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CENTRAL INTELLIGENCE AGENCY

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THIS IS UNEVALUATED INFORMATION

1. In 1949, the Institute for Applied Mathematics at the Dresden Technical University started scientific work on a digital computer for the solution of [redacted]ential and integral equations. The scientific work in its initial stages was supervised by Dr. Friedrich Adolf Willers, Professor of Applied Mathematics at the Institute. Willers, author of several books on numerical integration and mathematical machines and instruments, was engaged during World War II in the development of computing instruments for the German armed forces. Willers was assisted by Dr. N. Joachim Lehmann of the same Institute, an expert in applied mathematics and theoretical physics. After the work had progressed beyond the purely scientific preparations, Willers [redacted] and the scientific supervision was assigned to Lehmann. The construction of the computer was done jointly by scientific personnel of the avove-named Institute and by technical personnel of RFT VEB Funkwerk, Dresden. Eng. Kutzsche (fnu) of the Funkwerk was in charge of the technical development. An experimental model of the computer has been under construction for the last two years in a laboratory especially built for this purpose on the grounds of the Funkwerk. A team of about ten persons worked on the construction of the model under Lehmann's scientific and Kutzsche's technical supervision.

2. The first stage of the development after its scientific preparation consisted of preliminary trials which were carried out with the aid of a simple relay circuit. In these trials, a dual system (Dualsystem), using only the figures 0 and 1, was used. After these trials achieved satisfactory results, construction of a temporary model of the machine was started.

3. The machine in its completed form consists of the following parts:

a. The computing device (Rechenwerk).
b. The command device (Kommandowerk).
c. The memory device (Speicherwerk).
d. The input device with impulse center (Eingabewerk mit Impulszentrale).
e. The output device (Ausgabewerk).

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A principal connection diagram of these parts is to be found in Figure 1 of Annex 1.

4. It is not expected that the development of the machine will be completed before the end of 1955. It is planned to operate the machine with electron tubes. However, the possibility is being considered of substituting other elements, such as silicon or germanium diodes, or ferrite rings, for electron tubes at a later date. These elements are not used now because their quality and quantity is not yet considered good enough to warrant their use in a computing machine.

5. At present, a rack with 250 electron tubes has been completed. This rack measures 2 x 2 x 0.5 meters. Furthermore, the impulse center, with the approximate dimensions of 1.5 x 1 x 1 meter, has been completed. The blueprints of the memory device are completed and a temporary model of the memory device is being tested for permanent operation. The command device is not yet completed. The final machine will have two racks with electron tubes. One of these will be the rack with 250 tubes, now completed; the second rack will have 370 electron tubes.

6. The Computing Device (Rechenwerk)

The electron tubes used in this device are of the RF 12 P 2000 type. At present the computing device works with a simple binary system (Einfaches Dualsystem) which uses only the figures 0 and 1. The figure 1 is represented by a rectangular impulse of the impulse center; the figure 0 by a blocked impulse. Each figure is represented by a series of successive 1 and 0 impulses. Figure 2 on Annex 1 represents 37; Figure 2 on Annex 1 represents 23. It is planned to make use of a dual coded system (dualverschluesseltes System) in the final machine. This system will use four impulse channels instead of only one. Every channel is used for the representation of a power of 2 so that a rectangular impulse on the first channel means 1, on the second channel 2, on the third channel 4, and on the fourth channel 8. The impulses relating to one and the same number are placed vertically above each other. In Figure 4 on Annex 1, the two impulses on the left side of the picture thus represent the number 3; and the three impulses on the right side of the picture represent the number 7. The number 37 is represented by placing the impulses representing 3 and the impulses representing 7 after each other. Figure 1 on Annex 2 shows an "and" circuit in the dual system. Figure 2 on Annex 2 shows an "or" circuit. Annex 3 represents an addition circuit (with rectifiers and resistances) for the two terms of a sum. Annex 4 shows a tube as a Komplementbildner (sic).*

7. The Command Device (Kommandowerk)

The principal circuit is represented on Annex 5. It is provided with a command switch (Befehlsweiche) which decides whether to continue a computing operation or whether to repeat it if the result has been found to be incorrect.

