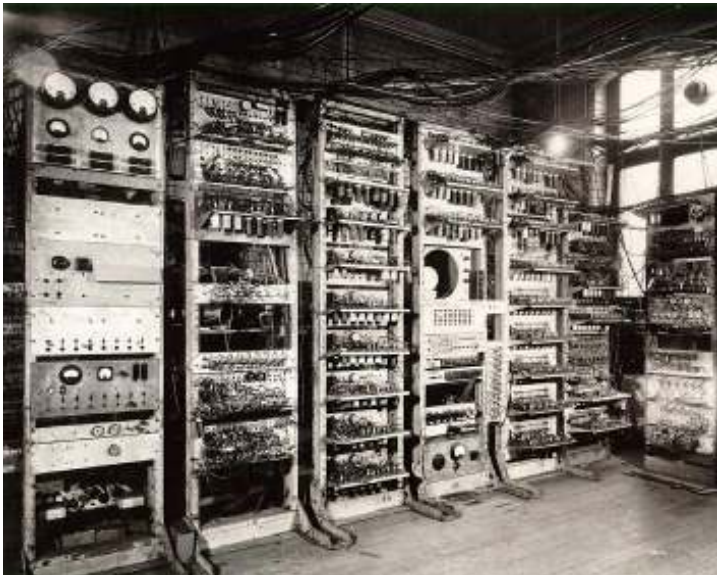


## The Baby: the World's First Stored-Program Computer

### The original computer

The original Small Scale Experimental Machine (SSEM), nicknamed the 'Baby' 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. The team used technology developed for Second World War radar and communications equipment. The major components comprised 300 thermionic diodes (type EA50), 250 other thermionic valves (mainly type EF50 and EF55 pentodes) and three cathode-ray tubes. 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

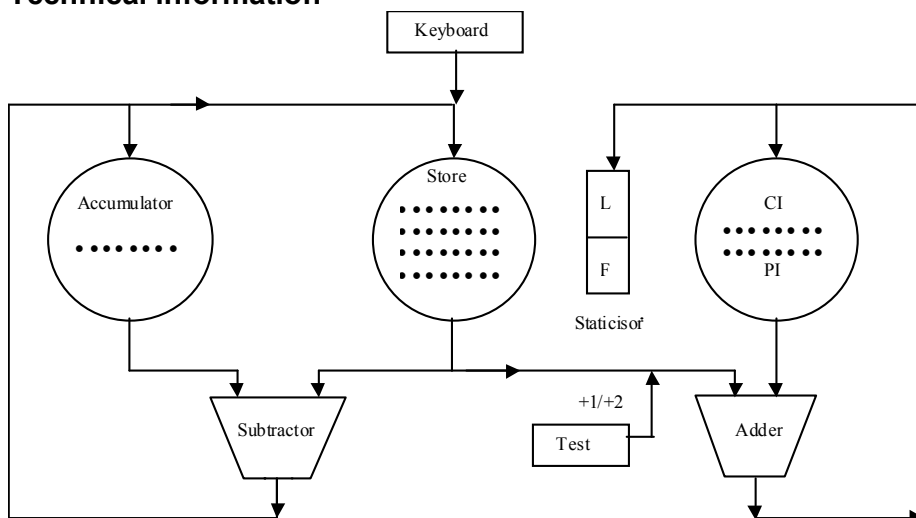
### The replica Baby

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 50<sup>th</sup> 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 MOSI. People who had retired from the industry kindly donated many components.

The replica Baby is now displayed in MOSI's Revolution Manchester Gallery.

## Technical information



- 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!)
- Power rating:** 3,500 watts.
- Clock Rate:** 100 kHz (compared to 1500 MHz in today's personal computers)

## Programming

There were just seven 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.

## After the Baby

The next step was to create a full-scale version, the Manchester Mark I, which was also known as the Manchester Automatic Digital Machine (MADM). Alec Robinson, Dai Edwards and 'Tommy' Thomas later joined the team. The enhanced Manchester Mark I included extended CRT storage, drum storage and a multiplier unit. This machine became the prototype for the Ferranti Mark I, the world's first commercially available computer. Built in Moston, the first Ferranti Mark I was delivered to the University of Manchester in February 1951.

### *For more information:*

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

**Visit** Computer50 website: [www.computer50.org](http://www.computer50.org)  
Baby 60<sup>th</sup> anniversary website: [www.digital60.org](http://www.digital60.org)

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