

POTTER

DD 480 Flexible Disk Storage System

Random Access — Simple Operation — Low Cost

MAR 7 1973

FEATURES

- Uses IBM compatible plastic enclosed disk
- 653 Kilobit capacity ideal for data input station use
- Data transfer rate of 33.3 Kilobits per second
- Data can be sector organized for interchange compatibility
- Positive identification of beginning of records
- Disk loaded from front of machine
- Design simplicity provides long term reliability
- Low cost

THE POTTER DD 480 FLEXIBLE DISK DRIVE is available for use by systems manufacturers in applications where cassette units have previously been specified. Using a single, plastic enclosed, flexible disk medium, this new disk drive provides several advantages over cassette type equipment. The Flexible Disk Drive uses multiple concentric tracks to record data, rather than just the one or two used in cassettes. Combining a disk organization of multiple tracks with a moving head-track accessing system provides the user with access to the recorded data in an average time of 1.67 seconds.

Data recorded on the disk may be organized on the individual tracks in up to 8 separate sectors. A series of holes, located on the outer periphery of the disk is detected photoelectrically, providing an output pulse for every 45° of disk rotation. When a Potter Disk Cartridge is used, an extra hole provides identification of the first sector.

Data check reading can be accomplished within one revolution of the disk (.67 seconds). The disk capacity of over 650,000 bits provides enough storage for the daily production of a keypunch operator.

The disk drive is loaded more simply than a home record player. The plastic enclosed disk is inserted into a loading slot at the top of the machine. Closing the door centers the disk and readies the drive for operation. Disk speed is 90 rpm which provides a data transfer rate of 33.3 K bits per second. The single gap head is held in contact with the disk only during actual read/write operations providing extended disk life. In use, if one and one half revolutions of the disk occur without a command to read or write data, a pressure pad, provided to



insure proper head-disk contact, is retracted. In addition, should no further commands occur within one and one half additional revolutions, the disk drive motor may be turned off. These features, along with the overall simplicity, provide long term reliability.

The DD 480 is ideally suited to applications such as Key-to-disk systems, hard-copy and crt data input stations and data terminals. It can also be used as a replacement for paper tape and magnetic tape for computer and peripheral microprogramming. The unit is available in three basic configurations — the drive with accessing capability only, with accessing and read only electronics, and with accessing and read/write electronics. Special interfacing to suit customer requirements is also available.

SPECIFICATIONS

Recording Medium — Single Disk Cartridge in sealed plastic envelope. Envelope size 8" x 8" x $\frac{1}{16}$ " (20.3 cm x 20.3 cm x 1.8 mm). Disk Diameter $7\frac{1}{2}$ " (19 cm). Recording Surface High Density micro-dispersed iron oxide. Disk substrate 0.0045" Mylar. Recording surface covered by 50 u inch Mylar. Specify IBM 23FD-II Disk Cartridge or Potter FD 239. The Potter Disk is interchangeable and provides an additional hole for sector indexing.

Disk Loading — From front of Disk Drive.

Disk Capacity — 653,312 bits (81,664 8 bit bytes).

Number of Tracks — 32 concentric tracks (Outer track is number 0, Inner track is number 31).

Track Capacity — 20,416 bits (2,552 8 bit bytes).

Sectors per Disk — 8.

Sector Indexing System — Sectors are identified photoelectrically through holes in the disk. The first sector on the Potter disk is identified by two holes, other sectors by a single hole each.

Disk Recording System — Double frequency, self clocking serial by bit.

Disk Rotational Speed — 90 revolutions per minute.

Disk Track Density — 1000 data bits per inch outer track, 1600 data bits per inch inner track, Constant data frequency.

Disk Data Transfer Rate — 33.3 Kilo bits per second.

Recording Head Assembly — Potter long life, single gap track for read/write or read only operation as required.

Disk Track Accessing Mechanism — 2 pulse operated stepping solenoids driving 1 lead screw. One solenoid for each direction of head travel.

Track Accessing Time — 80 milliseconds track to track.

Track Accessing Rate — 12 tracks/second.

Ready Time From Head Pressure Pad Retraction — 200 milliseconds.

Ready Time From A.C. Power on to Motor — 3 seconds.