8. The Memory Device (Speicherwerk)

The memory device is a magnet drum memory. The drums are discs made of pertinax with a diameter of 300 mm. and a width of 8 mm. Eight of these discs are placed on the shaft of a motor operating at 6,000 rpm. Every disc is provided with a layer of magnetite and is divided into eight sectors so that there is a total of 64 sectors. The memory is furthermore provided with a synchronizing disk (Synchronlaufscheibe).

* Note: Literal translation: complement former.

9. The Input Device with Impulse Center (Eingabewerk mit Impulszentrale)

Figures and commands are inserted into the input device with the aid of punched cards (Lochkarten) or punched tapes (Lochstreifen). The impulse generator provides the rectangular impulses mentioned above by means of a multivibrator (impulse amplitude: 20 V; impulse train frequency: 1,000 cycles).

10. The Output Device (Ausgabewerk).

This device writes the results down on a table or punches them onto cards for further use during the calculating operation. Neither the input nor the output device has as yet been completed.

11. According to statements by Dr. Lehmann, the completed machine is supposed to be able to carry out all calculations which can be made by the G 1 computer at Goettingen University. The Dresden machine is expected to carry out 70 "mixed operations" per second and to be able to produce a number sequence of ten power twenty (10^{20}) digits. 2

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Comment. The attached circuit graphs are drawn as though rectifiers were used instead of electron tubes. This is done for reasons of convenience only. The machine actually uses electron tubes.

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Figure 1

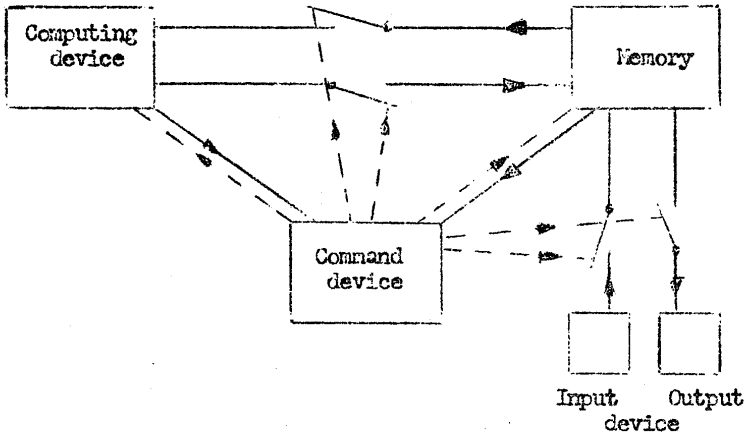


Figure 2

Figure 3

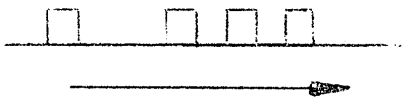
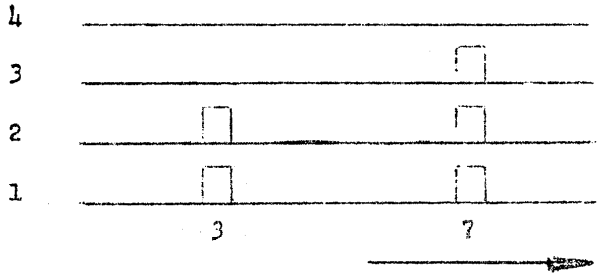


