SPERRY UNIVAC
COMPUTER SYSTEMS

PUBLICATIONS RELEASE

UTS 30

SPERRY
8439 Double-Sided
Diskette Subsystem

General Description

UP-9881

This library memo announces the release and availability of "SPERRY® 8439 Double-Sided Diskette Subsystem General Description" UP-9881. It is a Standard Library Item (SLI).

The SPERRY 8439 Double-Sided Diskette Subsystem is a versatile peripheral storage device and data-handling system designed for use with the latest SPERRY intelligent terminals and operating systems. Up to 737,000 bytes of information can be stored on one double-sided, double-density diskette written from the diskette subsystem. Diskette subsystem operations, including data recording, data retrieval, random-access searching, and diskette preparation, are performed under the command of a diskette controller which resides in a terminal connected to the diskette subsystem.

This manual describes the capabilities and operating characteristics of the 8439 double-sided diskette subsystem in general terms.

Copies can be ordered by your Sperry representative.

LIBRARY MEMO ONLY	LIBRARY MEMO AND ATTACHMENTS	THIS SHEET IS
Lists AC, CZ, MZ, 8, 9, 9U, 10, 11, 18, 19, 20, 21, 30, 31U, 37, 37U, 38, 60, 61, 62, 63, 63U, 64, 64U, 65, 66, 75, 76, 77, 78, 81, 81U, 83, 83U, 89, 89U	**Lists ZZ, 82, MCS, MCT (16 pages plus library memo)**	**Library Memo for UP-9881**
		RELEASE DATE: **August 1983**

SPERRY

8439 Double-Sided Diskette Subsystem

General Description

This document contains the latest information available at the time of preparation. Therefore, it may contain descriptions of functions not implemented at manual distribution time. To ensure that you have the latest information regarding levels of implementation and functional availability, please consult the appropriate release documentation or contact your local Sperry representative.

Sperry reserves the right to modify or revise the content of this document. No contractual obligation by Sperry regarding level, scope, or timing of functional implementation is either expressed or implied in this document. It is further understood that in consideration of the receipt or purchase of this document, the recipient or purchaser agrees not to reproduce or copy it by any means whatsoever, nor to permit such action by others, for any purpose without prior written permission from Sperry.

PRINTED IN U.S.A.

Contents

CONTENTS

FIGURES

TABLES

1. Introduction

1.1. CONCEPT

The SPERRY 8439 Double-Sided Diskette Subsystem (Figure 1–1) is a versatile peripheral storage device and data-handling system, designed for use with the latest SPERRY intelligent terminals and operating systems.

This diskette subsystem offers several attractive features:

- Large-scale storage on flexible 5¼-inch diskettes
- High-speed, random data access
- Simple and reliable operation
- Compact, desk-top design
- Minimal investment

