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Role of Laser in Optical Storage Devices

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ABSTRACT

The word optical in the computer industry refers to any storage method which uses a laser to store and retrieve data from media. The use of optical storage continues to grow at incredible pace, spurred on by the flexibility and affordability the technology offers. Optical storage devices are non-volatile, durability and it is great for archiving several forms of optical media are write-once read-many and it is transportability optical media are widely used on other platforms, including the personal computer.

Keywords : Laser, Optical storage.

Introduction :

Lasers are devices that emit narrow beams of intense electromagnetic radiation (light), the term laser originated as an acronym for "light amplification by stimulated emission of radiation". A laser beam has the special property that the light waves emitted are all in step with one another coherent and usually of one wavelength or colour [1,3]. Optical storage is the storage of data on an optically readable medium. Data is recorded by making marks in a pattern that can be read back with the aid of light, usually a beam of laser light precisely focused on a spinning disc. It is refers to store and retrieval of data in



optical manner [4,5] and Lasers are essential for optical communications, on which the information superhighway depends and for high density optical information storage devices. It is one of the emerging areas of wireless communication system, due to its low noise ratio makes its well suited communication medium for exchange of information. Currently laser communication is adopted in satellite communication for space research activities and due to its efficiency on low noise ratio, inexpensive, low power and its flexibility and its resistance to the radio interferences makes laser communication as one of research area in wireless communication. Research into lasers continues apace new types of laser are being developed with a variety of characteristics and potential applications. In some cases, the result is a cheaper, more compact portable device designed for a specific use or a more powerful laser used to generate power for instance.

Optical Disk Storage System:

Optical disc is usually circular disc which encodes binary data in the form of pits and lands on a special material on one of its flat surfaces. The encoding material sits atop a polycarbonate which makes up the bulk of the disc and forms a dust defocusing layer. Lasers produce almost all microprocessors and memory chips in personal computers.

Compact Disk Read Only Memory (CD-ROM):

Compact discs are optical storage devices (i.e., they use a laser to write and read data) made from plastic, aluminium and acrylic. It is a medium for the distribution of catalogs, directories, encyclopedias, software, Images, Sound etc, which are high volume and as a medium for the distribution of courseware, which includes: notes, tutorials, lectures (text, voice and images) and software. The information is actually stored as physical indentations on the surface of the CD. Recently low-cost equipment has been introduced in the market to make one-off CD-ROMs, putting them into the next category. Compact discs which a sequence of 'pits' is placed in a spiral track. They are approximately 2.2mm thick and store digital data onto a single spiral track. It prevents corrosion and physical damage, a protective layer covers the reflective surface, a low power laser beam is focused through the transparent protective layer and the reflected beam is detected [6,7]. Everywhere there is a pit, the beam is not reflected so that binary information can be represented as a series of pits and lands along the track.



Write Once Read Many Times (WORM) Disk Unit:

Some optical disks can be recorded once; the information stored on the disk cannot be changed or erased. Generally the disk has a thin reflective film deposited on the surface. A strong laser beam is focused on selected spots on the surface and pulsed. The energy melts the film at that point, producing a non-reflective void. In the read mode, a low power laser is directed at the disk and the bit information is recovered by sensing the presence or absence of a reflected beam from the disk. The photographic process is an obvious write-once only optical recording system, including the use of photographic films, photoresists and photopolymers require development or some other similar form of post processing. Other non-erasable technologies make use of ablative thin films and phase-change media. The recording mechanism is permanent and cannot be reversed. In ablative recording, spots on a thin film of metal, Bounded to the disk substrate, is melted to form a hole. The CD-R and DVD-R optical disks for computers are common WORM devices. On these disks, on region of the disk can be recorded a second time. However, these disks often use a file system based on ISO 9660 that permits additional files and even received versions of a file by the same name, to be recorded in a different region of the disk. To the user of the disk, the disk appears to allow additions and revisions until all the disk space is used. In high speed recording, the energy of a laser beam is sufficient to vaporize the metal, hence the term ablative. Whether melted or vaporized, the hole size must be large enough so that surface tension and reflow does not cause the void to be unstable. Polymer recording uses ablation to form makes in light-absorbing organic films by heat. Apart from the vaporization of material, the pressurized vapor also pushes the soft polymer away to form a clearly defined pit. Phase-change media can exist in two or more stable structural states. The material is manufactured in a metastable state. When a mark is required, heat is applied at the required bit cell with the laser and this heats the region up the material is allowed to anneal into a more stable state. Write-once systems are particularly suitable for archival storage. The most common application of WORM is used in document filling system.

Conclusion:

Optical storage devices are non-volatile which means that the memory can be



retained even when the powered is turned off. It is durability with proper care; optical media can last a long time, depending on what kind of optical media you choose. It is great for archiving several forms of optical media are write-once ready-many, which that when data is written to them, they cannot be reused. This is excellent for archiving because data is preserved permanently with no possibility of being overwritten and it is transportability optical media are widely used on other platforms, including the personal computer. For example, data written on a DVD-RAM can be read on a personal computer or any other system with an optical device and the same file system.

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