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A PUNCHED CARD READER

by

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EDITED MACHINE TRANSLATION

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ABSTRACT: This paper deals with a new type of on-line punched card reader designed to feed data into the punched tape input terminal of the Minsk-1 computer. The card reader extends the capability of this computer by providing an additional means of input. Standard 45-column cards are used at a speed of 100 cards per minute. The information is read in a series-parallel mode. An internal decoder converts the decimal data into 8-4-2-1 BCD code, compatible with the particular input terminal of the computer. The computer generates appropriate control signals utilized in the control module of the reader. A signal is fed into the computer whenever a word begins or ends. For the serial output of the digits, a shift register is used consisting of transistor--ferrite core elements. A laboratory model was built and tested with satisfactory results. The unit is small, simple, and reliable. Orig. art. has: 3 figures. English translation: 5 pages.

U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration
А а	*А а*	A, a
Б б	*Б б*	B, b
В в	*В в*	V, v
Г г	*Г г*	G, g
Д д	*Д д*	D, d
Е е	*Е е*	Ye, ye; E, e*
Ж ж	*Ж ж*	Zh, zh
З з	*З з*	Z, z
И и	*И и*	I, i
Й й	*Й й*	Y, y
К к	*К к*	K, k
Л л	*Л л*	L, l
М м	*М м*	M, m
Н н	*Н н*	N, n
О о	*О о*	O, o
П п	*П п*	P, p
Р р	*Р р*	R, r
С с	*С с*	S, s
Т т	*Т т*	T, t
У у	*У у*	U, u
Ф ф	*Ф ф*	F, f
Х х	*Х х*	Kh, kh
Ц ц	*Ц ц*	Ts, ts
Ч ч	*Ч ч*	Ch, ch
Ш ш	*Ш ш*	Sh, sh
Щ щ	*Щ щ*	Shch, shch
Ъ ъ	*Ъ ъ*	"
Ы ы	*Ы ы*	Y, y
Ь ь	*Ь ь*	'
Э э	*Э э*	E, e
Ю ю	*Ю ю*	Yu, yu
Я я	*Я я*	Ya, ya

* ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ё in Russian, transliterate as yё or ё. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

A PUNCHED CARD READER

An important means of improving computational-planning work is the wide use of contemporary computer technology and, primarily, electronic computers. The initial data of many economic problems, as a rule, are placed on punched cards at computing-analytical stations. The solution of such problems by computers, not having punched card reader, presents considerable difficulties, since the transfer of information on punched cards onto punched tape is a long and tedious process, which is not justified by further data processing in an [ETsVM] (ЭЦВМ) [Electronic Digital Computer].

For more effective use of electronic computers a modernization of the external devices of these machines is necessary, i.e., along with input from punched tapes it is also desirable to have input from punched cards. Let us give a description of one of the possible variants of a data input device from standard 45-column punched cards for the electronic computer "Minsk-1".

The card feed mechanism, utilized for input device work, ensures the feeding of cards by the wide side; interval between the cards is 3 positions, feed speed is 100 punched cards per minute, and the possibility of encoding positions of decimal figures in binary-decimal code is "8, 4, 2, 1." For a saving of machine time and to ease the programming in the input device the possibility of excluding any digits.

Numbers are introduced into the machine in series-parallel code. After issue of a number, along the input busbars the combination of signals "recording of number in the memory unit" is issued, after issue of all information, the combination of signals "end of input" is issued.

A block diagram of the device of data input from punched cards (Fig. 41) consists of an assembly which controls the work of the card feed mechanism and the beginning of data input into the electronic computer, [NV] (НВ) (Fig. 42), a conversion matrix from decimal code into binary-decimal M, and a control assembly of information issue from the matrix of conversion into the electronic computer У Fig. 43).

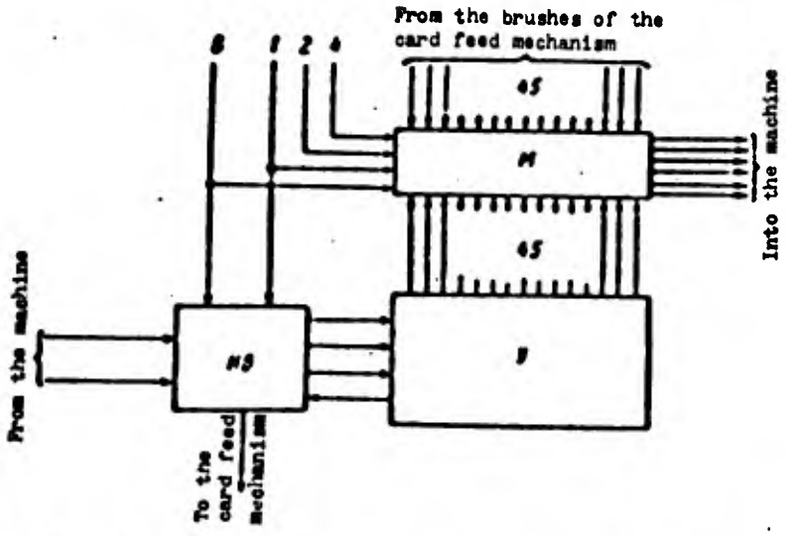

Fig. 41. Block diagram of a punched card reader.