Ready Time From Inserting Disk — 3 seconds.

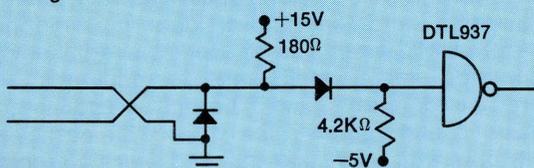
Recording Head Pressure Pad Retraction Cycle — Recording head pressure pad will disengage and retract if no read or write or track access command is received in 1.5 revolutions of the disk. (One second).

Motor Off Cycle — A "Motor Off" cycle command may be issued to the disk drive if no read or write or track access command is received within 3 revolutions of the disk. (2 seconds). This time may be overlapped with the "Recording Head Pressure Pad Retraction Cycle."

Logic and Command Interface — All status, command and data lines to or from the disk drive are negative going DTL/TTL +5/0 volt signals where 0 volts = the active state.

Logic 0 (inactive state) = +5V \pm 0.5V, Logic 1 (active state) = 0 \pm 0.5V, Sink 30 ma.

Data and command signals to the disk drive should be driven by a type 944 DTL integrated circuit with a 10,000 ohm pull up resistor to +5 volts or equivalent TTL type 9009. Data and reply lines from the disk drive should be terminated with the following recommended circuit.



Interconnecting Cable — One PC board mating connector is supplied with each disk drive.

The maximum cable length from connector pin to connector pin is 50 feet (15 meters).

All inputs and outputs require twisted pairs, one line per function, one for ground. All wires should be 22 AWG minimum with at least one twist/inch (1 twist/25 mm).

Environment — 50°-100°F (10°-43°C), 8%-80% Relative Humidity.

Disk storage within \pm 5° of Disk Drive Ambient temperature.

Physical Size — $11\frac{1}{4}$ " High (28.6 cm), $9\frac{3}{4}$ " Wide (24.8 cm), $8\frac{1}{2}$ " Deep (21.6 cm).

Mounting — Stand offs for integration into chassis assembly, or can be supplied with panel for standard 19" rack mounting or any other custom enclosure.

Weight — Approx. 18 pounds.

Power Requirements — A.C. 115 volts 60 Hz 100 watts.

D.C. +24 volts, 3 amp. pulses for 75 msec. with 5 msec. recovery, +24 volts constant at 250 ma., -15 volts constant at 750 ma. 50 Hz and other A.C. voltages available.

Input Commands:

Turn on Motor — Maintained level 0 volts = Motor on.

Seek Track "In" — Pulse, 80 milliseconds minimum. Each pulse causes head to advance away from the home position from one track to the next higher track — 1 to 2, 2 to 3, etc.

Seek Track "Out" — Pulse 80 milliseconds minimum. Each pulse causes head to retract towards the home position from one track to the next lower track — 9 to 8, 8 to 7, etc.

Write — Maintained level, 0 volts = unit will write data presented on data input lines from the disk controller.

Read — Maintained level, 0 volts = unit will read data and supply it on the read data line to the disk controller.

Note — Either a Write or a Read command will cause the head pressure pad to move to the engaged position with the disk surface in contact with the head assembly. In the event of a simultaneous command to both read and write data, the disk drive will permit only reading of data, and will not write over information which may be on the disk.

Reply Lines from Disk Drive:

Sector Boundary and Sector Index — Sector Boundary pulses of 80 usec. will occur every 83.3 msec. In addition, when using the Potter Disk, an index pulse of 80 usec. will occur once every revolution. The sector index pulse is spaced 41.5 msec. after the "last" or eighth sector pulse and is used as an indication that the next sector pulse is the "first" or number one.

Head Pressure Pad Engaged — Maintained level, 0 volts = head pressure pad has engaged and the disk surface is in contact with the head assembly. This signal will appear approximately 200 msec. after the disk drive receives either a read or write command.

