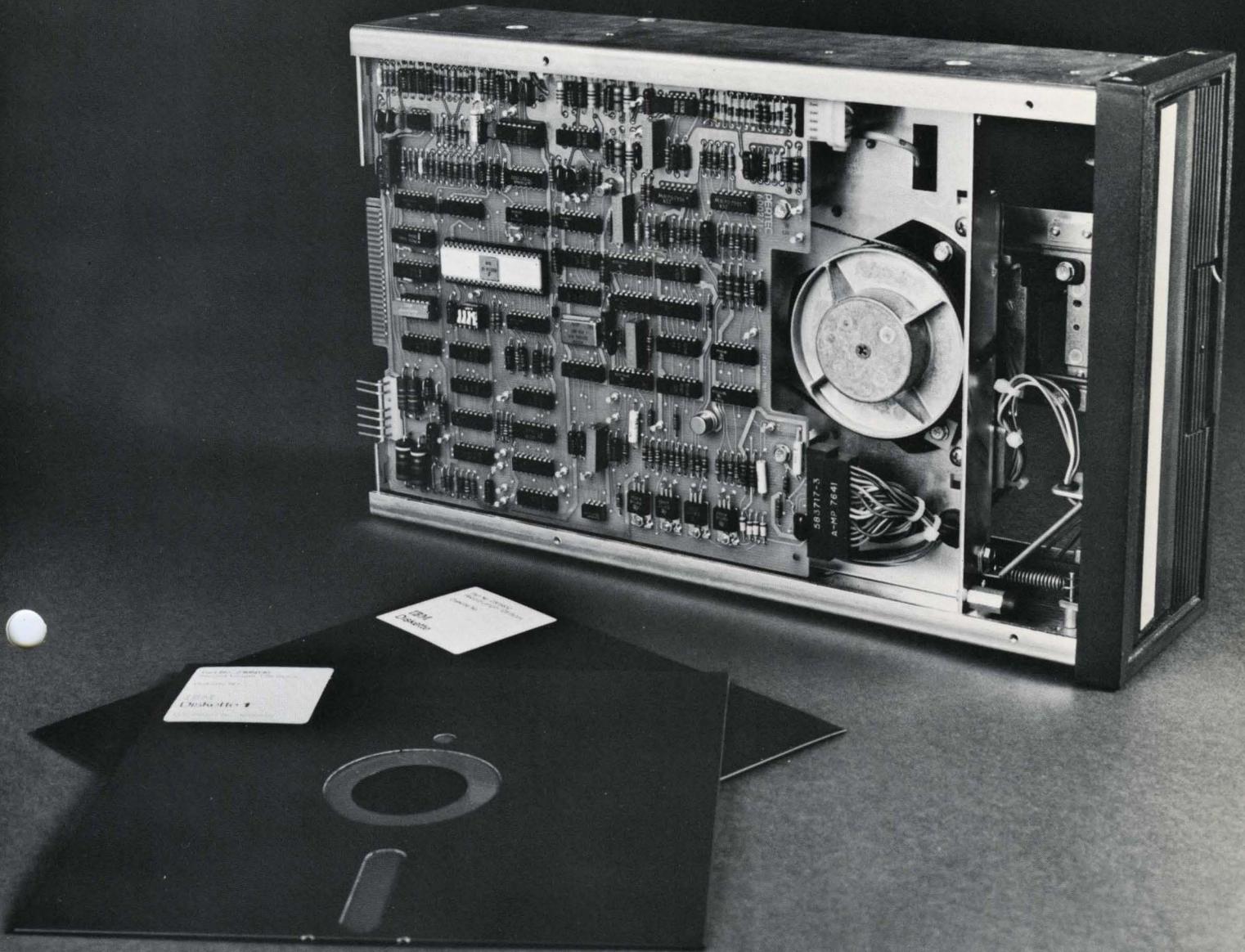# The iCOM Intelligent Floppy™ Disk Drive

THE iCOM FD5200

- The first floppy disk drive with single chip LSI controller/formatter built in to reduce cost, system size, assembly time, software development and maintenance. Saves on system integration, too.

- Features our field-proven Pertec Flexible Disk drive mechanics with write protect and automatic unloading of read/write head and head pressure pad for optimum diskette life.

- Soft sector formatting operates to IBM 3740 Standard. User can select other formats if desired.

- Ideal for 8 or 16 bit microprocessor systems. Interfaces to minicomputers as well. The FD5200's parallel digital interface makes the interfacing job for any application quick and easy.

- Integral "Daisy-Chain" capability allows up to 4 drives on common cable.

- Phase-Lock loop separator for enhanced data reliability.

- Features three step per track head positioning for better accuracy and data reliability.

The Intelligent Floppy.™
What it will do for you.

Built-in Controller/Formatter Saves in Many Ways

Meet iCOM's FD5200, the first floppy disk system with built-in controller/formatter! All circuitry is mounted on a single circuit board within the disk drive chassis, eliminating separate hardware and associated cables.