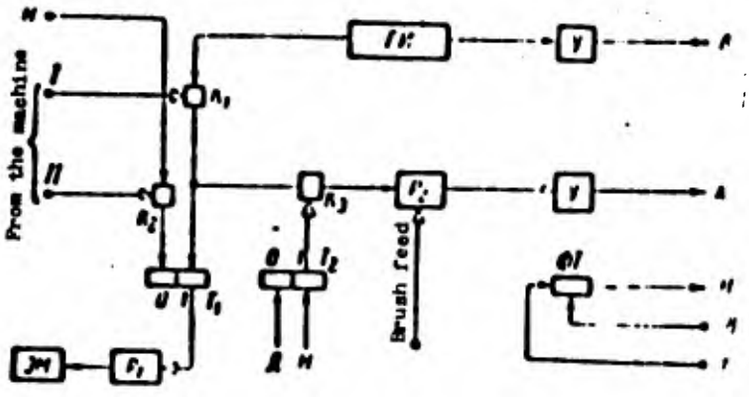

Fig. 42. Work control assembly of the card feed mechanism – NV.

The node NV ensures switch on and switch off of the card feed mechanism, as well as control over the work of node У. Switch on of the card feed mechanism is performed in the following way. In the presence of a resolving signal of (high potential) on busbar I (Fig. 42), key $К_1$ is open. Pulses from generator [GI] (ГИ) proceed to establish trigger $Т_1$ in state 1, and proceed to key $К_3$. Potential output 1 of trigger $Т_1$ switches on relay $Р_1$, through the contacts of which feed is sent to electromagnet [EM] (ЭМ) of the card feed mechanism.

The brushes of the card feed mechanism read out the decimal digits of numbers. Simultaneously, the mechanism ensures entry of corresponding digits 8, 4, 2 and 1 in binary code. Recording of a number from punched cards in matrix М and its simultaneous translation into binary-decimal code is performed according to the principle of coincidence of half currents.

During the passage of positions of odd decimal numbers through busbar 1 a signal is issued which records 1 on ferrite-transistor cell [FT] (ФТ); during the passage of the position of a decimal eight, the signal along busbar Н joins input Н of node У and records 1 on $ФТ_1$ (Fig. 41), sets trigger $Т_2$ (Fig. 42) in state 1 and through channel $К_1$, $К_3$, $Р_2$ series А enters the node У for information readout from matrix М.

In the presence of signal II (suppression of input) signal Н disconnects the card feed mechanism.

After readout of all information from the matrix and its input into the machine, signal Д (Fig. 42 and 43) prohibits the passage of series А.

Information readout from the matrix is carried out sequentially lines by full current pulses along busbars 1-45. Output signals from the matrix join shapers Ф, which ensure at the output signals of the necessary amplitude and duration.

For sequential issue of digits and numbers a two cycle shift register on ferrite-transistor cells is used (Fig. 43).

For distinguishing separate numbers on the matrix and to reduce readout time from М in the presence of omissions on the punched card, node У forms a combination of signals "recording in the [ZU] (ЗУ)," [memory unit] "end of input" and ensures direct transition from the n-th busbar to the n +k-th (k is the number of passed columns on the punched card). This is achieved by corresponding setting of toggle switches [TP1' – TP45'] (ТП 1' – ТП45') and TP1 – TP45 (see Fig. 43).

Toggle switches TP1' – TP45' in one position commutate the circuits so that the corresponding figure is the digit of a number, and in the other position the figure is generally excluded. Toggle switches TP1' – TP45' in one position commutate the circuits so that the corresponding figure is not the last digit of a number, and in

