Atanasoff-Berry Computer Users Guide

A practical guide to the operation of the worlds first digital electronic computer

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Identification of Operational Components

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ABC Front Panel Identification

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27. V Voltmeter
28. VS Voltage Selector Switch (Pos/Neg)
29. MS Motor Switch
30. ZD Zero Detection Coefficient Selection
31. SD Sign Detection Coefficient Selection
Base-10 Data Input

Reading the base-10 data begins before the machine is even turned on. The equations must first be encoded on IBM punch cards. Each IBM card encodes up to five numbers. The ABC uses fifty bits of precision in a two's compliment format. This gives us an integer range of \((-2^{49})\) to \((2^{49})\) or \((-5,629,499,953,421,312)\) to \((5,629,499,953,421,312)\). (NOTE: As of the writing, the ABC can still be used for accounting on the national level). Each IBM card has eighty columns. Fifteen are used to encode the number with a blank column between each; sixteen times five equals eighty. The base-10 cards are punched in the same way that numbers are written: 1-2-3 = 123. Negative numbers are indicated with the zero hole punched for each digit.

Example:

\[-13x + 54y = -105\]

Would be encoded on the base-10 card as:

```
------------000-----------------------------000
-------------13--------------54-------------105
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NOTE: ‘-’ is simply left unpunched.

Once the stack of cards have been prepared, the machine is then made ready to receive the input as follows:

1. Turn the ABC power on.
2. Check the main voltage levels. This is done by reading the voltage readout on the Voltmeter (V).
3. The Voltage Switch (VS) is used to check positive and negative levels. Each should read 120 volts.
4. The motor is then turned on (MS). DANGER: Revolving drums are hazardous!
5. Clear the CA and KA drums (SW_{11}, SW_{12}).
6. The Base-10 card is then entered into the base-10 card reader (upside down from the operator).
7. Direct the output to the desired bank of five coefficients (SW_{1}-SW_{6}).
8. Activate the card read switch (SW_{7}).
9. Activate the Add/Sub control from the base-10 reader (SW_{8}).
10. Start the card read (PB_{10}).
11. Note the base-10 read light is lit (L_{4}).
12. The card read process will automatically stop after the IBM card has been read.