# PDP-11
RX11 Floppy Disk System

The RX11 Floppy Disk System is a highly reliable, low-cost, mass storage subsystem, capable of storing up to 256,256 8-bit bytes per drive in an industry-compatible format. The RX11 provides a compact data interchange and software distribution medium for critical I/O applications. In addition, the RX11's random-access capability allows configuring very low-cost, disk-based systems with small PDP-11 processors. Such systems can satisfy the needs of applications that could never before afford random access storage.
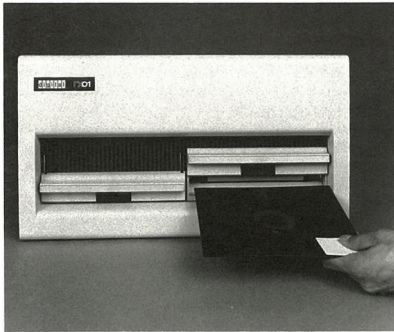
FEATURES

Speed
- 18 microseconds per byte transferred
- 83 milliseconds average latency
- 483 milliseconds average access
- 30 seconds to read the whole diskette

Capacity
- 256K 8-bit bytes/diskette
- 2 drives/controller

Human Engineering
- Extremely simple to load—just insert
- Small and compact—easy to transport or mail
- Preformatted

Reliability
- Simple construction and microprogrammed controller reduce complexity
- Long disk life because head contacts disk only during read/write
- Cyclic redundancy check, longitudinal redundancy check, and parity

Other
- Industry standard preformatting facilitates interchangeability and lowers hardware costs.

DESCRIPTION

The RX11 floppy disk system consists of an RX01 floppy disk drive unit an a PDP-11 quad interface module which requires a single SPC slot. The RX01 includes either one or two drives, a microprogrammed controller module, and a read/write electronics module, all housed in a 10½ inch, rack-mountable chassis. Up to two drives can be supported by each controller for a total storage capacity of 512,512 bytes.

Given an absolute sector address, the RX01 locates the desired sector and performs the indicated function. It automatically verifies head position and generates and verifies the cyclic redundancy check (CRC) character.

Track-to-track moves require ten milliseconds for the move plus twenty milliseconds for settling time if the head is loaded for a read or write. The rotational speed of the diskette is 360 rpm, which results in an average latency time of 83 milliseconds. The track-to-track move, head settling, and latency time produce an average access time of 483 milliseconds. During a sequential access, the whole diskette can be read in about thirty seconds.

The Media

The RX01 floppy disk uses the industry-standard "diskette" or "floppy" media, which are thin, flexible oxide-coated disks similar in size to a 45-rpm phonograph record. The disk is recorded on one side only and is permanently contained in an 8-inch square, flexible envelope.

The envelope has a large center hole for the drive spindle, a small hole for track index sensing, and a large slit for the read/write head. A solenoid contact load pad is located on the opposite side of the envelope. The inside of the envelope is covered with a soft material, designed to wipe the disk surface clean just before reading.

The diskette contains 77 tracks and 26 sectors per track. Each sector can store 128 8-bit bytes for a total formatted capacity of 256,256 8-bit bytes.

The diskette is an ideal storage, interchange, and software distribution medium. Compared to disk cartridges or disk packs, it is very inexpensive. Because it is flat and thin, the diskette is compact, enabling large amounts of data to be conveniently stored in a small space. Diskettes can also be easily transported in a briefcase or in a manila envelope.

The diskette is preformatted in the industry-standard format. However, the file structure is software dependent and may vary from system to system. Preformatted diskettes also reduce hardware costs by eliminating the circuitry required to generate the correct format.

Reliability

The RX01 provides exceptional reliability as well as low cost. The simple mechanical construction of the drive and the use of a microprogrammed controller that reduces hardware complexity contribute to reliability. To enhance disk life, the head contacts the disk only during reading or writing. With the head loaded on a given track, the media can withstand one million passes.

The RX01 performs parity checks and provides error indications. Each sector has a cyclic redundancy check (CRC) character as part of the header field, and another CRC character as part of the data field. The RX01 generates and verifies the CRC characters and provides error indications.

SPECIFICATIONS

Name	RX11
Type	floppy
Formatted Capacity per Drive (bytes)	256K
Number of Drives per Control	2
Formatted Capacity (on-line) per Control (bytes)	512K
Average Access Time	483 ms
Average Transfer Time per Word	$36\,\mu\text{sec}$