INTELLEC® SINGLE/DOUBLE DENSITY FLEXIBLE DISK SYSTEM

Flexible Disk system providing high speed Input/Output and data storage for Intellec Microcomputer Development Systems

Data recorded on double density flexible disk is in soft-sectored format which allows ½ million byte data capacity with up to 200 files per flexible disk

Available in both single density and double density systems

Associated software supports up to four double density drives and two single density drives, providing up to 2.5 Megabytes of storage in one system

Data recorded on single density flexible disk is in IBM soft-sectored format which allows ¼ million byte data capacity with up to 200 files per flexible disk

Dynamic allocation and deallocation of flexible disk sectors for variable length files

The Intellec® Flexible Disk System is a sophisticated, general purpose, bulk storage peripheral for use with the Intellec Microcomputer Development System. The use of a flexible disk operating system significantly reduces program development time. The software system known as ISIS-II (Intel System Implementation Supervisor), provides the ability to edit, assemble, compile, link, relocate, execute and debug programs, and performs all file management tasks for the user.
FLEXIBLE DISK SYSTEM

HARDWARE
The Intellec® flexible disk system provides direct access bulk storage, intelligent controller, and two flexible disk drives. Each single density drive provides ¼ million bytes of storage with a data transfer rate of 250,000 bits/second. The double density drive provides ½ million bytes of storage with a data transfer rate of 500,000 bits/second. The controllers are implemented with Intel's powerful Series 3000 Bipolar Microcomputer Set. The controllers provide interface to the Intellec System bus. Each single density controller will support two drives. Each double density controller will support up to four drives. The flexible disk system records all data in soft sector format.

The single/double density flexible disk controllers each consist of two boards, the Channel Board and the Interface Board. These two printed circuit boards reside in the Intellec System chassis. The boards are shown in the photograph, and are described in more detail in the following paragraphs.

INTERFACE BOARD
The Interface Board provides the flexible disk controller with a means of communication with the flexible disk drives, as well as with the Intellec system bus. Under control of the microprogram being executed on the Channel Board, the Interface Board generates those signals which cause the read/write head on the selected drive to be loaded (i.e., to come in contact with the flexible disk platter), cause the head to move to the proper track and verify successful operation. The Interface Board accepts the data being read off the flexible disk, interprets synchronizing bit patterns, checks the validity of the data using a cyclic redundancy check (CRC) polynomial, and then transfers the data to the Channel Board.

During write operations, the Interface Board outputs the data and clock bits to the selected drive at the proper times, and generates the CRC characters which are then appended to the data.

When the flexible disk controller requires access to Intellec system memory, the Interface Board requests the DMA master control of the system bus, and generates the appropriate memory command. The Interface Board also acknowledges I/O commands as required by the Intellec bus.

The Flexible Disk System is capable of performing seven different operations: recalibrate, seek, format track, write data, write deleted data, read data, and verify CRC.

The channel board is different for single and double density drives, due to the different recording techniques used. The single density controller boards support one set of dual single density drives. The double density controller boards support up to two sets of dual double density drives (four drives total).

The double density controller may co-reside with the Intel single density controller to allow conversion of single density flexible disk to double density format, and provide up to 2.5M bytes of storage.

FLEXIBLE DISK DRIVE MODULES
Each flexible disk drive consists of read/write and control electronics, drive mechanisms, read/write head, track positioning mechanism, and the removable flexible disk platter. These components interact to perform the following functions:

- Interpret and generate control signals
- Move read/write head to selected track
- Read and write data
**FLEXIBLE DISK SYSTEM**

**ASSOCIATED SOFTWARE — INTEL SYSTEMS IMPLEMENTATION SUPERVISOR (ISIS-II)**

The Flexible Disk Drive System is to be used in conjunction with the ISIS-II Operating System. ISIS-II provides total file management capabilities, file editing, library management, run-time supports, and utility management.

ISIS-II provides automatic implementation of random access disk files. Up to 200 files may be stored on each ¼ million byte flexible disk for single density system or on each ½ million byte flexible disk for double density system. For more information, see the ISIS-II data specification sheet.

