NASA TECH BRIEF

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Concept for High Speed Computer Printer

Most printers currently use mechanically actuated type. Magnetic ink is often used, and is sprayed toward the paper, shaping the different characters magnetically. These printers are very fast, rated at 132 characters per line, and 1200 lines per minute.

Simplified Mechanical Schematic
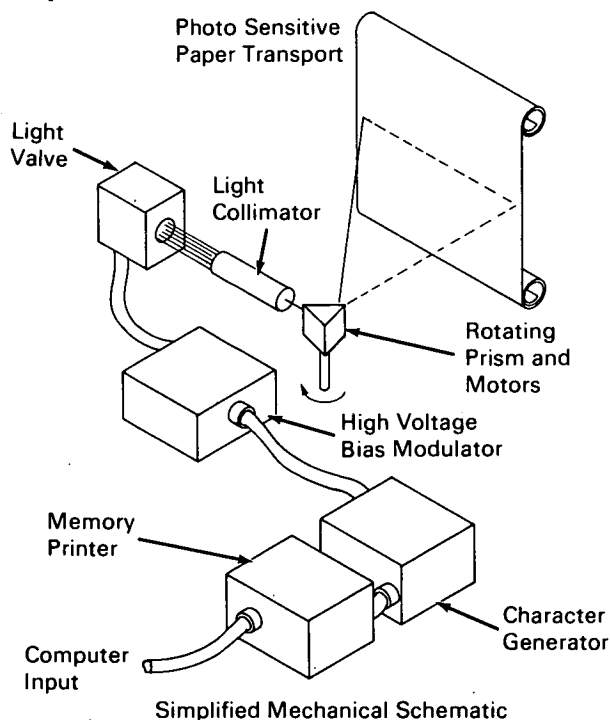
This new conceptual design for a high speed computer printer uses a Kerr cell as a light shutter for controlling the print on photosensitive paper. Applied to output data transfer, the information transfer rate of graphic computer printers could be increased to speeds approaching the data transfer rate of computer central processors (5000 to 10,000 lines per minute).

This information should interest designers and manufacturers of peripheral computer equipment, computerized newspaper and manuscript publication industries, and has possible application for rapid reporting of stock market quotations.

The printer operates by projecting a modulated light beam which is scanned across photosensitive paper or film. Several scans are required to form the complete characters in the line of information. The unique feature of this printer is the use of the light valve (Kerr Cell) for character definition as direct output of the computer. However, several other display methods are possible. One method would be to group several of these light valves; by careful selection of which valve is either on or off, a complete character could be formed and printed.

As shown in the figure, the printer is composed of separate components. The heart of the printer is the light valve or electronic shutter, used to modulate the light beam which forms the characters to be printed. The actual time for the shutter or light valve to go from fully closed through fully open back to fully closed is approximately 15×10^{-9} seconds (15 nanoseconds), or it could cycle 66×10^{6} times in one second. Therefore, the limiting factor is not the shutter, but the sensitivity of the paper or film.

The optical system of the printer is a straightforward projection system; if space did not allow, a fiber optics system could be utilized for placement of the light valve at a more convenient remote location. The transport system encompasses the mechanism to store the photosensitive paper or film, move it past the printing point, process the printed paper (either wet or dry), and maintain a synchronous speed with the electronic printing process.

(continued overleaf)

The last major components of the computer printer are the required electronic circuits. The memory printer contains the necessary electronics to accept and retain a complete line of information from the computer. This information is retained until the character generator acts upon it, then resets itself for the next line of information. The memory printer also supplies the necessary synchronization pulses to the prism and transport servo system.

The prime electronic circuit is the character generator which supplies the modulation signal to the high voltage bias modulator during the scan, forming that portion of the individual characters which appears in the particular scan line. The output of this character generator controls the high voltage bias, which furnishes the necessary voltage stress across the light valve to actuate the polarization characteristic.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Kennedy Space Center
Code AD-PAT
Kennedy Space Center, Florida 32899
Reference: B70-10484

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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