Figure 4



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Annex 2

Figure 1

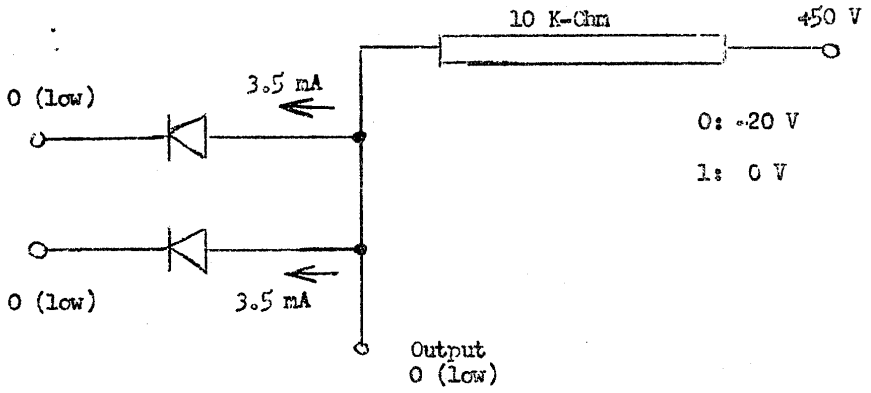
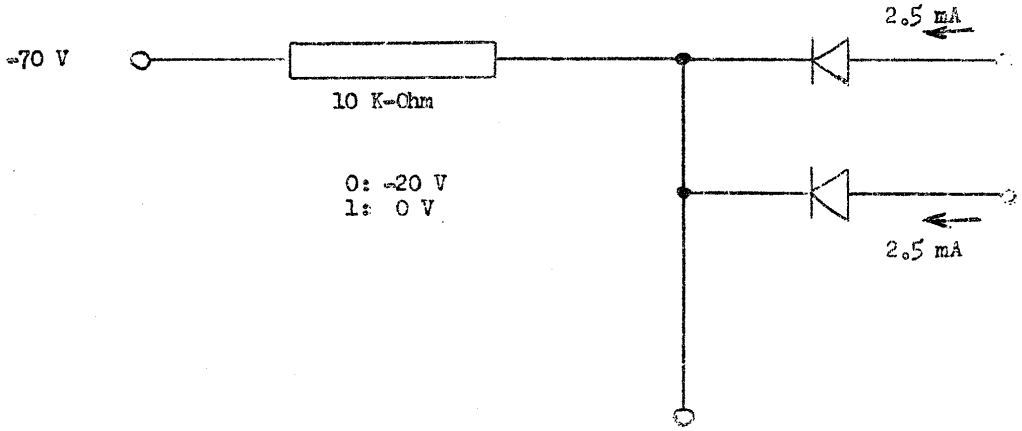
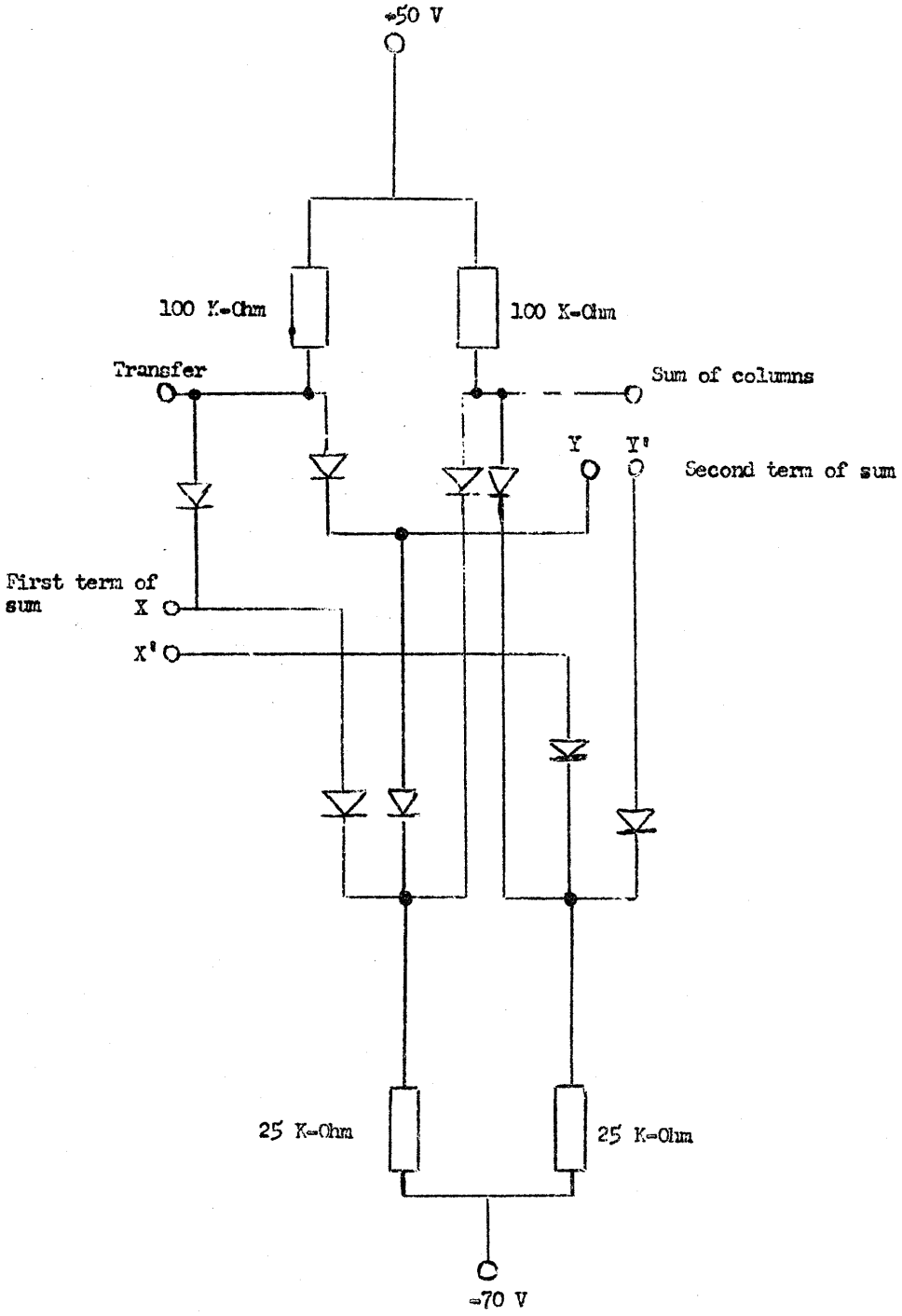