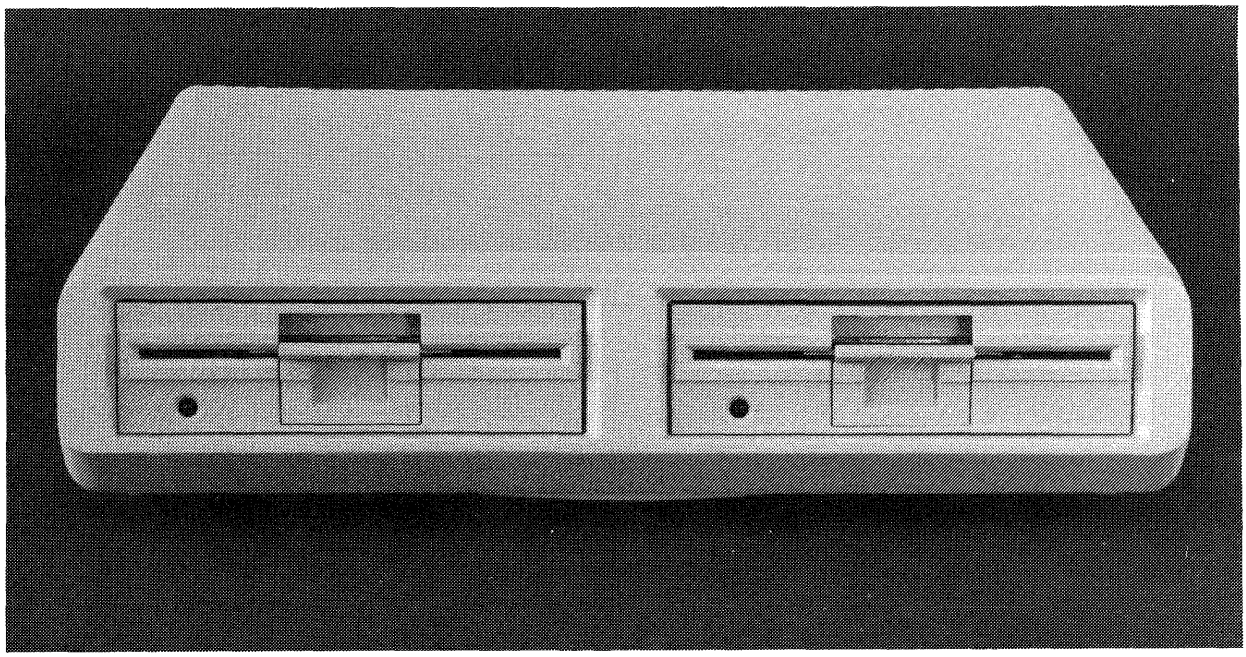

Figure 1–1. The SPERRY 8439 Double-Sided Diskette Subsystem

1.2. DESIGN

The 8439 diskette subsystem is designed for durability, simple operation, high performance, and adaptability. The subsystem operates under the control of a terminal containing the diskette controller. Very little direct contact with the subsystem is required.

Continuous 24-hour operation will not harm the diskette drives. No internal or external cooling mechanism is required as long as the surrounding environment is maintained as described in the specifications (Section 4). To increase the life of the drives and the diskettes, the motor mechanism of each drive is never activated unless a request to perform some function has been sent to the subsystem. Thus, even if power is on, the spindle inside the drive does not rotate unless a command has been sent from the controller.

When attached to SPERRY terminal systems, this diskette subsystem allows you to select a diskette drive to read or write data, to seek new storage locations from any position, and to print the stored data or copy it to another diskette. These functions can be controlled from the terminal or from a remote host processor in conjunction with a user program in the terminal.

In addition to these basic functions, a special utility program can be used to enable the SPERRY diskette subsystem to read or copy a standard diskette from another manufacturer.

2. Equipment Description

2.1. OVERVIEW

The 8439 diskette subsystem consists of a lightweight casework, one or two industry-standard 5¼-inch diskette drives, and a dedicated interface cable. A tilt/rotate top (Figure 2–1), which serves as a base for a terminal, may be selected.

Two versions of the subsystem are available. One has its own power supply which can be controlled with a power switch on the back of the cabinet (Figure 2–2). This version is equipped with an internal power supply which provides the dc power for the drives. The other version comes without its own power supply (Figure 2–3); power is supplied by the terminal which controls its operation.

Section 4 contains a list of diskette subsystem specifications.

