pdp11

RX11 FLOPPY DISK SYSTEM

FEATURES

* High reliability
* Industry compatiblity
* Ease of maintenance
* Simple operation
* Use as an I/O device or a random-access file device
* Low-cost, compact, removable diskettes

* 256,256 bytes of data storage capacity per diskette
* Average access time of 483 milliseconds
* Head loaded only when reading or writing
* Extensive operating system and diagnostic software support

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DESCRIPTION

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.

The RX11 Floppy Disk System consists of an RX01 Floppy Disk drive unit and 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.

Because the diskette is preformatted in the industry-standard format, it ensures industry compatibility and drive-to-drive interchangeability. The RX01 can read diskettes written on other standard floppy disk equipment and vice versa. 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 the design goal MTBF (Mean Time Between Failures) of 5000 hours. 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.

OPERATION

The RX01 Floppy Disk drive unit is simple to operate. When the door is opened, the diskette, properly oriented, can be inserted. When the door is closed, the diskette is engaged on the registration hub. Once the diskette drive attains operating speed, the software takes over. The diskette removal procedure is the reverse of the insertion procedure. Elimination of any other operator controls greatly simplifies operation.

SPECIFICATIONS

Storage medium:	preformatted diskette (industry-compatible)
Capacity per diskette:	256,256 8-bit bytes
Data transfer speed:	18 μsec per byte
Time for half revolution:	83 msec
Diskette rotation speed:	360 rpm
Drives per control:	2 (maximum)

Track Positioning Time

One track move:	10 msec
Average track seek:	380 msec
Maximum track seek:	760 msec
Head settling:	20 msec

Data Organization

Surfaces per diskette:	1
Tracks:	77
Sectors:	26
Capacity per sector:	128 8-bit bytes
Recording method:	double frequency
Recording density:	3200 bits per inch maximum

Register Addresses

Command status (RXCS):	177170
Error status (RXES):	177172

UNIBUS Interface

Interrupt vector address:	264
Priority level:	normally BR5
Data transfer:	programmed I/O
Bus loading:	2 bus loads

Mechanical Specifications

Mounting:	RX01 fits in standard 19-inch cabinet which is not supplied with the system. The unit requires 10½ inches of cabinet space. Interface requires one SPC slot.
Size:	10½ inches x 19 inches x 17 inches (26.67 cm. x 48.26 cm. x 43.18 cm.)
Weight:	60 lbs. (dual drive)
Interface cable:	BC05L-15, 15-foot length (4.57m.)

Power

Starting current:	3.5A maximum at 115V, 60Hz (dual drive)
	2.5A maximum at 230V, 50Hz (dual drive)
Running current:	2.5A maximum at 115V, 60Hz (dual drive)
	1.5A maximum at 230V, 50Hz (dual drive)
Interface current:	1.5A maximum at +5 VDC
Heat dissipation:	200 watts maximum (dual drive)

Environmental Specifications

Temperature:	15° C (59° F) to 32° C (90° F) with a maximum temperature gradient of 20° F per hour or 11°C per hour
Relative humidity:	20% to 80% with a maximum wet bulb of 25° C (77° F) and a minimum dew point of 2° C (36° F)

Models

RX11-AA:	PDP-11 single-drive system, 115V, 60 Hz
RX11-AD:	PDP-11 single-drive system, 50Hz
RX11-BA:	PDP-11 dual-drive system, 115V, 60Hz
RX11-BD:	PDP-11 dual-drive system, 50Hz NOTE: 50Hz models are field-adjustable in the following four voltage ranges: 90—120VAC; 100—132 VAC; 200—264 VAC; 180—240 VAC

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