A simple 8-bit bi-directional bus makes it easier to integrate the FD5200 into your system. Accrued benefits include: reduced hardware costs, smaller size, shorter assembly time, easier software development, improved reliability and lower maintenance.
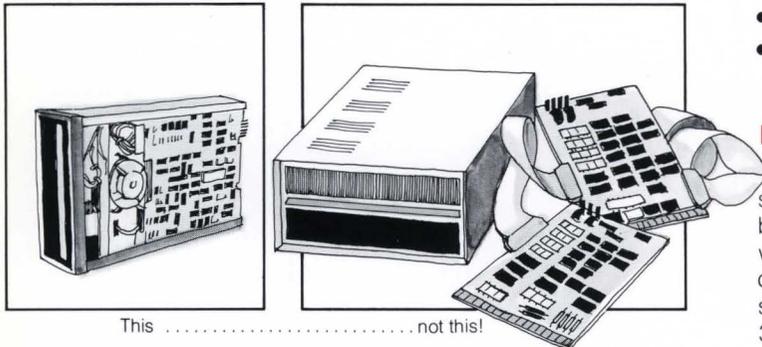
This .... not this!

The heart of the controller/formatter is a special LSI chip which makes it possible for the formatter to perform the complex logic needed to write data on the diskette in IBM 3740 format. Other user selectable formats can be used, too.

In addition, many system housekeeping functions are performed by the FD5200. For example, the control section automatically performs track seek and verify without intervention of the host processor, making for simpler programming. The modular format means simpler maintenance. Fewer components insure greater reliability. And diskette initialization capability is included, too!

Pertec Makes the Driving Easy...and Accurate

The FD5200 uses our high performance, field proven Pertec disk drive mechanics. For good reasons. The ferrite read/write heads provide total IBM compatibility with 20,000 hour head life and 7.5 million passes on a single track. You get 3-steps-per-track linear movement, rather than the typical one-step-per-track. This gives you superior track positioning accuracy. Also, we have a unique head retract system which unloads both the head and pressure pad from the diskette except when actually reading or writing. This means less chance for data degradation, plus a longer media life overall. Add write protect and Pertec's reputation for quality and value and you can see why Pertec says...leave the driving to us.
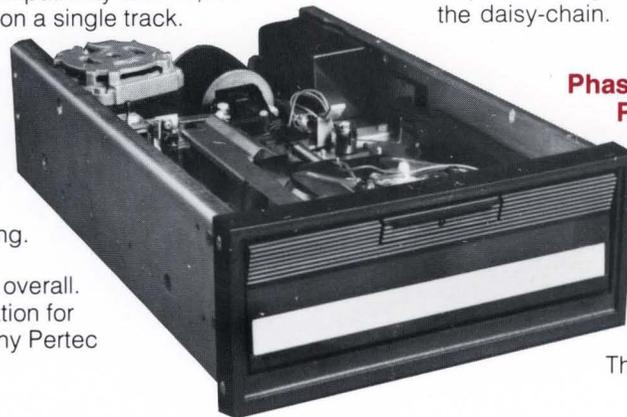
The Integral Formatter Provides These Advantages

The integral controller/formatter structure gives you a number of advantages such as:

- Simple eight-bit, bi-directional digital bus for data, status and control provides easy interfacing.
- Single or Multiple Sector Read/Write with automatic sector search for optimum system throughput.
- 128 Byte or variable record lengths, user selectable.
- Automatic track seek with verification to reduce system overhead.
- Entire track read for rapid data input to your processor.
- Entire track write for efficient diskette initialization.

IBM 3740 Media Compatibility

The FD5200 provides IBM compatible soft sector formatting. (Other formats may be selected by the user as well). Data written on the FD5200 floppy disk is capable of being read by an IBM 3740 system. And data written on an IBM 3740 can be read on the iCOM FD5200. You get full IBM media compatibility.

THINK

Daisy-Chain 4 Drives on a Common Cable
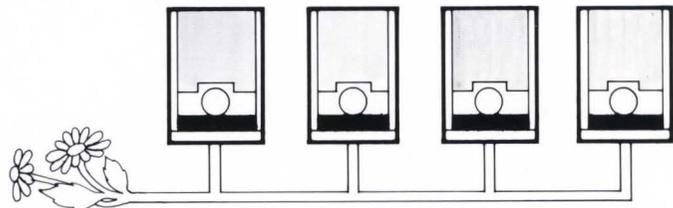
The FD5200 provides address selection and gating functions needed to daisy chain up to four disk drives using a common cable. The daisy-chain interface consists of a 50 conductor flat ribbon cable with a maximum cable length of 30 feet (9.14 meters) from the controller to the last unit on the daisy-chain.

