

XXX. COMPUTER COMPONENTS AND SYSTEMS*

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RESEARCH OBJECTIVES

The Computer Components and Systems Group of the Department of Electrical Engineering, M.I.T., has previously reported its progress under separate cover. This is the first report by the group in the Quarterly Progress Report of the Research Laboratory of Electronics.

Almost without exception, the work of this group has been focused on particular fundamental problems stemming in each case from broad general studies of high-speed computer systems. The investigation of the use of ferromagnetic thin films as logical, memory, and output devices has moved decidedly into Kerr magneto-optics studies. The Kerr magneto-optic effect has been used to observe the motion of domain walls in ferromagnetic thin films during switching. This effect is also being studied with the purpose of increasing its magnitude by means of a suitable choice of materials or by means of a suitable choice of dimensions for optimum optical interference.

The original work on the wirewound cryotron was followed by attempts at component simplification and increased speed, and has led to a careful examination of electron graphics. Requirements on chemical purity, geometric resolution, and reproducibility of optical, electrical, and magnetic parameters have led to the development of molecular feedback control.

The study of the mechanisms by which information is stored in computers has led to the development of a concise language for the description of three-dimensional configurations. This language is physically meaningful, capable of providing communication between active workers in the field, and, most important, suitable for storage in computer memories. Related to this crystal algebra is the interest in the high-density information content in masks used for the deposition of thin-film circuitry. To summarize, three main research topics have evolved in this group: magneto-optics, electron graphics and molecular feedback, and the topology of structures.

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*This work was supported in part by the U.S. Navy Bureau of Ships under Contracts NObsr 72716 and NObsr 77603.

