Collections Department
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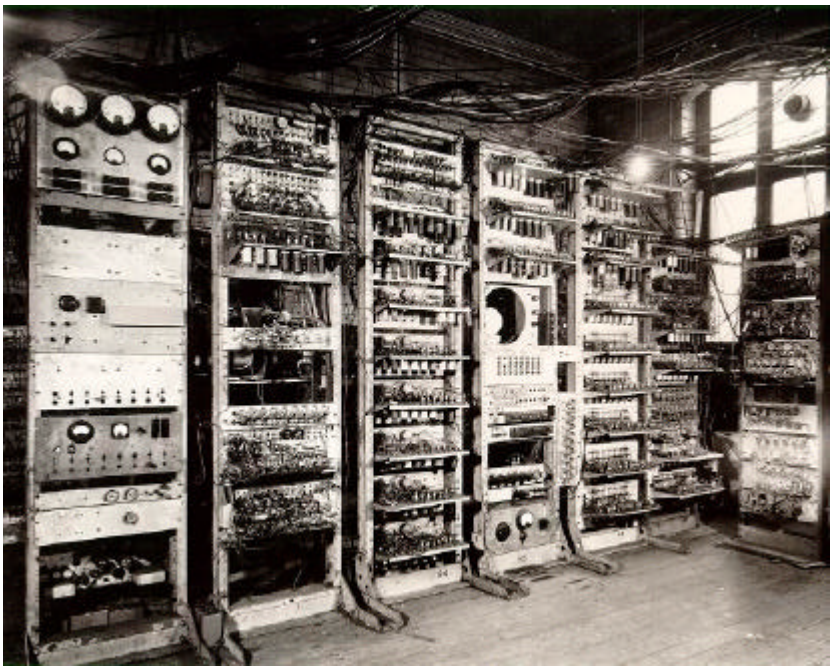
The ‘Baby’: The World's First Stored-Program Computer

The original computer

The original computer was developed as a research prototype to prove the concept of digital storage using the cathode ray tube (CRT). The people who designed it were Professor Freddie Williams, Tom Kilburn and Geoff Tootill at the University of Manchester. Alec Robinson, Dai Edwards and ‘Tommy’ Thomas later joined them. The machine ran the world's first stored program at about 11.00 a.m. on Monday 21 June 1948.



Dimensions

Length: 5.23 m (17 ft)

Height: 2.26 m (7 ft 4 in)

Weight: 1 tonne

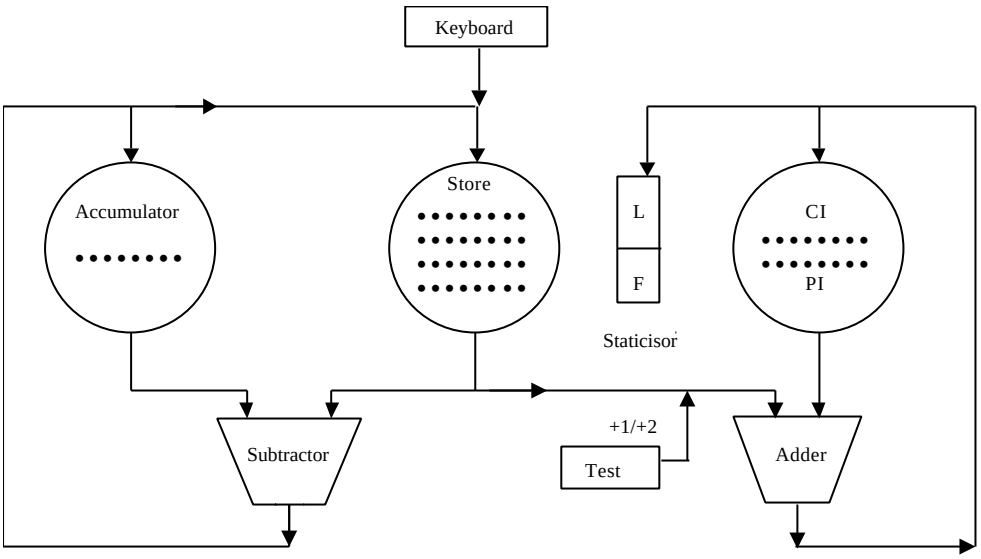
The computer was subsequently enhanced to include extended CRT storage, drum storage and a multiplier unit. Ferranti Ltd then engineered the design for reliability and production in quantity, and delivered the Mark 1 Computer to the University of Manchester in February 1951.

The replica ‘Baby’

The replica was built to mirror the state of the original as it was on 21 June 1948. The goal was to run the replica on the 50th anniversary of the first stored program. This was achieved before a distinguished audience at 11.15 a.m. on Sunday 21 June 1998.

A team of enthusiastic volunteers, led by Chris Burton, rebuilt the machine. Although the prototype no longer existed, the team gleaned invaluable information from Dai Edward's lab notebook, Alec Robinson's photographs and the personal recollections of Tom Kilburn and Geoff Tootill. The rebuild was sponsored by ICL Ltd, and supported by the University of Manchester and the Museum of Science and Industry in Manchester. People who had retired from the industry kindly donated many components.

The ‘Baby: technical information



Digital storage – three cathode ray tubes

Accumulator: - accumulates the results of arithmetic operations via the Subtractor
- 1 word of 32 bits

Control: - 2 words of 32 bits. Controls the extraction of instructions from the Store
- CI (Control Instruction) - store address of Current Instruction
- PI (Present Instruction) - buffer store for the Current Instruction

Store: - Holds instructions, starting values, and results, for the program
- 32 words of 32 bits (1024 bits, compared to millions of bits on today's chips!)

Electronics

The team used technology developed for Second World War radar and communications equipment. The major components comprised 300 thermionic diodes (type EA50) and 250 other thermionic valves (mainly type EF50 and EF55 pentodes).

Power supplies: +300V, +200V, +50V, -150V, -1250V.
Power consumption: 3,500 watts.
Clock Rate: 100 kHz (compared to 330 MHz in today's personal computers)

Programming

There were just six instruction types. Programs were loaded bit-by-bit using the push-button 'typewriter'. The first program was a test for prime numbers, and could run from seconds to hours, according to the size of the trial number. The historic first run took just a few seconds.

For more information:

Read Lavington, Simon. *A History of Manchester Computers.* Swindon, UK: British Computer Society, 1998.

Visit Computer50 website: www.computer50.org.

Consult *The Computer that Changed the World* (CD-ROM). Europress, 1998.