Bringing bre

A subjective look through 40 years of New Electronics issues. By ***Graham Pitcher.***

Look at the cross section of a tree trunk and the rings you see tell you how old that tree was. But the rings also give an indication of the weather – thinner rings imply the weather wasn't so good that year.

New Electronics' archive gives similar information on the state of the electronics industry through the last 40 years. There are some very thick volumes, particularly those from the late 1970s, and some very thin volumes, such as 2001.

It's always interesting to dip into any archive – you never know what you'll find. Government investment is a continuing theme. In our 9 January 1973 issue, we reported that Christopher Chataway – then minister for industrial development – had announced the Government was to invest £10million into the UK's semiconductor industry over six or seven years to 'encourage the development of integrated circuits specially design for particular applications by British semiconductor manufacturers'. The move, we believed, reflected a view that Britain would do best containing its semiconductor activities to custom design and specialisation. Today, the UK is home to the majority of European design houses.

Above:
New Electronics' 10th Anniversary issue. Amongst the news stories covered in the 5 September 1978 issue were AMD signing a cross licensing agreement with Zilog, rumours of Texas Instruments announcing a 64kbit dram and Data General's introduction of the fastest minicomputer. The editorial addressed speculation about Inmos' future.

Intel arrives

When *New Electronics* was launched in September 1968, the world was a very different place. It's fair to say that electronics – certainly as we know it today – had yet to be invented.

Yet it was all about to happen.

Two electronics pioneers – Gordon Moore and Bob Noyce – cut their teeth in Fairchild in the late 1950s. But the company they were just about to set up would change the electronics world. It was, of course, Intel – short for 'integrated electronics'.

The first product from Intel was the 3101, a 64bit bipolar ram. A number of similar memories followed until, in 1971, it launched the first of a range of products which would cement its place in electronics history. That was the 4004, a 4bit microprocessor capable of 60,000 operations per second.

New Electronics' 3 April 1973 issue reported on a six month study of 'components called microprocessors', published by the Electrical Research Association. The news story quoted Dr David Turtle as saying: "... in the long term, they will go into consumer equipment, doing such jobs as controlling all the warning and emergency systems in a car." Not a bad guess.

Five years on, however, there was still some confusion. "What is this microprocessor anyway?" asked Roger Bennison of Cambridge Consultants. He attempted to answer such questions as What are they? What can they be used for? Are they here to stay?

His conclusion? "The microprocessor reflects human ingenuity. It exists only because of the brilliance of thousands of engineers and its uses are limited only by the needs of the community and ingenuity of the people who program their new slaves."

Despite government investment through the 1970s, the UK semiconductor industry was not in a good state by 1980. This was partly technological, partly financial. The industry was relying on Government support, but when Margaret Thatcher won the 1978 general election, she brought a different approach. Money that had previously been available from the National Enterprise Board was cut. "It would

THE NEW ELECTRONICS TIMELINE
1968:
New Electronics publishes its first issue. Bell Labs develops molecular beam epitaxy.

1969 :
ARPANET, the predecessor of the internet, is created.
RS232 standard finalised.

eakthroughs

appear that the future role of NEB is to have minimal interaction with industry," said the editorial in *New Electronics*' 9 September 1980 issue. "(Recent events) should dispel, once and for all, any wishful thinking that the UK might, one day, achieve a Government backed electronics manufacturing industry." No back up, concluded the editor, is probably better than half hearted support.

20:20 hindsight is a wonderful thing, but would Inmos, for example, have made it as a leading semiconductor company had more Government support been forthcoming? As it was, the company received a phenomenal (in 1980s terms) £211million from various sources before being rescued by Thorn EMI. Its technology was eventually acquired by STMicroelectronics.

Crystal balls

We all like a little bit of crystal ball gazing and there's no better place than an executive forum. Here's an example from our 18 April 1978 issue. Richard Cutting, then managing director of Cambridge Consultants, thought that, by 2000, 'we may expect to see 32 and 64bit microcomputers using associative memory and mimicking to some extent the functions of the brain'.

The benefits? He thought such computing power would bring intelligent interactive terminals, self correcting circuitry and language translation, amongst other things. 'Will executives in 2000 visit such a forum or will they see it from home?', the editor mused.

Digital signal processing

One technology which has had a significant impact on the electronics industry over the last three decades is digital signal processing. What started out as an expensive technology almost entirely the preserve of the military has developed into a pervasive technology which underpins pretty much the whole of the world's communications network.

In 1979, a Texas Instruments engineer outlined how a dedicated signal processing microcomputer could become a leadership product. The development team delivered a single chip dsp in 1982. The device had a 32bit alu and could run at 5MIPS, which was claimed to be a speed comparable to that of mainframe computers.

New Electronics reported on dsp developments in its 19 April 1983 issue. The chips, it noted, were produced on a 2.7µm nmos process and featured the equivalent of 55,000 transistors. Running from a 5V power supply, they consumed 950mW.

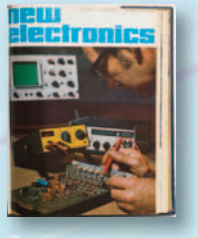
Today, the TMS320C64x+ dsps are amongst the highest performance fixed point devices available from TI. The 'C6455', for example, is made on a 90nm process and handles up to 9600MIPS at a 1.2GHz clock rate. According to TI, the device offers the operational flexibility of high speed controllers and the numerical capability of array processors.

Quantum mechanics

The legendary physicist Richard Feynman once said that anyone who claimed they understood quantum mechanics clearly did not. Notwithstanding, he proposed the concept of quantum computers in 1981.

It's not a surprise to find that progress towards the quantum computer has been slow. *New Electronics* took a look at what some researchers were up to in 1995.

