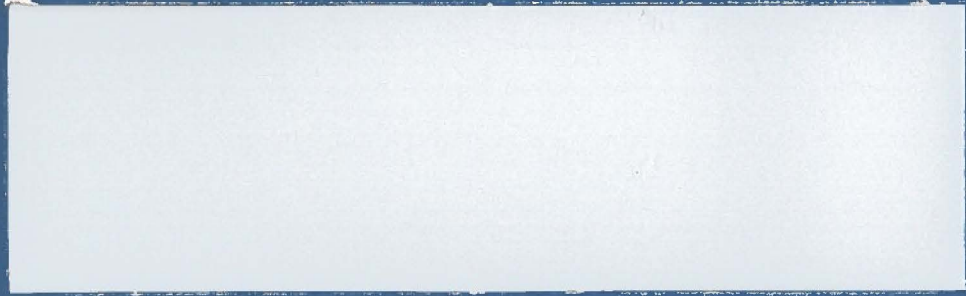


# MCM COMPUTERS LIMITED



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DDS - 1000

DISKETTE DRIVE

USER'S MANUAL

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To Order DDS-1000 User's Manual Use the Number Below:

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PREFACE

The objectives of this manual are to describe the DDS-1000 Diskette Drive (sometimes also called "floppy" or flexible disk drive) and its use with the MCM/900 APL language desk top computer. This manual should be read in conjunction with Section 8, "External Allocation System (EASY) and A Virtual System (AVS)" of the MCM/900 User's Manual. That section provides a general description of the MCM/900 file system and virtual system -- both of which are usually used with the DDS-1000 or the smaller DDS-500 diskette drives.

## 1.0 GENERAL DESCRIPTION OF DDS-1000 DISKETTE DRIVE

The DDS-1000 comprises two 500K byte double-sided flexible disk drives used to store programs and data. Under the control of AVS, A Virtual disk operating System, programs are automatically swapped by the MCM/900 computer in 2K byte blocks between the fast random access memory (RAM) of the computer and the DDS-1000 as required. This allows use of much larger Work Spaces (WS) to the APL user. System 900 also has a filing system (called External Allocation System or EASY) which can conveniently be used to write and read data on diskettes of the DDS-1000.

The actual drives of the DDS-1000 are enhanced double-head versions of the standard single-head drives of the earlier diskette systems such as the DDS-500. The drives are physically the same size as the earlier ones and are treated the same way from the software viewpoint. Apart from the double-sided (and double capacity) features, the only other significant difference is faster track to track seeks. The DDS-1000 records data on a total of four surfaces, since there are two drives per DDS-1000, and each surface is viewed by System 900 as a "unit" of storage divided into a maximum of 255 groups as selected by the programmer.

Single sided disks recorded on the DDS-500 diskette drive system may be read by the DDS-1000. Similarly, one surface of each DDS-1000 diskette may be used on the DDS-500. (The second surface of double-sided diskettes written on a DDS-1000 cannot be read on the DDS-500, so there is "upward" but not total two-way compatibility in going from DDS-500 to 1000).

The DDS-1000 employs a stepper motor positioning mechanism and can write up to 77 tracks per surface. Seek speed (access time) is 3 msec track to track. Rotational latency, 167 msec maximum, is determined by the rotational speed of 360 rpm.

Each track contains 16 sectors and each sector can store 256 bytes (formatted) so there are 4096 bytes per track. Only 64 of the 77 tracks are used to allow alternates for "bad" tracks, so total capacity used per diskette surface is 4096 x 64 or 262,144 bytes.

Worst case read time per sector is 431 msec and average read time is 174 msec. Worst case write time per sector is longer by one revolution because the sector is read after being written, and is 597 msec. Average write time per sector is 340 msec.

The DDS-1000 controller contains a buffer of 256 bytes which is the equivalent of one sector.

## 2.0 INSTALLATION

### 2.1 GENERAL

This section contains information and instructions for unpacking the DDS-1000, installing it and preparing for operation.

