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STEP

AUTHORS: (8) Linek, Allan and Novak, Tstirad

TITLE: (6) A special printing device with a transformation of binary numbers into decimals expressed by the international teletype code

SOURCE: (15) Československá akademie věd. Ústav matematických strojů. Stroje na zpracování informací, no. 8, 1962, 121-134 (In Russian. Resumes in Czech and German)

TEXT: The results of computations concerning crystal structures, especially projections of electron densities, are usually plotted by hand in the form of maps. A special computer M-1 is used for computations at the crystal structures laboratory

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of the Institute of technical physics of the Czechoslovak Academy of sciences. A teletype serves as an additional unit that prints the results on a sticky tape. Sticking this tape to a sheet of paper yields maps of wanted dimensions and forms. Up to now the results were printed in the octal system. We proposed a new device for printing the results in the decimal system. The device is designed for special crystallographic computations, but some of its parts or principles of operation can be used in other fields. In view of the speed of the M-1 output it is necessary to print a number of 6 characters (at the most) in a 1.5 seconds interval. We chose the relay as the building block of our device since we had previous experience in operating relay machines and because

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of its simplicity and availability. We used the tape teletype because of the possibility of simultaneous perforation. The RFT51 teletype was modified by adding to it a camshaft pulse generator that derives its motion from the shaft. We aimed at building an independent printing unit capable of operating with all the computers in the laboratory. The block diagram of the binary to decimal and to teletype code transformer is given and its principle of operation is explained. The transformation is based on comparing the binary number to $m_i \times 10^n$ ($m_i = 8;4;2;1$) and then printing out the result, deducting the $10^n \sum_i m_i$ from the binary number and comparing the remainer to $m_i \times 10^{n-1}$, and so on. A block diagram of the entire device is given and its operation is explained. Wiring diagrams of the one-tact decoder, the comparison circuit and the decoder that transforms the binary-

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decimal number into a teletype code are given. The device does not print zeros unless there is a non-zero entry in a higher-order decimal place. The mechanical and electrical modifications of the RFT teletype were carried out and its operation was satisfactory. It should be added that the length of a tact is 75 msec. This operating speed can be dealt with by an Aritma relay. There are 8 figures and 2 tables.

ASSOCIATION: Institut tekhnicheskoy fiziki Chekhoslovatskoy AN, (Institute of Technical Physics, Czechoslovak AS) Prague

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