



INTELLEC® SINGLE/DOUBLE DENSITY FLEXIBLE DISK SYSTEM

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

Available in both single density and double density systems

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

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

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

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.



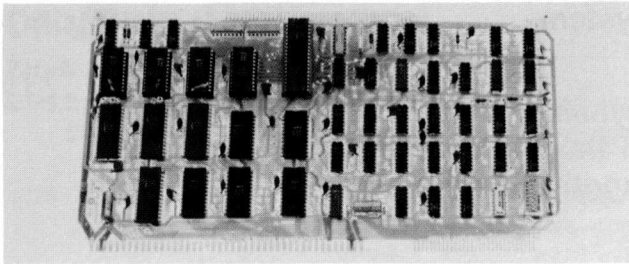
FLEXIBLE DISK SYSTEM

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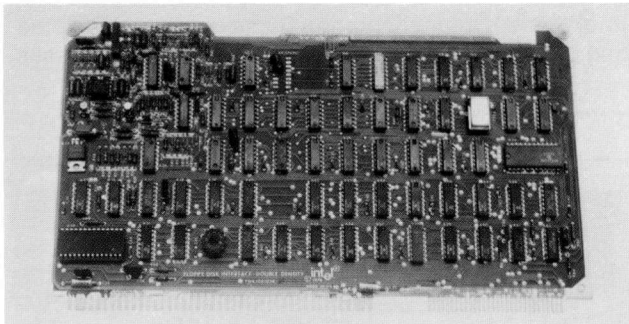
HARDWARE

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 consists 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.



SINGLE/DOUBLE DENSITY CHANNEL BOARD



DOUBLE DENSITY INTERFACE BOARD
(SINGLE DENSITY INTERFACE BOARD
IS SIMILAR TO THE ONE SHOWN ABOVE)

CHANNEL BOARD

The *Channel Board* is the primary control module within the flexible disk system. The Channel Board receives, decodes, and responds to channel commands from the Central Processor Unit (CPU) in the Intellec system. The Channel Board can access a block of Intellec system memory to determine the particular flexible disk operations to be performed and fetch the parameters required for the successful completion of the specified operation.

The control functions of the Channel Board have been achieved with an 8-bit microprogrammed processor, designed with Intel's Series 3000 Bipolar Microcom-

puter Set. This 8-bit processor includes four 3002 Central Processing Elements (2-bit slice per CPE), a 3001 Microprogram Control Unit, and 512 × 32 bits of 3604 programmable-read-only-memory (PROM) which stores the microprogram. It is the execution of the microprogram by the microcomputer set which actually effects the control capability of the Channel Board.

This board is the same for either single or double density drives, except that the Series 3000 microcode is different.

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 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

Single Density	Double Density
Flexible Disk	Double Density Specified Flexible Disk
One Recording Surface	One Recording Surface
IBM Soft Sector Format	Soft Sector Format
77 Tracks/Diskette	77 Tracks/Diskette
26 Sectors/Track	52 Sectors/Track
128 Bytes/Sector	128 Bytes/Sector

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

Single Density	Double Density
5V @ 3.75A (typ), 5A (max)	5V @ 3.75A (typ), 5A (max)

INTERFACE BOARD

Single Density	Double Density
5V @ 1.5A (typ), 2.5A (max)	5V @ 1.5A (typ), 2.5A (max) - 10V @ 0.1A (typ), 0.2A (max)

FLEXIBLE DISK DRIVE PERFORMANCE SPECIFICATION

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

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

MDS-640 Rack Mount Kit
MDS-BLD 10 Blank Flexible Disks
MDS-DDR Second Drive Cabinet with two additional drives

ORDERING INFORMATION

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

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**Note New Telephone Number

*Field Application Location