Upon receipt of the DDS-1000, carefully inspect the unit for any damage which may have been sustained in transit. Notify MCM and file a claim with the carrier if there is any such damage. All equipment is carefully inspected and tested before shipping.

### 2.2 UNPACKING

The DDS-1000 unit should be unpacked as follows:

1. Remove the shipping straps and cargo wrap.
2. Remove the protective plastic shroud from the unit.
3. Place the disk unit on a desk or other flat surface.
4. Remove shipping diskette from each drive carefully.

#### Note Carefully

If unit is to be shipped to another location, all packing materials should be retained. DDS-1000 units must be shipped with shipping diskette inserted and drive doors closed to ensure that the heads cannot touch. Vibration against each other will erode head surfaces.

### 2.3 POWER CONNECTIONS TO DDS-1000

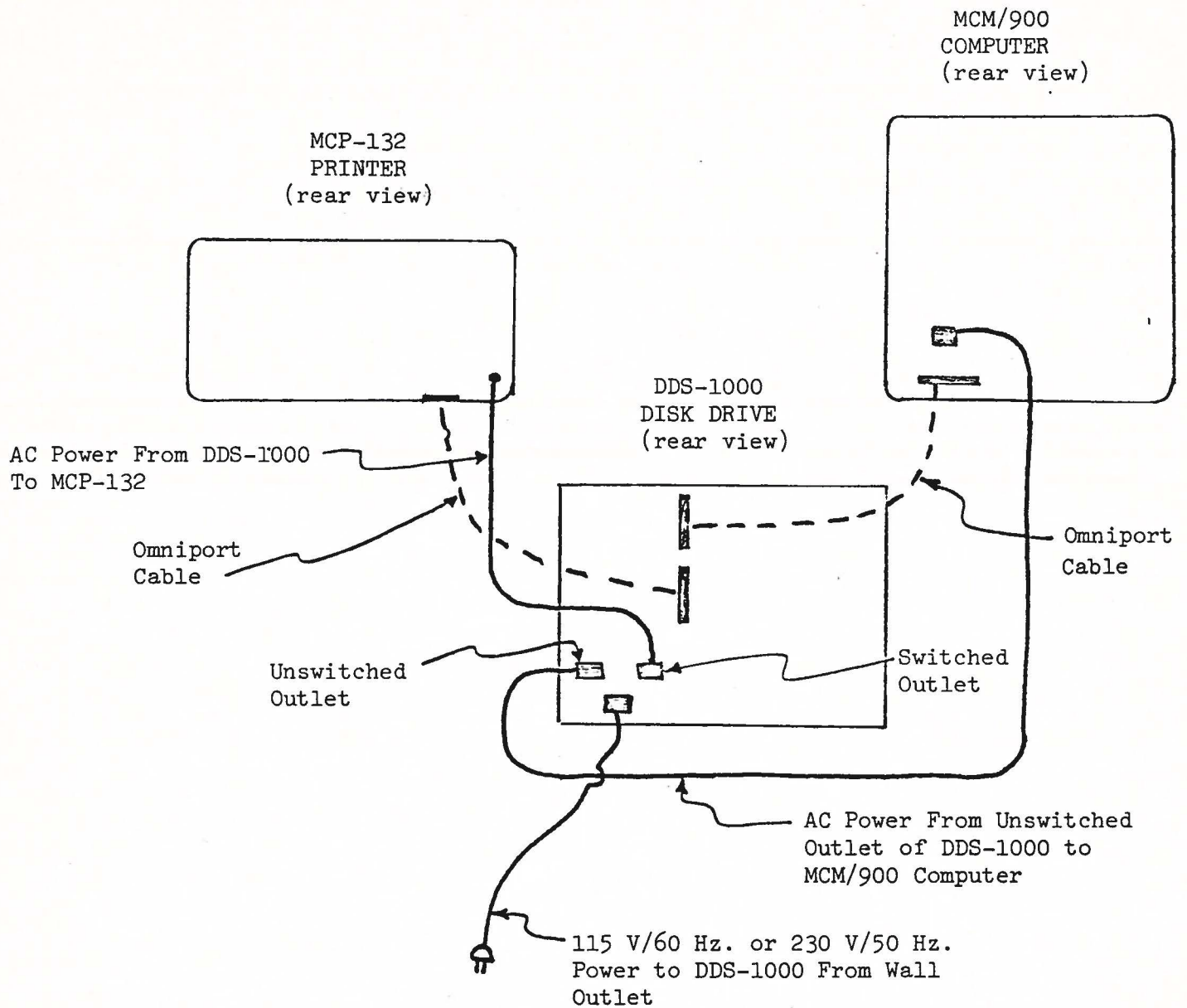
The DDS-1000 is designed to operate from a nominal line voltage of 117 volts, 60 Hz or optionally 230 volts, 50 Hz. It is important to verify that the DDS-1000 has the right voltage rating prior to connection to a wall outlet. Once this is checked, connect the DDS-1000 to the outlet using its power cord.