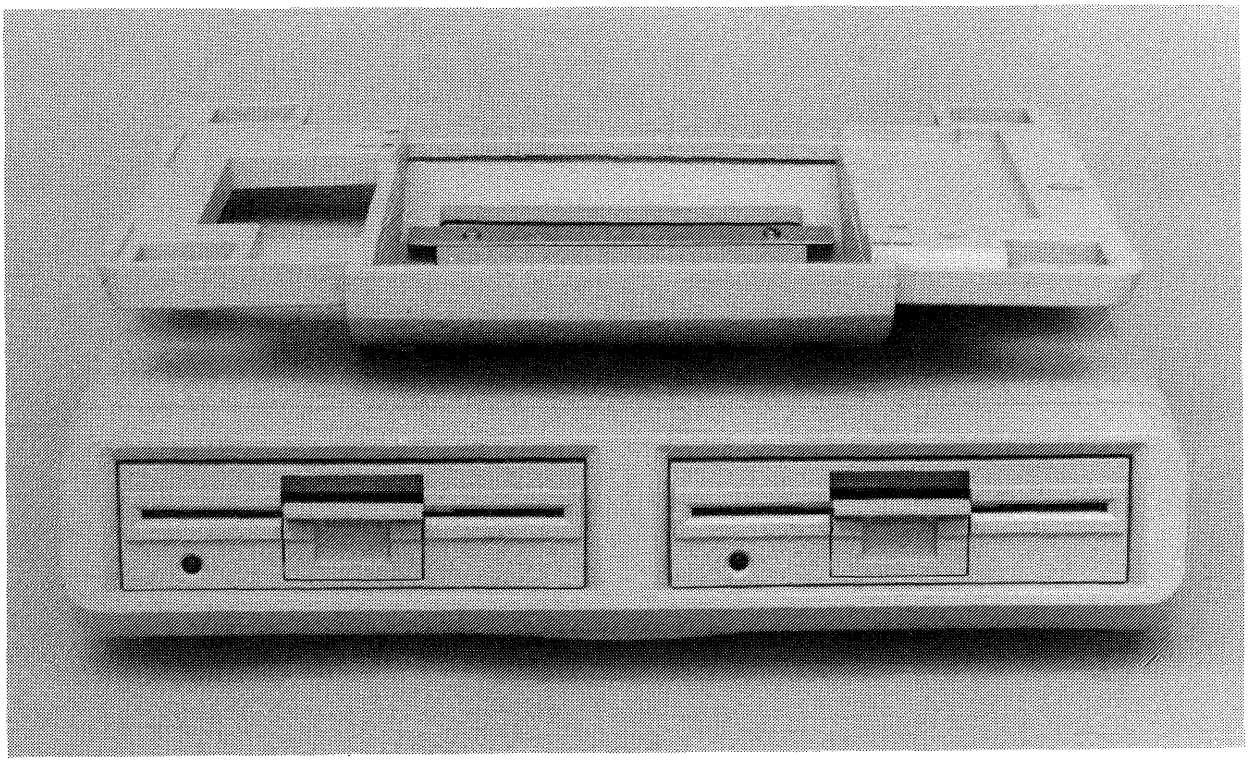

Figure 2–1. 8439 Diskette Subsystem With Tilt Top

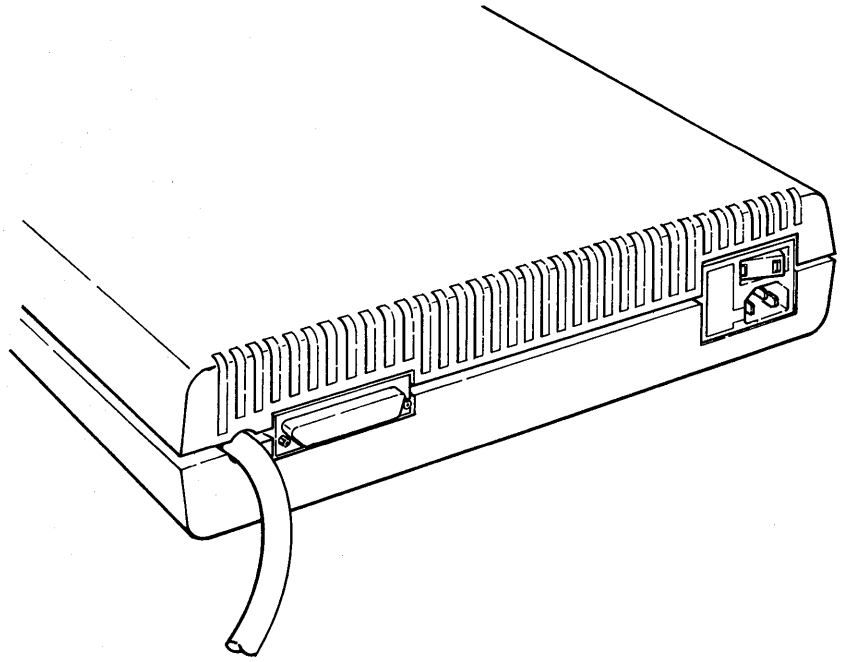

Figure 2–2. 8439 Diskette Subsystem With Power Switch

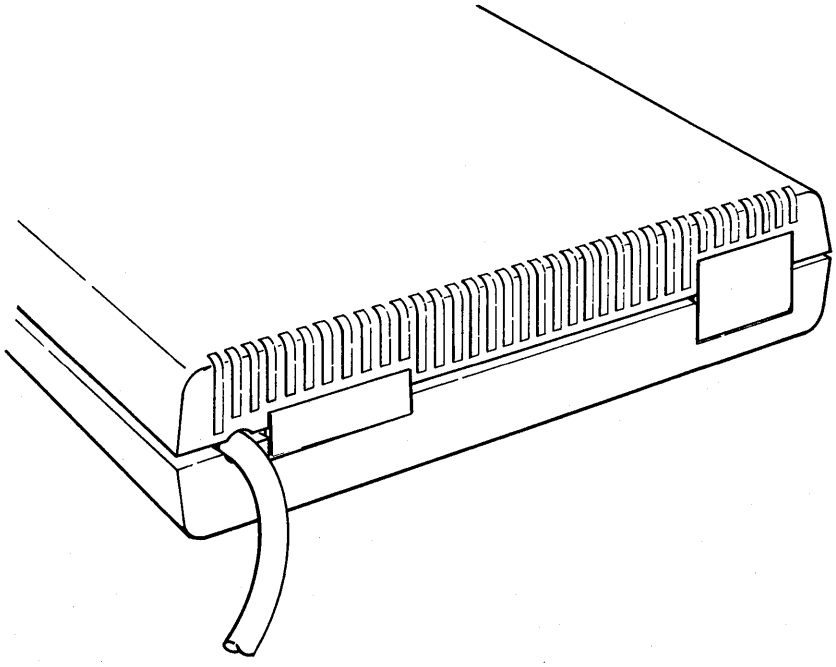

Figure 2–3. 8439 Diskette Subsystem Without Power Switch

2.2. CONTROLS AND INDICATORS

The 8439 diskette subsystem with its own power supply has only one external control — an I/O (on/off) power switch (Figure 2–2). This switch applies or removes primary input power to the diskette subsystem. The subsystem without its own power supply has no external power control.

Both versions of the device have red indicator lights (Figure 2–4) in the front panels of the drives. The light goes on briefly when an individual drive is selected.

