:

1/2 revolution average  
1 revolution maximum

#### Sector size:

Header . . . . .6 bytes + 2 bytes  
of CRC  
Data . . . . .512K bytes + 4 bytes  
of ECC

#### Number of consecutive sectors transferable in one operation:

32 maximum

#### Bad sector flag:

1st bit of header

#### Alternate sector flag:

2nd bit of header

#### Alternate sector location:

Any; specified in header

#### Program load:

From lowest numbered ready drive

#### Overlapped seek execution:

Yes, hardware only

#### Alternate sectoring:

Yes

#### ECC error detection:

Yes

#### ECC error correction:

Provision for software correction

## SPECIFICATIONS

### PHYSICAL

#### 710 Dimensions:

Single board, 15 x 15 inch  
(38 x 38 centimeters)

#### Cabling to drives:

A Cable: 30 pair control bus;  
daisy-chained; terminated at  
last drive

B Cables: 26-wire flat cable;  
radial; one per drive

#### Cable Connectors:

Located on front board edge of  
controller board

### POWER REQUIREMENTS (maximum)

#### Current:

+5 5%, 3.8A  
-5 5%, 0.8A

#### Power:

23W

### OPERATING ENVIRONMENT

#### Operating Temperature:

0-55 degrees Celsius

#### Relative Humidity:

0-90% noncondensing

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At POINT 4 Data Corporation, our business is multi-user systems with a personal touch. We design and manufacture computer systems, distribute them through a worldwide network of value-added resellers and support those resellers with personal service.

POINT 4 computer systems are flexible, cost-efficient, expandable and upward compatible. And we're working for the future, developing new and better products and planning more and better ways to support our customers.

*The materials contained herein are intended for general information. Details and specifications concerning the use and operation of POINT 4 Data Corporation's equipment and software are contained in the applicable technical manuals, available through local sales representatives.*

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2569 McCabe Way, Irvine, CA 92714 • (714) 863-1111 • TWX: (910) 595-1113 • Telex 4722040P4DC