

POWER SAVING METHOD AND APPARATUS FOR COMPUTER DISK DRIVES

ABSTRACT OF THE DISCLOSURE

A power saving method and apparatus is disclosed which maintains an operational or near-operational state for computer memory disk drives. A microprocessor (12) implements microcode instructions to determine if a disk drive (10) is inactive. This is done by checking a control unit (26) through an interface to see if any files are currently opened or data is being transferred by the disk device (10). If no files are opened and/or no data transfers are occurring, the drive (10) is considered inactive. If the inactive period continues for a period of time which is greater than a predetermined reference activity level, then actions are taken to reduce the rotational velocity of the drive spindle motor (18) to its lowest operational level, or just below the lowest operational level without stopping the disk (22). The spindle motor (18) is accessed by the microprocessor (12) through a spindle motor control unit (16). In the case of a constant linear velocity disk drive, the spindle motor (18) is indirectly controlled by the microprocessor (12) sending a message to an actuator (17) to move a data head (23) to a track (32) that is near the outer periphery of the disk medium (30). In order to maintain a constant linear velocity, the spindle control (16) slows the angular velocity of the motor (18) resulting in a reduction of power consumed. When it is necessary to access data again, the drive (10) enters an active state and the head (23) is moved by a microprocessor "seek" command. In the case of a constant angular velocity disk drive having selectable speeds, the microprocessor (12) controls the motor speed directly. The microprocessor (12), upon determining that the disk (22) has been inactive for a predetermined threshold period, selects a constant speed that is the lowest operation speed available. This results in a power saving mode being implemented for the disk drive (10). The drive (10) is returned to normal operational speed by a microprocessor "seek" command. For further savings, the motor (18) is stopped or "spun down" when left inactive for a longer period of time.

Fig. 1

This Sheet Has Been Replaced