The DDS-1000 will not switch on even though power is applied to it, and it does not have an ON/OFF switch. It is turned on by the application of a 5 volt OMNIPOINT signal from the computer which is present if the computer has been turned on by pressing the keyboard START key. In order to do this, follow the instructions in the next section (Para 2.4).

## 2.4 CONNECTION TO THE COMPUTER

The DDS-1000 is usually connected as shown in Figure 2.4. The power cord of the DDS-1000 is first connected to an AC supply with matching voltage rating to that shown on the DDS-1000 back panel. The MCM/900 is then powered from the unswitched AC outlet at the back of the DDS-1000, and both voltage specifications must be verified to match prior to connection. The printer is connected to the switched outlet of the DDS-1000 as shown, and once more voltage rating is to be verified.

The DDS-1000 cannot be turned on by itself. It is switched on by an electrical signal from the computer through the OMNIPOINT cables after they are connected as shown in Figure 2.4. Note that the OMNIPOINT cables are keyed to fit only one way and must not be forced the wrong way, i.e. pin 1 must go to pin 1 at the other end, etc. Once these cables are connected, the DDS-1000 will switch on when the START key of the MCM/900 is depressed.



**FIGURE 2.4** Typical Connection of DDS-1000 To Other Subsystems.



## 2.5 SWITCHES AT BACK OF DDS-1000

The DDS-1000 is equipped with two rocker switches at the back of the unit which allow for four possible address combinations. The table at the back of the DDS-1000 shows what unit numbers are assigned to the disk surfaces for the four possible switch positions. The table is reproduced here:

### DISK ADDRESS ASSIGNMENT FOR DDS-1000

		<u>UNIT NUMBERS</u>				
<u>SW1</u>	<u>SW2</u>	<u>LEFT DRIVE</u>		<u>RIGHT DRIVE</u>		<u>AVS WHERE?</u>
OFF	OFF	1	3	2	4	THIS DRIVE
OFF	ON	5	7	6	8	ELSEWHERE*
ON	OFF	9	11	10	12	ELSEWHERE*
ON	ON	13	15	14	16	ELSEWHERE*

\* E.G. AVS MAY BE ON ANOTHER DDS-1000 IF IT IS CONNECTED. NOTE THAT TWO DDS-1000'S MUST NOT HAVE THE SAME UNIT NUMBERS. SAME IS TRUE FOR OTHER DRIVES.

3.0 USING DDS-10003.1 PHYSICAL UNIT ADDRESS

Disk physical unit address is 207 + Logical Unit Address. For example, if unit 1 is a disk which is busy and protected then

`□OUT 208`

returns

208 197 129

The 208 is the physical unit number selected, the 197 the answer back for any disk, and the 129 is the status (128 plus 1) per the table below:

DISK STATUS

BUSY	128	Controller not ready to accept command
TRACK ZERO	64	Head at track zero
NOT INDEX	32	Index hole not currently sensed
POWER ON	16	Interface power on
HEAD DOWN	8	Head loaded to diskette
DRIVE READY	4	Disk in place and rotating
HARD ERROR	2	Single-sided diskette mounted and an attempt has been made to access second side.
PROTECT	1	Disk cannot be written

## NOTE:

Any combination of these values may appear as status. For example, if Status is 21, this is interpreted as:

16 Power On  
4 Drive Ready  
1 Protected

The following function may be evaluated to produce disk status as separated numbers -- e.g. in the foregoing status, the 21 is shown as 1 4 16.

