The Four Generations of Computers
BBC Microbe: Fourth Generation Computers

Tony Nixon:
The Centre for Computing History in Haverhill, near Cambridge houses a collection of these fourth generation machines. In the early 80s, around 30 independent computer manufacturers could be found in Cambridge and the surrounding area.

One of the best-selling computers of this time was the BBC Micro, designed and manufactured by a small Cambridge company called Acorn. Chris Turner was Acorn's Chief Engineer at the time.

Tony Nixon:
How many people would work on something like that in terms of designing and building it? What sort of size team would you have?

Chris Turner:
A relatively small team. I mean at at, at, at Acorn in the early days there were maybe six to ten of us working on these things. So, somebody like myself stitching all of the hardware together, somebody else working on the operating system.

Tony Nixon:
This is a wildly different company to the company that produced the ICL for example, where there'd have been very large numbers of people.

Chris Turner:
Oh yes. I mean, these VSLI chips created the opportunity for relatively small teams of people to get together and very quickly implement a single board computer. And so of course Acorn is well known because of its success with the BBC micro. But there were lots of other computer companies springing up around the same time. Dragon, Tangerine, Oric, Sinclair of course, our main competitor. And that that was just in the UK. In the States of course we had Apple, Commodore, Tandy, and so this industry grew very, very quickly and it was enabled by the progress in semiconductor manufacturing. According essentially to Moore's Law that says, you know for every 18 months or thereabouts you get twice as many transistors on a chip for the same, for the same cost or the same area.

Tony Nixon:
Yeah.

Chris Turner:
Which means that, you know, whilst we have a tens of thousands of transistors on the chips on this wafer, today's chips have, each have billions of transistors on (yeah) and those of course are the chips that are in that, inside your smart phone and your, your latest Netbook and all of those products today.

Tony Nixon:
And how, what's the power consumption, I mean, ignoring the monitor for a minute. What sort of power consumption would you expect for the, er for the computer itself?

Chris Turner:
Well not so much really. I mean power density in terms of, you know, the size of products remains pretty much the same. Um I mean this is I think a 5 volt 3 amp power supply in the BBC micro, so 15, (15 watts) 20 watts

Tony Nixon:
Tell us something about the democratisation of the industry Chris because at this point for the first time you suddenly start selling to individuals whereas before you were selling to large industries.

Chris Turner:
Well that's right. And I've thought since that this period was something of a perfect storm that created our personal computer or microcomputer industry because you had this enablement of in particular the semiconductor technology. But you also had this perception or demand that was drawing the perceived need to have a computer out of just companies and into small businesses and homes. People were beginning to use computers for databases in small businesses, mailing lists and keeping track of orders and things of that nature. But then of course you had the popularisation of computers that, that you saw on television programmes and HAL in 2001, Zen in Blakes 7, I suppose Asimov's Robots, for us and those of us into science fiction. But there was a general feeling that you know computers were the way forward.

Tony Nixon (commentary):
By the end of the 80s, the huge choice of office computers had narrowed, and many machines became evolutionary dead-ends.

Over the four generations, we've seen big changes in the technology. We've also seen a move towards greater usability, popularity and portability, as well as massive reductions in price.

The industry is probably as creative today as it ever was. It would be fascinating to see what Tommy Flowers, the engineer behind Colossus, would have made of all this.