### ISIS-II OPERATIONAL ENVIRONMENTAL SPECIFICATION

**ISIS-II**

32K bytes RAM memory
48K bytes when using Assembler Macro feature
64K bytes when using PL/M or Fortran
System Console
Single or Double density Flexible Disk Drive

### HARDWARE SPECIFICATIONS

**MEDIA**

<table>
<thead>
<tr>
<th></th>
<th>Single Density</th>
<th>Double Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Disk</td>
<td>Double Density Specified Flexible Disk</td>
<td>Double Density</td>
</tr>
<tr>
<td>One Recording Surface</td>
<td>One Recording Surface</td>
<td>One Recording Surface</td>
</tr>
<tr>
<td>IBM Soft Sector Format</td>
<td>Soft Sector Format</td>
<td>Soft Sector Format</td>
</tr>
<tr>
<td>77 Tracks/Diskette</td>
<td>77 Tracks/Diskette</td>
<td>77 Tracks/Diskette</td>
</tr>
<tr>
<td>26 Sectors/Track</td>
<td>52 Sectors/Track</td>
<td>52 Sectors/Track</td>
</tr>
<tr>
<td>128 Bytes/Sector</td>
<td>128 Bytes/Sector</td>
<td>128 Bytes/Sector</td>
</tr>
</tbody>
</table>

### PHYSICAL CHARACTERISTICS

**CHASSIS AND DRIVES**

Mounting: Table-Top or Standard 19" Retma Cabinet
Height: 12.08 in. (30.68 cm)
Width: 16.88 in. (42.88 cm)
Depth: 19.00 in. (48.26 cm)
Weight: 64.0 lb (29.0 kg)

### ELECTRICAL CHARACTERISTICS

**CHASSIS**

DC Power Supplies
Supplied Internal to the Cabinet

AC Power Requirements
- 3-wire input with center conductor (earth ground) tied to chassis
- Single-phase, 115 VAC; 60 Hz; 1.2 Amp Maximum (For a Typical Unit)
- 230 VAC; 50 Hz; 0.7 Amp Maximum (For a Typical Unit)

**FLEXIBLE DISK OPERATING SYSTEM CONTROLLER**

DC Power Requirements (All power supplied by Intellec Development System)

### CHANNEL BOARD

<table>
<thead>
<tr>
<th></th>
<th>Single Density</th>
<th>Double Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V @ 3.75A (typ), 5A (max)</td>
<td>5V @ 3.75A (typ), 5A (max)</td>
<td>5V @ 3.75A (typ), 5A (max)</td>
</tr>
</tbody>
</table>

### INTERFACE BOARD

<table>
<thead>
<tr>
<th></th>
<th>Single Density</th>
<th>Double Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V @ 1.5A (typ), 2.5A (max)</td>
<td>5V @ 1.5A (typ), 2.5A (max)</td>
<td>5V @ 1.5A (typ), 2.5A (max)</td>
</tr>
<tr>
<td>- 10V @ 0.1A (typ), 0.2A (max)</td>
<td>- 10V @ 0.1A (typ), 0.2A (max)</td>
<td>- 10V @ 0.1A (typ), 0.2A (max)</td>
</tr>
</tbody>
</table>

### FLEXIBLE DISK DRIVE PERFORMANCE SPECIFICATION

<table>
<thead>
<tr>
<th></th>
<th>Single Density</th>
<th>Double Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (Unformatted): Per Disk</td>
<td>3.1 megabits</td>
<td>6.2 megabits</td>
</tr>
<tr>
<td>Per Track</td>
<td>41 kilobits</td>
<td>82 kilobits</td>
</tr>
<tr>
<td>Capacity (Formatted): Per Disk</td>
<td>2.05M bits</td>
<td>4.10 megabits</td>
</tr>
<tr>
<td>Per Track</td>
<td>26.6K bits</td>
<td>53.2 kilobits</td>
</tr>
<tr>
<td>Data Transfer Rate</td>
<td>250 kilobits/sec</td>
<td>500 kilobits/sec</td>
</tr>
<tr>
<td>Access Time:</td>
<td>Track-to-Track</td>
<td>10 ms</td>
</tr>
<tr>
<td></td>
<td>Head Settling Time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Average Random</td>
<td>Positioning Time</td>
<td>260 ms</td>
</tr>
<tr>
<td>Rotational Speed</td>
<td>360 rpm</td>
<td>360 rpm</td>
</tr>
<tr>
<td>Average Latency</td>
<td>83 ms</td>
<td>83 ms</td>
</tr>
<tr>
<td>Recording Mode</td>
<td>Frequency Modulation</td>
<td>M^2FM</td>
</tr>
</tbody>
</table>