Phase Locked Loop Maximizes Data Reliability

The FD5200 data separation circuit has an LSI phase locked loop for data and clock bit separation and address word detection. The circuitry is optimized to lock onto data within the pre-amble without tracking phase errors produced by peak shift effects. This means maximum data reliability.

The Intelligent Floppy™
Its Academic Credits.

The Intelligent Floppy™— A Perfect Mate for the Intelligent Terminal

The iCOM FD5200 Intelligent Floppy with its built-in controller/formatter for typical stand-alone applications such as intelligent terminals and data logging, but it also offers new capabilities for multiprocessing in other types of systems.

The reduced cost of the FD5200 permits designers to consider using several FD5200's rather than a single shared formatter/controller. This approach makes possible not only overlapping head seeks, but also overlapping reads and writes that cannot be achieved at all with a shared formatter/controller. This permits the system designer to achieve optimum throughput and more efficient total system operation.

About iCOM — World's Largest Manufacturer of Microperipherals™ for Microcomputers.

iCOM has been building floppy disk systems for microcomputers for more than three years. Thousands of units are operating perfectly in the field. Many major computer manufacturers have incorporated iCOM floppy disks into their systems.

iCOM is a division of Pertec Corporation, one of the largest and most respected manufacturers of peripherals, microsystems, data entry products and data processing systems.

We deliver... and we'll be around to give you service whenever and wherever you may need it.

Performance Specifications:

Diskette — Standard IBM 8-inch formatted or unformatted
Tracks Per Inch — 48
Number of Tracks — 77
Disk Rotational Speed — 360 rpm ±1.5%
Data Transfer Rate — 250,000 bits/second maximum
Recording Density — 3,268 bits/inch (inside track)
Maximum Bits/Track — 41,665 (unformatted)
Maximum Bits/Disk — 3.2 million (unformatted)
Average Latency Time — 83.3 milliseconds
Start Up Time — 2 seconds maximum
Stop Time — 2 seconds maximum
Access Time, Track to Track — 10 milliseconds (Seek time minimum)
Head Settling Time — 20 milliseconds (At last track addressed)
Head Loading Time — 40 milliseconds maximum
Minimum Disk Life — 7.5×10^6 passes per track
Minimum Head Life — 20,000 hours in-contact operation
Maximum Error Rate — 1 bit in 10^9 recoverable
1 bit in 10^{12} non-recoverable

Physical Specifications:

Height — 3.45 inches (87.6 mm)
Width — 8.60 inches (218.4 mm)
Length — 14.2 inches (360.7 mm)
Weight — 14 pounds (6.35 kg)

Environmental Specifications:

Temperature (Operating) —+50°F (+10°C) to +110°F (+42°C)
Temperature (Non-operating) —−40°F (−40°C) to +160°F (+71°C)
Relative Humidity (Operating) — 20% to 80%
Relative Humidity (Non-operating) — 5% to 95% without condensation
Vibration (Operating) — 6-600 Hz., 0.5 g peak
Shock (Operating) — 11 millisecond duration, 1.5 g

Cooling

Heat dissipation from a single unit is normally 53 watts (177 BTU/hr) and a maximum of 70 watts (235 BTU/hr).

No forced ventilation is required in an environment where the drive has access to a free flow of air caused by normal convection.

The Intelligent Floppy.™

Command Summary

COMMAND	BITS							
	7	6	5	4	3	2	1	0
Restore	0	0	0	0	h	V	r_1	r_0
Seek	0	0	0	1	h	V	r_1	r_0
Step	0	0	1	u	h	V	r_1	r_0
Step In	0	1	0	u	h	V	r_1	r_0
Step Out	0	1	1	u	h	V	r_1	r_0
Read Command	1	0	0	m	b	E	0	0
Write Command	1	0	1	m	b	E	a_1	a_0
Read Address	1	1	0	0	0	1	0	0
Read Track	1	1	1	0	0	1	0	$\bar{s}$
Write Track	1	1	1	1	0	1	0	0
Force Interrupt	1	1	0	1	I_3	I_2	I_1	I_0

Status for Type 1 Commands

NAME	DEFINITION
Busy	When set, command in progress. When reset no command in progress.
Index	When set, indicates index mark detected from drive. This bit is a copy of the NINXP input but inverted to true form.
Track 00	When set, indicates REad Write head is positioned to Track 0. This bit is a copy of the MTRKOO but inverted to true form.
CRC Error	When set, there was one or more CRC errors on an unsuccessful track verify. This bit reset to 0 when updated.
Seek Error	When set, the desired track was not verified. This bit reset to 0 when updated.
Head Loaded	When set, indicates the head is loaded and engaged. This bit is an "and" of HLD and HLT.
Protected	When set, indicates WRite Protect is activated. This bit is a copy of NWPRT input but inverted to true form.
Not Ready	This bit when set indicates the drive is not ready. When reset, the drive is ready. This bit is a copy of the RDY input but inverted and also "ored" with MRST.

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