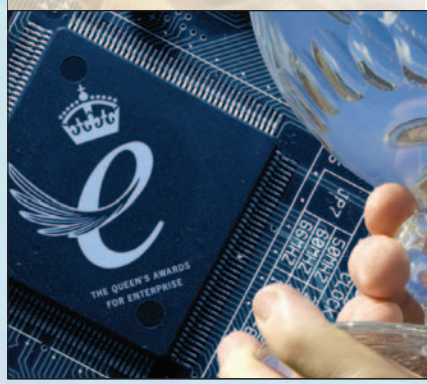
Scientists from the Cavendish Laboratory in Cambridge, working with Hitachi Cambridge



Above:
The 3 April 1973 cover showed Alpha, the latest digital multimeter from Advance Electronics. News stories included availability of the first ccd – a 1 x 500 element device from Fairchild.

Queen's Awards

The Queen's Awards were launched in 1966. Winners in 1968 included AB Electronics, BICC, Chloride Electrical Storage, EMI, ICL, STC, Welwyn Electric and 20th Century Electronics, which rebranded itself in the late 1970s as Centronic.



1970:
The first cdrom patented by James Russell, from Pacific Northwest Laboratories.

1971:
Intel introduces the 4004 microprocessor. The 4bit device can execute 60,000 operations per second. 3M introduces the ceramic chip carrier. Texas Instruments announces the first portable calculator.

Above:
Whilst Sony's G type reel to reel tape recorder predated New Electronics, it was the foundation upon which Sony built its reputation for consumer electronic products.

Laboratory, made what they believed was a 'major advance' in the pursuit of quantum level semiconductors.

What the team achieved was to demonstrate that small and precise numbers of electrons could be controlled to perform a range of functions. Whilst progress had been made in the technology beforehand, what the Cavendish team showed was that quantum effects could be demonstrated at 'near room temperature'.

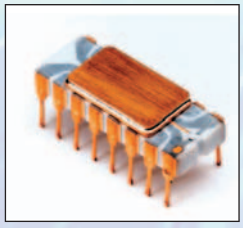
Single electron devices were the goal and that target still remains. Simply put, the power consumption of a device depends upon the number of electrons per transistor. Reduce the number – ideally to one – and power consumption drops. Designers then have the choice of increasing the number of transistors for the same power consumption or keeping the same number of transistors and cutting power consumption dramatically. As we said at the time 'one ic the size of a Pentium could provide the data processing capacity equivalent to 1000 of today's powerful pcs'. And the researchers were expecting to achieve their target by 2015.

In 2001, more quantum developments were reported by the same lab. Quantum computing is based on quantum bits, or qubits. What the lab claimed in 2001 was that the elements needed to construct a qubit had been demonstrated. This, it thought, would allow quantum computers to be introduced.

Dr David Williams, then the senior researcher at Hitachi Cambridge Lab, said: "The technical barriers are big, but we are aiming to have structures with a small number of qubits in the next two or three years."

Right:
Sinclair's ZX Spectrum brought colour to home computing.
Picture: Bill Bertram

Below:
Intel's 4004 microprocessor. Launched in 1971, was this the device that launched the modern electronics industry?



Going soft

Increasing design complexity has required the development of innovative software solutions. In the early days, circuits were drawn by hand and masks created from these drawings. But that could only survive for so long.

Calma was one of the pioneers, developing the GDS II format – which survives today. But others, such as Mentor Graphics, Daisy Systems and Valid Logic – each appearing in 1981 – took the technique forward. Unfortunately, the significance of these events appears to have eluded *New Electronics* at the time.

The eda market developed through the 1980s and Cadence was formed in 1988 through the merger of SDA Systems and ECAD. Shortly afterwards, Joe Costello – previously an SDA vice president – became Cadence's ceo. Costello remained as ceo for almost 10 years, creating the largest company in the eda industry.

Cadence also started to explore a new strategy – providing systems design software, rather than servicing ic design. The move reflected the comparative market sizes. Whilst the chip design market was worth around $180m, the systems design market was worth $880m.

Ironically, Cadence bought Valid Logic in 1991.

Clive Sinclair

Any review of technology would be incomplete without some mention of Clive Sinclair, above. He featured regularly in *New Electronics*' coverage, with news of his digital multimeter in 1973 and the Black Watch shortly afterwards.

In 1981, we wrote about a £5m deal to create a production plant for the Microvision pocket tv and radio. At the time, Sinclair planned to make 1m of these a year, but the device wasn't quite the success he envisaged.

In March 1981, he launched the ZX81, an upgrade to the previous year's ZX80. Built around the Z80 processor running at 3.5MHz, the device had 8k of rom, with programs loaded from a cassette recorder. In the same issue, we carried news of the BBC's intention to launch its own computer. Not long after that, he launched the ZX Spectrum.

Disclaimer

It is, obviously, impossible to review 40 years of publication in such a small space. There are gaping holes in the coverage – what about programmable logic? The demise of Marconi and Ferranti? Manufacturing moving offshore? But I hope this has given at least a flavour of the last 40 years.

Returning to the tree ring analogy, the latest volumes of *New Electronics* are not as thick as before. And there's a reason: the emergence of the internet as a publishing medium. We believe the internet is where you go to find out what you know you need. Magazines, however, are where you go to find out what you need to know.

Will there be anniversary issues of *New Electronics* in the future? We think so – and we hope the UK electronics industry features strongly in our future coverage. ■

1972:
The HP-35, the first scientific handheld calculator, introduced. Magnavox ships the Odyssey 100 home games system. Nolan Bushnell forms Atari. C language developed by Bell Labs.

1974:
Texas Instruments introduces the TMS1000 micro. Over the next 25 years, more than 35 versions are produced for use in products ranging from toys to burglar alarms. Motorola announces the MC6800.