### ENVIRONMENTAL CHARACTERISTICS

**MEDIA**

Temperature:
- Operating: 15.6°C to 51.7°C
- Non-Operating: 5°C to 55°C

Humidity:
- Operating: 8 to 80% (Wet bulb 29.4°C)
- Non-Operating: 8 to 90%

**DRIVES AND CHASSIS**

Temperature:
- Operating: 10°C to 38°C
- Non-Operating: −35°C to 65°C

Humidity:
- Operating: 20% to 80% (Wet bulb 26.7°C)
- Non-Operating: 5% to 95%

**CONTROLLER BOARDS**

Temperature:
- Operating: 0 to 55°C
- Non-Operating: −55°C to 85°C

Humidity:
- Operating: Up to 95% relative humidity without condensation
- Non-Operating: All conditions without condensation of water or frost
**FLEXIBLE DISK SYSTEM**

### EQUIPMENT SUPPLIED

**SINGLE DENSITY**
- Cabinet, Power Supplies, Line Cord, Two Drives
- Single Density FDC Channel Board
- Single Density FDC Interface Board
- Dual Auxiliary Board Connector
- Flexible Disk Controller Cable
- Flexible Disk Peripheral Cable
- Hardware Reference Manual
- Reference Schematics
- ISIS-II Single Density System Disk
- ISIS-II System User’s Guide

**DOUBLE DENSITY**
- Cabinet, Power Supplies, Line Cord, Two Drives
- Double Density FDC Channel Board
- Double Density FDC Interface Board
- Dual Auxiliary Board Connector
- Flexible Disk Controller Cable
- Flexible Disk Peripheral Cable
- Hardware Reference Manual
- Reference Schematics
- ISIS-II Double Density System Disk
- ISIS-II System User’s Guide

### OPTIONAL EQUIPMENT

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS-640</td>
<td>Rack Mount Kit</td>
</tr>
<tr>
<td>MDS-BLD</td>
<td>10 Blank Flexible Disks</td>
</tr>
<tr>
<td>MDS-DDR</td>
<td>Second Drive Cabinet with two additional drives</td>
</tr>
</tbody>
</table>

### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS-2DS/110V</td>
<td>Flexible Disk drive unit with two drives, single density drive controller, software, and cables.</td>
</tr>
<tr>
<td>2DS/220V</td>
<td></td>
</tr>
<tr>
<td>MDS-DDS/110V</td>
<td>Flexible Disk drive unit with two drives, double density drive controller, software, and cables.</td>
</tr>
<tr>
<td>DDDS/220V</td>
<td></td>
</tr>
<tr>
<td>MDS-DDR/110V</td>
<td>Add-on drive unit with two drives and double density cable, without controller and software. Can be used with double density controller.</td>
</tr>
<tr>
<td>DDR/220V</td>
<td></td>
</tr>
</tbody>
</table>

**Intel Corporation**

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TELEX: 34-6372

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**U.S. REGIONAL SALES OFFICES**

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      - TWX: 910-935-1114

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      - Suite 220  
      - Oakbrook 60521  
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      - TWX: 910-651-5861

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      - Dayton 45415  
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      - Chelmsford 01824  
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      - TWX: 710-343-6333

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**OVERSEAS MARKETING OFFICES**

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    - Flower Hill-Shimamachi East Bldg.  
      - 1-23-9, Shinmachi, Setagaya-ku  
      - Tokyo 154  
      - Tel: (03) 426-9261  
      - TELEX: 751-28426

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- **BELGIUM**
  - Intel International*  
    - Rue du Moulin à Papier  
      - 51-Boîte 1  
      - B-1160 Brussels  
      - Tel: (02) 650 30 10  
      - TELEX: 24814

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**Note New Telephone Number**

*Field Application Location*