$(\phi, (8p2)\tau^{-1} \square OU 208) / 2 * 0, 17$

3.2 WRITING, READING ON DDS-1000

Refer to Section 8.1 of the MCM/900 User's Manual for the procedure and examples.

## 4.0 DESCRIPTION OF DISKETTE

### 4.1 GENERAL PHYSICAL DESCRIPTION AND USE

The diskette is a flexible disk enclosed in a plastic jacket. The interior of the jacket is lined with a wiping material to clean the disk of foreign material.

When removed from the drive, the diskette is stored in an envelope. To protect the diskette, the same care and handling procedures specified for computer magnetic tape apply. These precautionary procedures are as follows:

1. Return the diskette to its storage envelope whenever it is removed from file.
2. Keep cartridges away from magnetic fields and from ferromagnetic materials which might become magnetized. Strong magnetic fields can corrupt or destroy recorded data on disk.
3. Replace storage envelopes when they become worn, cracked or distorted. Envelopes are designed to protect the disk.
4. Do not write on the plastic jacket with a lead pencil or ball point pen. Use a felt tip pen.
5. Heat and contamination from a carelessly dropped cigarette ash can damage the disk.
6. Do not expose diskette to heat or sunlight.
7. Do not touch or attempt to clean the disk surface. Abrasions may cause loss of stored data.

### 4.2 DISKETTE WRITE PROTECT (See Diagram B)

The diskette has the capability of being write protected. The write protect feature is selected by the hole in the diskette. When the hole is open it is protected; when covered, writing is allowed. The hole is closed by placing a tab over the front of the hole, and the tab folded over covering the rear of the hole. The diskette can be write protected by removing the tab.

NOTE: Use the metalized tabs provided to cover the write protect hole. Ordinary tapes may be transparent to the infra-red detector.

### 4.3 DISKETTE SELECTION

Care should be taken to use only MCM approved diskettes. The media vary and some diskettes may damage the head on your unit, and void the warranty.

## 5.0 OPERATION OF DDS-1000

### 5.1 GENERAL

This section describes the procedures required of the user during the course of normal operation of the DDS-1000. These procedures consist of performing the following.

### 5.2 TURNING DISK ON/OFF

The disk drive is on as long as it is powered, connected to the computer via the OMNIPOINT and the computer is running.

### 5.3 LOADING DISKETTES

To load the diskette, depress the latch, insert the diskette with the label to the left and write protect notch on the lower side of the leading edge. Move the latch to the right to lock diskette on the drive spindle. The diskette should be loaded or unloaded with all power on and drive spindle rotating for better registration. To unload depress the latch.

**WARNING:** Do not unload a diskette unless this unit was closed implicitly or explicitly:

```
XF [LOGICAL UNIT NUMBER] 10  
OFF  
WC
```

If a disk is not closed, the system does not update the directory and cannot retrieve the data from that disk. If a new disk is mounted when the previous disk was not closed, the new disk directories will be overwritten by the directories from the previous disk, thereby causing a *DISK ERROR* if data is read from the second diskette.

GENERAL INFORMATION ON DISKETTESDISKETTE

Do not bend or fold the diskette.

Do not touch exposed areas of magnetic disk.

Do not expose to a magnetic field in excess of 50 oersteds.

Diskettes should be stored within the system operating environment.

Storage environment range - Temperature 50-125 Deg. F. Relative Humidity 8-80%.

Store diskettes in an upright position.

WRITE-ON LABELS

Labels in five different colors are provided to allow color coding. The labels are removable and may be replaced as needed.

When applying the labels, do not touch the exposed magnetic disk surface with the adhesive side of the label.

When writing information on the label, keep the diskette in the protective envelope to prevent possible contamination or damage to the recording surface. Write in the label areas with soft tip pen only.

