

The Magnetic Tape Device for the Parametron Digital Computer M-1

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A detailed explanation of the magnetic tape device is described, which has recently been installed as an auxiliary memory for the existing parametron computer M-1.

The control unit of the device is constituted with 2067 parametrons of the same kind as those used in the central computer. 208 electron tubes, 341 transistors and 244 diodes are used for the read-write unit of the device.

According to the instructions sent from the central computer, the control unit performs the following operations; to disassemble each word from the core memory into magnetic tape format by adding a lateral parity bit to each character of four bits length, to assemble each ten characters into a word, storing it to the specified location and to cause the tape to move or to stop at right timing.

Five new instructions are provided for the tape control. They are:

(1) 93 n , Delete.

Delete the information on the tape along the tape distance n .

(2) 94 n , Hunt.

Select the tape unit and locate the head on the block-gap before the n -th block on the tape. This operation is executed concurrently with other arithmetic operations of the central computer.

(3) 95 n 00 n , Read Forward.

Move the tape forward and read n words from the tape into the core memory beginning with location m .

(4) 96 n 00 m , Write.

Move the tape forward and write onto the tape a block of n words stored in the core memory beginning with the location m . Write the block number, if necessary.

(5) 97 n 00 m , Read Backward.

Move the tape backward and read n words into the core memory

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beginning with the location $n+m-1$ and retrogressing until location m .

Instructions 93, 94 are 20 bits long and the others 40 bits long.

There are nine tracks on a magnetic tape, five of which are for recording information, and one for parity check and the rest for timing clocks.

Each bit in the core memory is recorded longitudinally on the tape in the form of a single-error correcting code of three bit length. The code can easily be decoded by merely giving the output as the majority among the three bits.

The counter to record the frequency of error corrections is equipped for the purpose of supervising the degree of degradation of magnetic tapes. At the end of each block a longitudinal parity bit is automatically written in each of six information tracks.

A magnetic tape of 2400 feet in length can accommodate about 30000 words, each of 40 bit length.

The frequency of error correction is observed to be one out of 10^6 under the operating condition.

Tracing Experiments and some Considerations on the High-speed Carry Propagation Circuit of the University of Manchester

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One of the authors had a chance of visiting the University of Manchester and being informed of their high-speed carry propagation circuit in 1959. Upon his return to Japan the authors traced the work at Manchester, and found the circuit very satisfactory.

Micro-alloy junction transistors were employed in the experiment, and it turned out that the transistor serves as an electronic relay with contact resistance as small as three ohms and switching time less than 100 ns.

Possible applications are shown also on parity checking circuit and on high-speed shifting circuit.

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