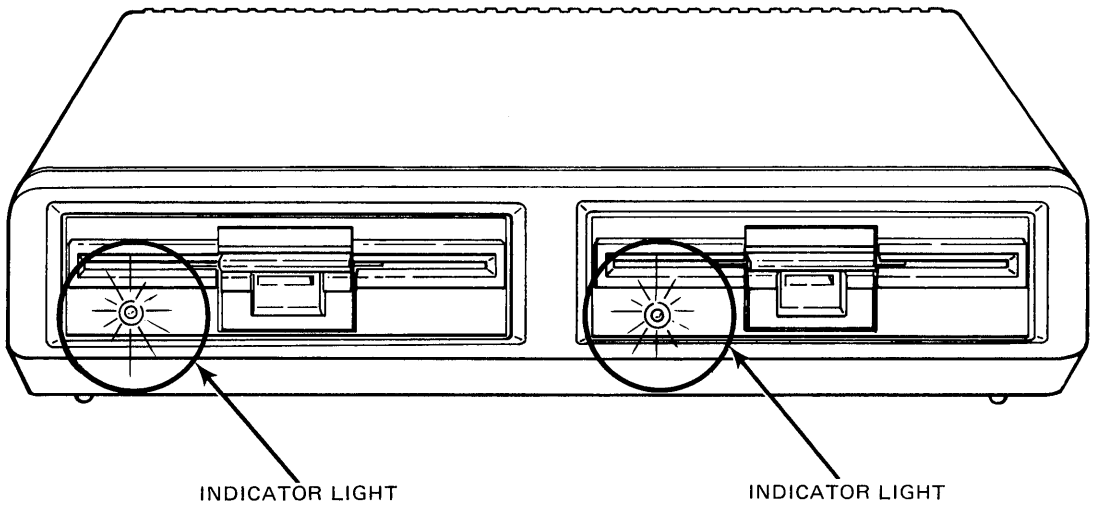

Figure 2–4. Indicator Lights on the Diskette Subsystem

2.3. DRIVES

A single diskette drive is supplied with the diskette subsystem; optionally, the subsystem can be equipped with two diskette drives. When the optional second diskette drive is included in the diskette subsystem, a diskette may be inserted in each drive and operations may then be performed on either drive. (Diskette drives are selected one at a time for any operation.) Each diskette drive has its own read/write heads that can read from or write on either side of a flexible diskette. Each drive also has its own driving mechanism and related electronic components and circuitry.