ENVELOPE

Return the diskette to protective envelope after use.

Usage

Insert the diskette with write protect notch on lower side of leading edge.

APPROVED DISKETTES

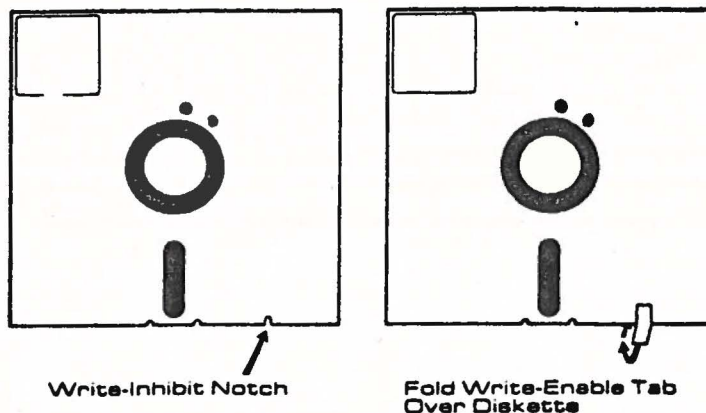
To date the only media approved for use with the DDS-1000 is the ITC DD32-4000 diskette. (MCM Part No. 117-0020).

### WRITE-INHIBIT NOTCH

This diskette has a write-inhibit notch which prevents the diskette from being written.

When the notch is exposed, the diskette is protected from writing. When the notch is covered, writing is allowed.

To allow writing, place a write-enable tab over the notch on the front side of the diskette and fold it over, covering the notch also on the backside. To protect the diskette from writing, remove the tab.



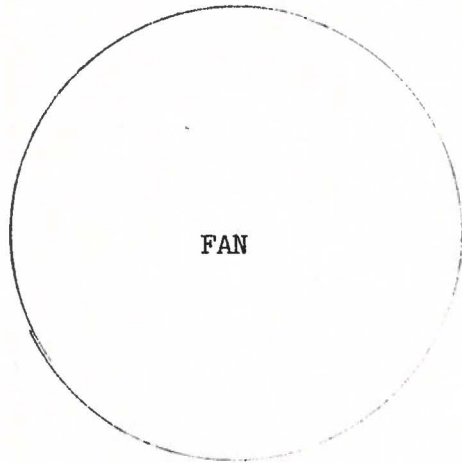
### IMPORTANT NOTICE TO PURCHASER

The following is made in lieu of all warranties, express or implied: Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his intended use, and user assumes all risk and liability whatsoever in connection therewith.

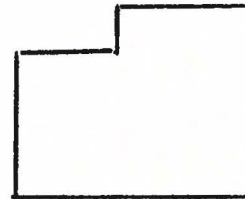
SPECIFICATIONS

Line Voltage	117 Volts, 60 Hz., 1.8 A. 230 Volts, 50 Hz., 0.95 A.(Optional)
Height	27 cm (10.5 inches)
Width	44.5 cm (17.3 inches)
Depth	46 cm (18 inches)
Weight	22.6 kilograms (50 pounds packed)
Ambient Temperature	+10 to +38 C.
Relative Humidity	20 to 80%

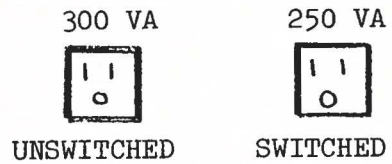




DISK ADDRESS  
ASSIGNMENT



CONVENIENCE  
OUTLETS



AC INPUT TO DDS-1000  
(DISCONNECT BEFORE CHANGING FUSES)