Figure 2



Annex 3



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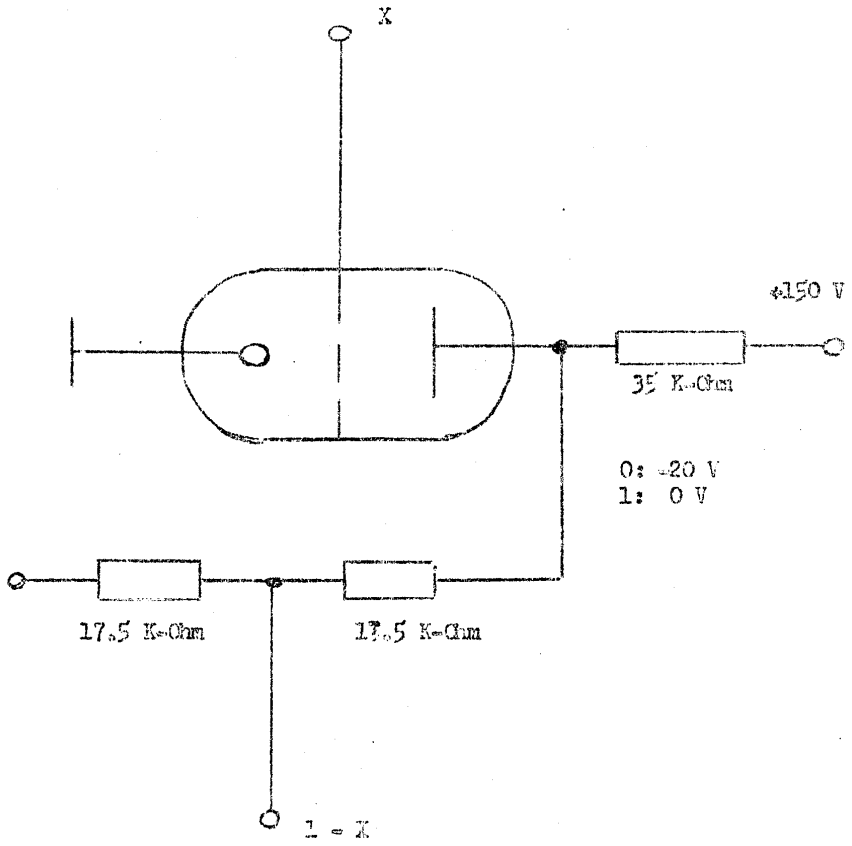
Annex 4



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