2.4. CONFIGURATION

An interface and cable connection allow the diskette subsystem to be used as a peripheral device by a terminal containing the diskette controller. Two subsystems (or four diskette drives) can be interfaced to the same controller.

3. Operating Characteristics

3.1. OVERVIEW

Diskette subsystem operations such as data recording, data retrieval, random-access searching, and diskette preparation are performed under the command of a diskette controller which resides outside the diskette subsystem. For example, when the 8439 diskette subsystem is used with the SPERRY Universal Terminal System 30 Single Station (UTS 30) display terminal, the diskette controller resides in a cartridge connected to an interface in the terminal. The UTS 30 passes commands to the diskette controller through a 128-byte storage area residing in the UTS 30 memory. Commands and status reports passed between the diskette controller and the diskette drives travel through a cable running from the bottom of the cartridge to the diskette subsystem.

Specific operating characteristics of the diskette subsystem are determined by the terminal system it is attached to. Therefore, the capabilities of the 8439 diskette subsystem can only be broadly described here. Refer to the applicable terminal operator's reference for specific operating procedures and requirements.

3.2. DISKETTES

The flexible 5¼-inch diskette (Figure 3–1) is an inexpensive and reusable medium for quick-change data storage. With the double-sided, dual-density diskette subsystem, up to 737K bytes of information can be stored on one diskette. An additional, optional diskette drive can be included in this diskette subsystem to increase the storage to over 1.4 million bytes (on two diskettes), or approximately 400 single-spaced typed pages.

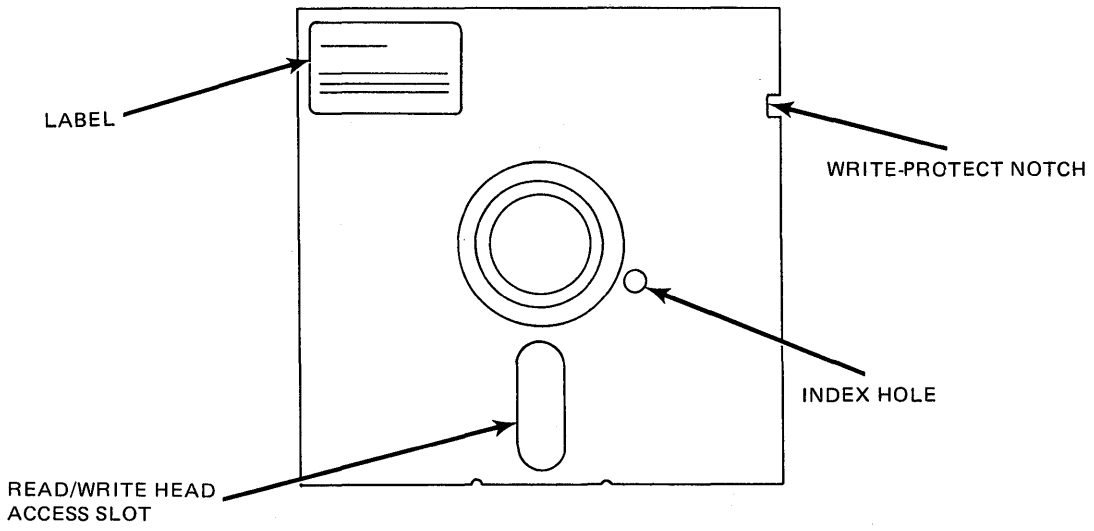

Figure 3–1. 5¼-Inch Diskette Used in the Diskette Subsystem

The diskette is inserted into the horizontal opening of the diskette drive with the diskette label facing up and the oval, read/write head access slot toward the rear of the drive door (Figure 3–2).

Diskette specifications are given in Section 4.

Figure 3–2. Inserting a Diskette into the Diskette Subsystem

3.2.1. Diskette Preparation

Diskette preparation consists of mapping out the tracks and sectors over the entire surface of the diskette, and identifying each track and sector with an address.

