The Wang Model 2270 Diskette Drive provides a modestly priced high-speed, direct-access external storage capability for all Wang 2200 series systems which have a disk I/O instruction set. The Model 2270 is available in three configurations, ranging in on-line storage capacity from one-quarter to three-quarters of a million bytes:

**STORAGE CAPACITY**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>On-Line Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2270-1</td>
<td>Single Removable Diskette Drive</td>
<td>262,144 bytes</td>
</tr>
<tr>
<td>2270-2</td>
<td>Dual Removable Diskette Drive</td>
<td>524,288 bytes</td>
</tr>
<tr>
<td>2270-3</td>
<td>Triple Removable Diskette Drive</td>
<td>786,432 bytes</td>
</tr>
</tbody>
</table>

Each diskette has a storage capacity of 4 megabyte (262,144 bytes). Total on-line storage is therefore determined by the number of diskettes which are accessible on-line in the disk unit. The Model 2270-1 holds a single diskette, the Model 2270-2 holds two diskettes, and the Model 2270-3 holds three diskettes. On the 2270-2 and 2270-3, each drive has an independently controlled read/write head. A single or dual diskette drive can be field upgraded to the maximum three drives for the price difference plus an upgrade charge, should additional on-line storage become necessary. Because the diskettes are removable, off-line storage is limited only by the number of diskettes available.

**PHYSICAL CHARACTERISTICS OF THE “DISKETTE”**

A “diskette” is a small flexible disk platter (about 7½ inches in diameter, the size of a 45 rpm phonograph record) which is coated on its recording side with a magnetic material. The recording surface is divided into 64 concentric circular recording tracks, each of which is further segmented into sixteen 256-byte sectors. Data is transferred to and from the diskette in 256-byte blocks (although multi-sector records can be read or written automatically if the argument list requires). Because the sectors are individually numbered and randomly accessible, access to records located anywhere on the disk is fast and direct.

**THE “WRITE PROTECT” FEATURE**

Valuable data stored on a diskette can be protected against accidental overwriting with the Write Protect feature. If an operator inadvertently attempts to record data on a protected diskette, the system will signal an error, and suppress the write operation.

**OPERATIONAL CONVENIENCE FEATURES**

In addition to the speed, reliability, and substantial storage capacity which are characteristic of disk storage devices in general, the Model 2270 offers simplicity and convenience of operation. Each diskette is factory sealed in a tough, flexible plastic envelope which protects it against damage from dirt buildup, scratches, and abrasion. For this reason, and because of their thin, flat design, the diskettes are easy to handle and convenient to store. The diskette is mounted simply by slipping it into a drive slot and closing the drive door. When it must be removed, a touch of the RELEASE button causes the spring-loaded release mechanism to automatically open the door and eject the diskette halfway out of the drive, for ready removal. Their ease of handling, mounting, and storing (and their low cost) make the diskettes ideal media for storing multiple small files, or large multi-volume files, if it is not necessary to have the entire data base on-line at all times.
SPEED

Information can be written to and read from the disk at high speed. The total time required to access any given item of data on the disk can be broken down into two components: the track access time and the disk latency time.

- **Access Time** — The track access time is the time required to position the read/write heads to a specified track on the disk platter. The “average access time” is the time required for the read/write heads to move from track #0 to the middle track on a disk platter. On the Model 2270, the average access time is 363 ms (about .3 second). The minimum access time is 14 ms (for sequential read/write operations).

- **Disk Latency Time** — The latency time is the time required for the desired sector on a track to rotate to the read/write head. The “average latency time” is the time required for a sector which is one-half track (8 sectors) away from the read/write head to rotate to the read/write head. Since the disk platters make one complete revolution in about 170 ms, the average latency time is one-half this time or about 84 ms. The staggered arrangement of sequential sectors on a track makes it possible to read or write multi-sector records or perform disk copy operations, with significant savings in total latency time.

AUTOMATIC FILE MAINTENANCE

Files can be maintained on a disk in one (or both) of two modes: Automatic File Cataloging mode and Absolute Sector Addressing mode. On most systems, the BASIC instructions in both of these modes are part of the standard instruction set, and do not require an additional software package. On some systems, the disk instructions may be obtained as part of an optional ROM.

**Automatic File Cataloging** — This mode includes 16 BASIC statements which provide rapid, easy access to cataloged files on the disk. Catalog mode permits the user to save and load program and data files by name, without concern for where or how the files are actually stored on the disk. The system itself automatically keeps track of the size and location of each file. The BASIC instructions available in Catalog mode are listed below.

- **SCRATCH DISK** is used to create a catalog on a specified disk platter. The catalog consists of two parts, a Catalog Index and a Catalog Area.
- **MOVE END** is used to alter the size of the catalog after it has been created with SCRATCH DISK.