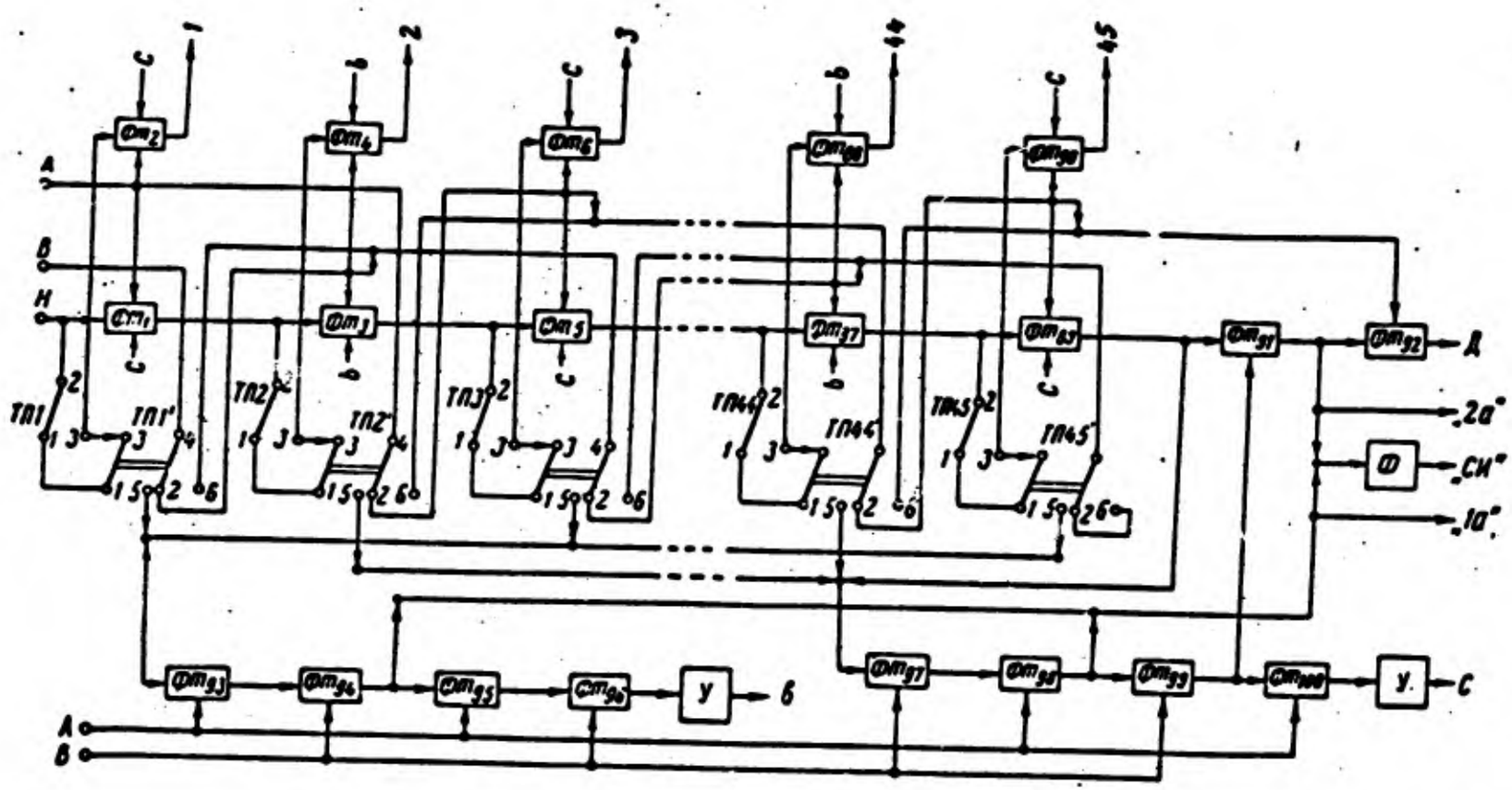

Fig. 43. Control assembly of the issue of information from matrix of conversion y,

the other, so that it is the last one.

We must note that the two toggle switches which belong to one digit cannot simultaneously be in the position "figure is excluded" and "figure is the last digit of the number."

Information from the punched cards enter the machine through the input channel from punched tapes. For checking the circuit of the input device from punched cards a laboratory mock-up was built, using the elements described in [27]. This mock-up was tested under laboratory conditions. Tests showed the stable work of the device on the whole with a divergence of feeding voltages of ± 15%.

Pulse generator (GI) ensures 2 series of pulses with a repetition frequency of 2 kHz, shifted relative to one another by a half period [28]. The power amplifier, built on triode [P601] (П601), forms current pulses with a width of 2-3 μs and amplitude of up to 1 A. Ferrite-transistor cell (FT) ensures current in a load of 100 mA. The conversion matrix M is constructed on ferrite cores 0.9 [VT] (ВТ) with dimensions of 2 × 1.3 × 1 mm.

Use of punched cards feed by the wide side ensures an increase of high speed operation by twice, as compared to feed by the narrow side.

According to the described layout, a device of data input from punched cards can be built in binary-decimal or octal code, differing by simplicity and small dimensions.