ADDRESS  
SWITCHES

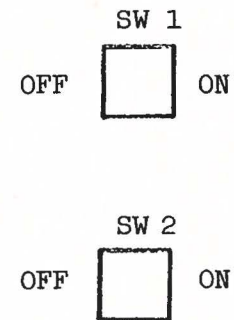
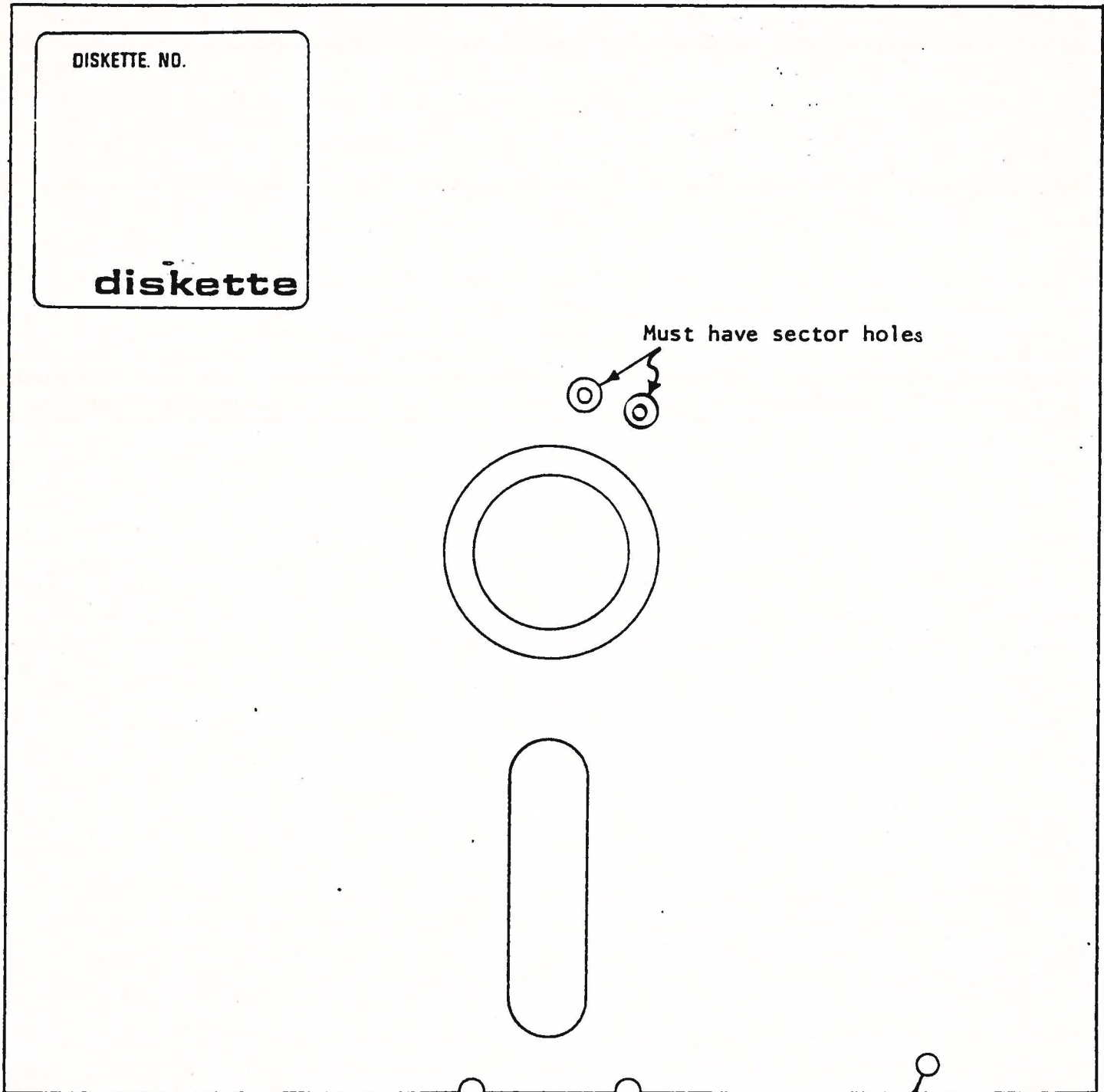


DIAGRAM A

BACK PANEL OF DDS-1000

DIAGRAM B



DISKETTE. NO.

**diskette**

Must have sector holes

Cover this hole to write  
enable the diskette

DIAGRAM C