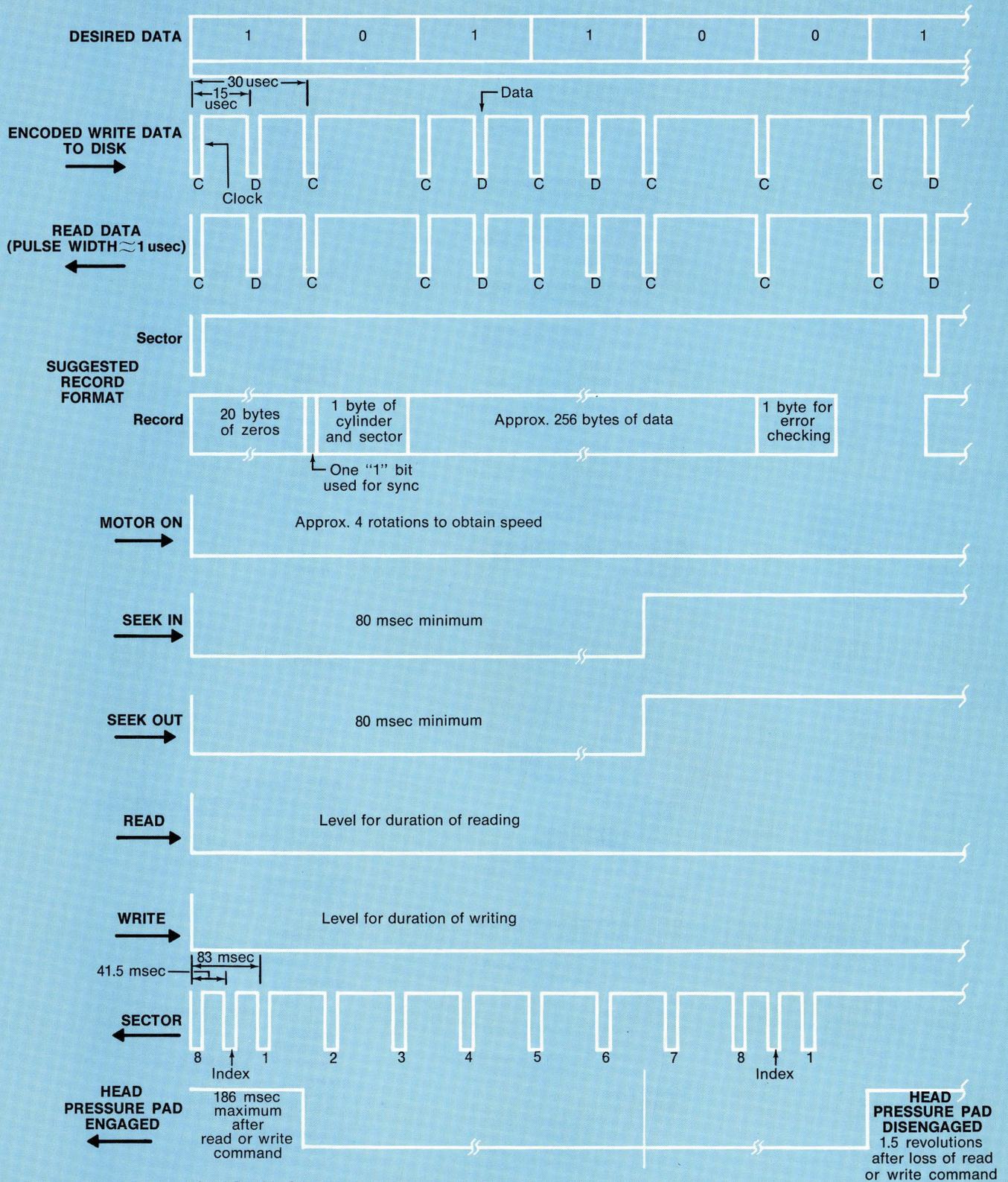
The head pressure pad engaged signal will remain in the active state after the Read Data or Write Data command is removed for $1\frac{1}{2}$ revolutions of the disk. This line may be interpreted as a unit ready signal.

Home — Maintained level, 0V = head assembly is in the home, or "out" position.

Data Lines:

Write Data and Read Data — Serial data stream, digitally organized, double frequency type recording. See chart on next page.

WRITE DATA – DOUBLE FREQUENCY ENCODED (See Below)



Note: Double frequency encoding is a self clocking code and therefore requires a window generator to strip the data from the clock bits.

HEAD PRESSURE PAD DISENGAGED
1.5 revolutions after loss of read or write command

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