The addresses are supplied one track at a time by the diskette controller and, as the addresses are received, address cyclic redundancy check (CRC) characters are generated and written following the addresses.

Address assignments do not have to follow the physical sequence of sectors. In a series of sector addresses, for example, the second sector in the series need not be located next to the first sector, nor the third next to the fourth; instead, a defined number of physical sectors separates each sector in the entire series. This method of assigning sector addresses provides an efficient means of accommodating the diskette subsystem to the input/output rates of different host controllers.

Diskette preparation is a one-time operation for each new diskette; the procedure can also be applied to used diskettes to strip them of old data in preparation for complete rewriting.

3.2.2. Diskette Format

Each side of a double-sided, double-density diskette contains 80 tracks (00-79). Tracks are available for indexing and formatting information, and for recording data.

Double-sided, double-density diskettes are standard for SPERRY 5¼-inch formatted diskettes. Single-sided, single-density diskettes can be read or copied to SPERRY-formatted diskettes through a special utility program.

An example showing a diskette formatted for 512 bytes per sector, 9 sectors per track, is shown in Figure 3–3.

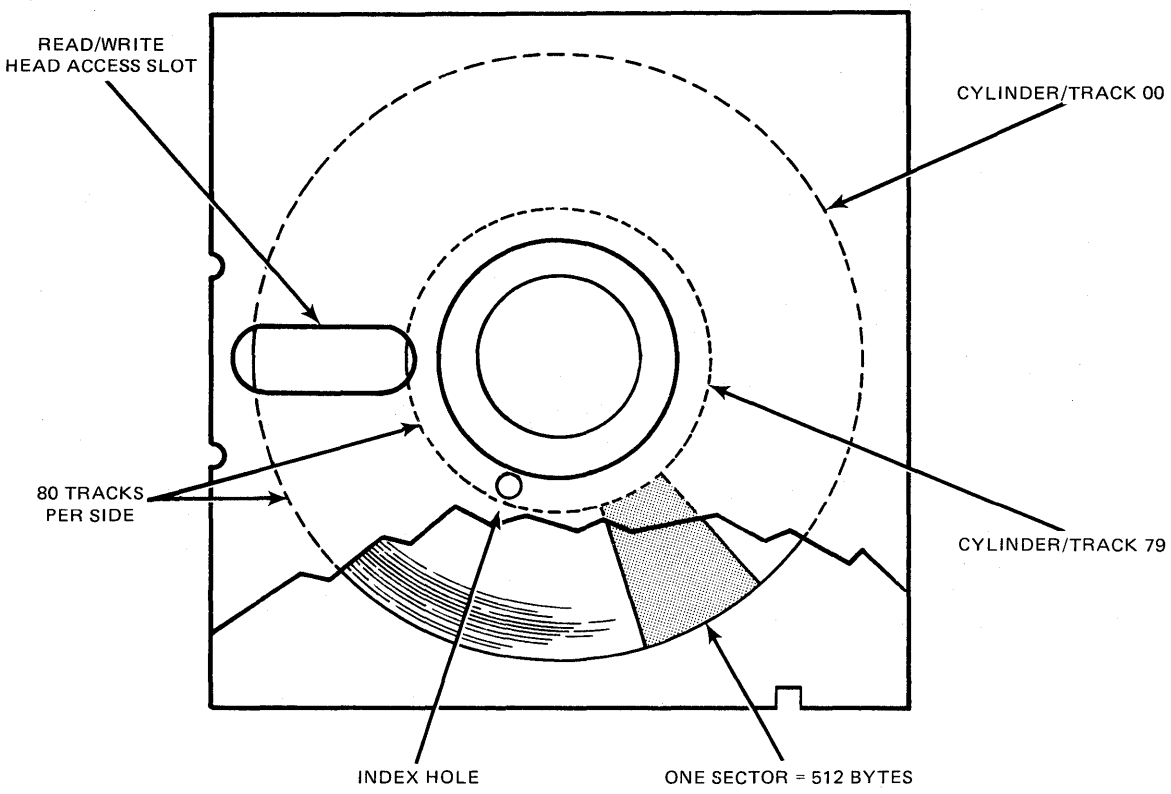

Figure 3–3. Track and Sector Format for Double-Density Diskettes (512 Bytes per Sector)

3.2.3. Deleting Bad Sectors

Bad sectors are marked as permanently unusable by the diskette controller. The diskette controller determines the total number of bad sectors that render the diskette unusable. Also, if track 0, sector 1 (used for indexing) of the diskette is faulty, the diskette cannot be used.