- **LIST DC** enables the operator to list out the names and locations of all cataloged programs and data files.
- **SAVE DC** is used to name and save BASIC programs on the disk.
- **LOAD DC**, when executed as a command, is used to load a named program from the disk into the System 2200. When executed in a program, LOAD DC can be used to chain or overlay programs from a disk.
- **DATASAVE DC OPEN** is used to name and open a new data file on the disk (as many as seven cataloged files may be open simultaneously).
- **DATALOAD DC OPEN** is used to reopen an existing data file on disk. The file is referenced by name.
- **DATASAVE DC** is used to store a data record in a currently open file on disk. Multiple-sector records are written automatically.
- **DATALOAD DC** is used to read data from a currently open file on disk. Multiple-sector records are read automatically.
- **DATASAVE DC CLOSE** is used to close one or all currently open files on disk.
- **DSKI D and DBACKSPACE** enable the programmer to skip forward and backward over data records within a cataloged data file.
- **SCRATCH** is used to “scratch” program or data files which are no longer needed. The disk space occupied by a scratched file can be reused for a new file.
- **MOVE** is used to copy the entire catalog (the Catalog Index as well as the Catalog Area) from one diskette to another. MOVE also automatically deletes all scratched files from the catalog.
- **VERIFY** performs special validity checks on specified sectors to ensure that the data stored in them is correct. VERIFY is normally used following a MOVE to ensure that the catalog has been copied accurately.
- **LIMITS** enables the programmer to examine the beginning, ending, and current sector addresses of a specified file, as well as the total number of sectors used in the file.

**Absolute Sector Addressing** — This mode consists of eight BASIC statements which permit the programmer to address specific sectors on the disk directly, thus enabling him to design his own disk operating system. Two of the eight Absolute Sector Addressing mode instructions are special statements which can be used to read or write one sector (256 bytes) of un-
For a program or data file stored on disk,

**Disk Dump Utility**: Generates a list of disk contents.

**Check Disk Utility**: Checks for disk errors.

**Disk Indexing Utility**: Prints a catalog index listing disk contents.

**Utility Programs**: A collection of utility programs.

- **Copy**: Copies text or graphics from one file to another.
- **Verify**: Verifies the correctness of copied text.
- **Edit**: Edits text or graphics.
- **Format**: Formats a disk.
- **Search**: Searches for text or graphics.
- **Print**: Prints text or graphics.

**Reliability**:

**Copy**: To ensure that all information is copied accurately and reliably, a backup copy of the data stored on the disk should be created.

**Verify**: The data and programs on the disk are verified to ensure they are accurate.

**Edit**: Edits the data and programs to correct any errors.

**Format**: Formats the disk to prepare it for use.

**Search**: Searches for specific data or programs on the disk.

**Print**: Prints the data and programs for reference.

**Availability Disk Utilities**

**Initialization**: The disk is initialized by the system to ensure that the disk is ready for use.

**Format Disk**: Formats the disk to prepare it for use.

**Verify**: Verifies the correctness of the disk.

**Utility Programs**: A collection of utility programs.

- **Copy**: Copies text or graphics from one file to another.
- **Verify**: Verifies the correctness of copied text.
- **Edit**: Edits text or graphics.
- **Format**: Formats a disk.
- **Search**: Searches for text or graphics.
- **Print**: Prints text or graphics.

**Automatic Sector Formatting**

The automatic sector formatting utility is used to format the sectors on a disk. The utility reads the disk sectors and assigns sector numbers in a sequential order.

**Save Disk**: Saves the disk contents to a file on disk.
DATA SHEET

SPECIFICATIONS

STORAGE CAPACITY
Model 2270-1 ................. 262,144 bytes
Model 2270-2 ................. 524,288 bytes
Model 2270-3 ................. 786,432 bytes

PERFORMANCE
Rotation Speed
360 rpm

Access Time (position head to track)
Minimum (one track) ........ 14 ms
Average (across one-half available tracks) ......... 363 ms
Maximum (across all available tracks) ............. 726 ms

Latency Time (platter rotation to sector on track)
Average (one sector read/write, one-half revolution) .... 84 ms

Read/Write Time
One 256-byte sector (including CPU/Controller Overhead) .... 21.8 ms

MOVE/COPY Time (entire disk platter)
2 min (approx)

Physical Dimensions
Height ....................... 19 in. (47.5 cm)
Width ....................... 17.5 in. (43.8 cm)
Depth ....................... 16.3 in. (40.8 cm)

Weight
68 lb (30.6 kg)

Power Requirements
Voltage: 115 or 230 VAC ± 10%
50 or 60 Hz ± 1 cycle
Power: 225 Watts

SPECIFICATIONS (Cont.)

Cabling:
12-ft (3.7 m) cable with connector to female receptacle on the CPU.
8-ft (2.4 m) cord to power source.

Operating Environment
60°F to 90°F (16°C to 32°C)
20% to 80% Relative Humidity

Recommended Operating Environment
35% to 65% Relative Humidity

Standard Warranty Applies

ORDERING SPECIFICATIONS

A removable diskette drive capable of storing programs and data for any Wang 2200 series system with a disk capability. The diskette drive must be available in three configurations of one, two, or three drives, ranging in on-line storage capacity from 262,144 bytes to a maximum 786,432 bytes. Smaller configurations must be field upgradeable to a larger configuration. Diskettes must be easily removed and replaced in the unit, and individual diskettes must be formatted automatically by the system. The system must provide the capability to read and write multi-sector records of any length, and to use entire arrays as arguments. The system also must offer a set of built-in internal file management instructions, as well as a number of BASIC statements and commands which enable the user to design his own management system.

Wang Laboratories reserves the right to change specifications without prior notice.