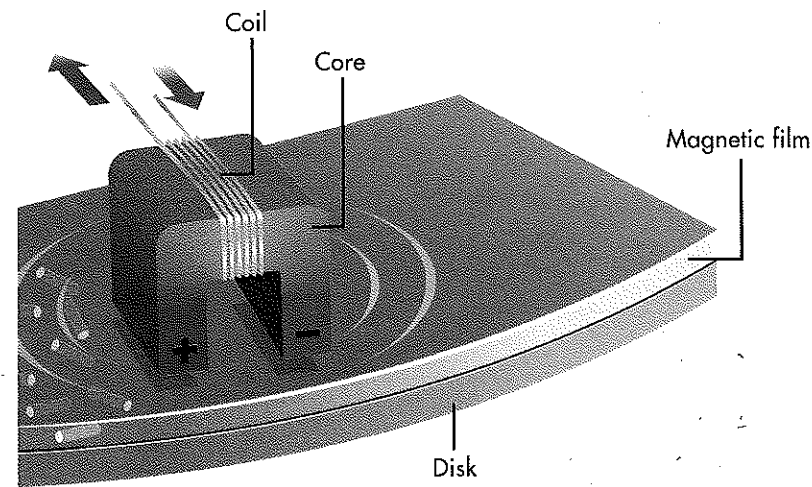
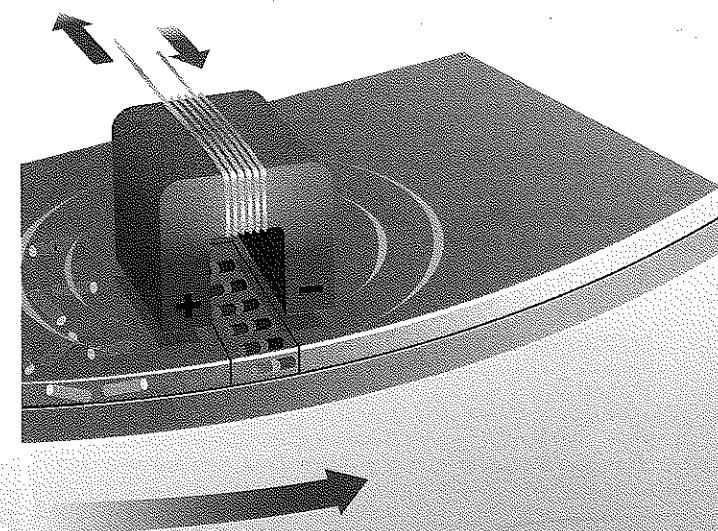


# How a Drive Writes and Reads Bits on a Disk

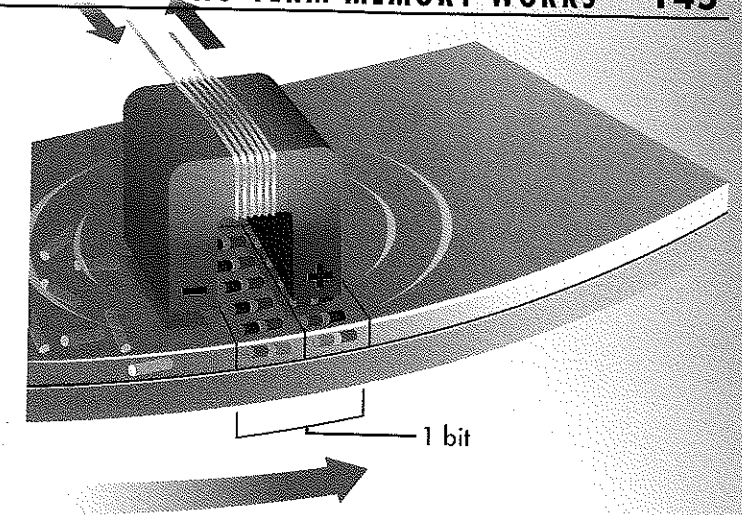
**1** Before any data is written to a disk, iron particles are scattered in a random pattern within a magnetic film that coats the surface of the disk. The film is similar to the surface of audio and video tapes. To organize the particles into data, electricity pulses through a coil of wire wrapped around an iron core in the drive mechanism's read/write head, which is suspended over the disk's surface. The electricity turns the core into an electromagnet that can magnetize the particles in the coating, much as a child uses a magnet to play with iron filings.



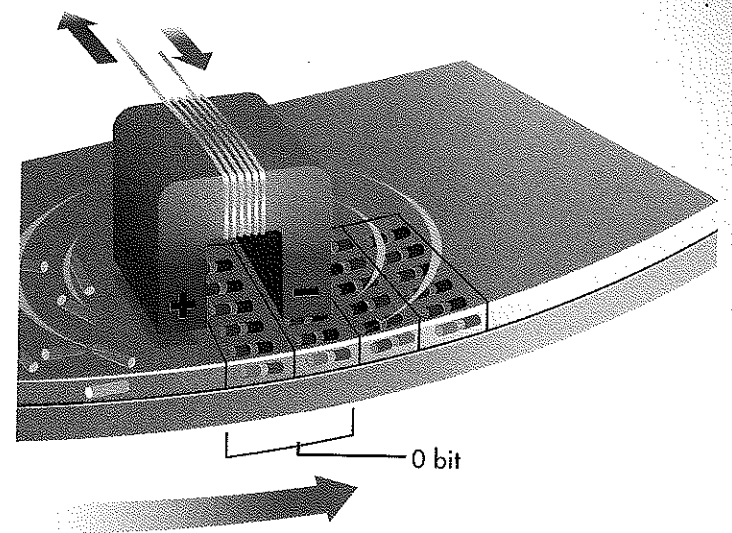
**2** The coil induces a magnetic field in the core as it passes over the disk. The field, in turn, magnetizes the iron particles in the disk coating so their positive poles (red) point toward the negative pole of the read/write head, and their negative poles (blue) point to the head's positive pole.



**3** After the head creates one band of aligned, magnetized particles on the revolving disk, a second band is created next to it. Together, the two bands represent the smallest discrete unit of data that a computer can handle—a bit. If the bit is to represent a binary 1, after creating the first band, the current in the coil reverses so that the magnetic poles of the core are swapped and the particles in the second band are magnetized in the opposite direction. If the bit is a binary 0, the particles in both bands are aligned in the same direction.



**4** When a second bit is stored, the polarity of its first band is always the opposite of the band preceding it to indicate that it's beginning a new bit. Even the slowest drive takes only a fraction of a second to create each band. The stored bits in the illustration represent the binary numeral 1011, which is 11 in decimal numbers.



**5** To read the data, no current is sent to the read/write head as it passes over the disk. Instead, the magnetic opposite of the writing process happens. The banks of polarized particles in the disk's coating are themselves tiny magnets that create a magnetic field through which the read/write head passes. The movement of the head through the magnetic field generates an electrical current that travels in one direction or the other through the wires leading from the head. The direction the current flows depends on the polarities of the bands. By sensing the changes in direction of the current, the computer can tell whether the read/write head is passing over a 1 or a 0.

