



THE CIRRUS STORAGE SYSTEM

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SUMMARY

The CIRRUS computer is a low cost machine of unusual power and flexibility. The main features of the machine design and hardware are described first to provide a background to the thesis. Four storage units are required: two coincident-current core stores, the main store of 16,384 19 bit words and the register store of 1024 20 bit words, and two fixed stores, the control fixed store of 4096 38 bit words and the machine language fixed store of 8192 19 bit words. The register store is only a reduced form of the main store and only the latter is discussed in detail. The drive system is based on the load-sharing switch and is temperature compensated to optimise operation over the range 10°C - 45°C. The drive currents are controlled by transistors operating as non-saturating current switches. The store circuits are integrated into the overall machine hardware and do not require separate input, output or address registers. The stores are not fast, 6 μ sec cycle, but are a low cost design conservative in both hardware ratings and timing. Another type of drive system using a new type of magnetic switch is also discussed in Appendix 2. Both fixed stores have the same bit capacity and are identical mechanically, the different word capacities and word lengths being achieved by a minor change in the addressing circuits. Two forms of fixed store developed by the author are described, both using a prewired inductively coupled array in which the information is stored by the mechanical arrangement of the selection wires within the array. The first using E cores was not particularly successful mechanically or electrically and was replaced by the second using ferrite rods. Both were designed to operate on a 1.5 μ sec cycle but the second form is probably capable of an 0.5 μ sec cycle with minor modifications. The stores are relatively cheap to construct and have a 20:1 speed/cost advantage over the core stores. A feature of the stores is the low drive

and large output in comparison with other types of fixed store described in the literature. Some other forms are discussed and briefly compared with the CIRRUS stores. The fixed store is then considered as a logical network and the application of this device to the design of complex switching networks is discussed. The control unit of the CIRRUS computer is taken as an example of this design approach. Finally some possible changes in the store circuits are considered in view of the improved and cheaper semiconductors now available and the possible future development of the storage system is discussed.

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