3.3. DISKETTE SUBSYSTEM OPERATIONS

All of the operations described in Table 3–1 are directed by a terminal containing the disk controller. Depending on the terminal and operating system used with the diskette subsystem, these functions may vary slightly.

Table 3–1. Diskette Subsystem Operations

Operation	Description
Write	A write operation, initiated by a command from the diskette controller, stores data on a magnetic diskette in the diskette subsystem. Data is transferred from the host buffer to the diskette subsystem in sector-size blocks of 512 bytes. If the block of data contains less than 512 bytes, the end of the transfer is indicated in a predetermined way by the operating system.
Read	A read operation retrieves data from storage on a magnetic diskette. As with write operations, read operations transfer data one sector at a time by way of a command from the diskette controller. The read command specifies a sector address for each transfer of data.
Error detection	Several error detection procedures are performed by the diskette controller to insure the integrity of data written to and read from the diskette. After executing a command, or upon the immediate detection of an error, the diskette controller reports status to the terminal. Errors reported include the following: — Invalid block (CRC) parity in data read from the diskette — Invalid block (CRC) parity in sector and track addresses — Unlocatable sector and track addresses in read and write commands — Invalid write command to a write-protected diskette

The diskette controller contains routines used to attempt recovery from CRC errors in sector and track addresses during write operations, and from CRC errors in data during read operations. Other recovery procedures for specific errors must be determined by local terminal programming procedures.

4. Specifications

The SPERRY 8439 Double-Sided Diskette Subsystem is designed to operate in a typical business environment. The physical, environmental, and technical specifications of the diskette subsystem are detailed in the following lists.

4.1. PHYSICAL CHARACTERISTICS

Width	36.8 centimeters (14.5 inches)
Height	8.25 centimeters (3.25 inches) without tilt top
	12.5 centimeters (4.87 inches) with tilt top
Depth	33.3 centimeters (13.1) inches
Weight (dual drive)	5.9 kilograms (13 pounds) without power supply
	6.8 kilograms (15 pounds) with power supply

4.2. POWER REQUIREMENTS

Voltage (built-in power supply)	100/120 volts ac or 200/240 volts ac
Phase	Single
Frequency	60 or 50 Hz
Wattage (per sub-system)	130 watts
Heat dissipation (per drive)	30.8 Btu/hour (9 watts) typical

4.3. ENVIRONMENTAL RANGE

Temperature	10 to 34 degrees Celsius (50 to 93 degrees Fahrenheit)
Humidity	20% to 80% relative humidity with no condensation

The 80% limit for relative humidity is a requirement of the flexible diskette. The diskette subsystem itself will tolerate 95% humidity.

4.4. OPERATING CHARACTERISTICS

Rotational speed	300 rpm
Rotational period	200 milliseconds ± 1%
Average latency	100 milliseconds
Byte size	8 bits per byte
Diskette format	
Total number of cylinders	80
Total number of tracks	160
Maximum density	96 tracks per inch 5922 bits per inch
Interface	Transfers serial data line and control and status information
Controller command functions	Format diskettes Read multiple sectors Write multiple sectors

4.5. VARIABLE CHARACTERISTICS

Read/write speed	250,000 bits per second for modified frequency modulation (MFM)
	125,000 bits per second for frequency modulation (FM)
Diskette format	
Sectors per track	9
Bytes per sector	512
Data storage capacity per 2-sided diskette	737,280 bytes, approximately

Track-to-track access time	6 milliseconds
Settling time	50 milliseconds
Head load time (can overlap with track-to-track access time)	50 milliseconds with motor on 650 milliseconds with motor off
Recording modes	(Frequency modulation) Modified frequency modulation

4.6. DISKETTE SPECIFICATIONS

Diameter	12.6 centimeters	(5.125 inches)
Jacket size	12.9 centimeters	(5.25 by 5.25 inches)