



UK companies involved in design and manufacturing generate some £23 billion a year in revenues, making it the fifth largest electronics sector in the world.

One of the problems with electronics is its visibility; despite the fact that it underpins probably every industry sector, it's hidden from sight. And the same applies to its economics.

The UK is not perceived as being a major electronics nation, yet the UK's electronics industry employs, directly and indirectly, around 250,000 people in 11,500 companies. And those companies – involved in design and manufacturing – generate some £23 billion a year in revenues, making the UK's electronics sector the fifth largest in the world.

While there is no leading independent device manufacturer based in the UK, it is the base for a range of successful fabless semiconductor companies and CSR is a leading example. Microprocessor IP developer ARM is another, shipping many times more processor cores than Intel. Meanwhile, Imagination Technologies is a global leader in the supply of graphics, video and communications processors and Wolfson is carving a leading position based on its low power consumer audio solutions.

Derek Boyd, chief executive of the UK Electronics Alliance, believes UK electronics is in 'good shape'. "While we are not immune from the effects of the global economy, we are seeing the return of confidence," he claimed. "The first part of 2009 saw the biggest and sharpest decline the semiconductor industry has experienced. We've seen strong recovery. The industry is showing resilience, with renewed investment, more recruitment and a quite spectacular market share growth for companies such as Imagination and ARM."

Alongside these established companies is a vibrant start up culture, with the area around Bristol renowned for its expertise in communications technology. Companies such as Icera Semiconductor and picoChip are developing world leading wireless communications technologies.

Manufacturing is an important part of the make up of the UK electronics industry, ranging from small contract

In good shape

More successful than it appears, the UK's electronics sector is holding its own.

By **Graham Pitcher.**

manufacturers to full scale semiconductor production. There are some 200 contract manufacturers in the UK, with world leaders such as Jabil. Many of these are specialising in handling high value, low volume projects, providing an alternative to far Eastern companies.

At the other end of the scale, National Semiconductor's Greenock facility (right) is currently fully loaded – a big turn round in the plant's fortunes. Once threatened with closure, the plant is now a central part of the company's manufacturing plans. "National Semiconductor has closed a plant in Texas," said Boyd, "and transferred the tools to Greenock, allowing production to move from 6in to 8in wafers. This is a strategic investment for the company and a clear signal of Greenock's importance. But it's not only manufacturing; National Semiconductor has also built an R&D presence on the site."

And there are other manufacturing success stories. "Seagate has increased the size of its R&D operation in Northern Ireland, as well as extending its manufacturing plant," said Boyd. "Meanwhile, International Rectifier is putting a lot of its process development into its Newport facility."

The IR fab in Newport is currently experiencing high demand for its new products – some of which are being manufactured on a 90nm process – while NXP's Hazel Grove site is running flat out to meet demand for devices such as power mosfets.



In Scotland, Semefab has invested more than £13 million in manufacturing equipment in order to support the commercialisation of micro and nanotechnology based products.

Semefab is making ultra low pressure sensors for US company Acuity. These sensors are likely to be used in applications such as medical ventilation and respiration, and industrial pressure and flow measurement.

Semefab uses a deep reactive ion etching process and can undertake through wafer etching for membrane structures at very high rates.

Now, the company is close to opening a third manufacturing foundry. Called CMOS3, this 1200m² class 100 facility will run devices on 6in wafers, with feature sizes as small as 0.8µm.

The academic sector is also a major contributor to the global profile of UK electronics. In global university league tables, UK universities are second only to those in the US and universities such

as Glasgow and Edinburgh are undertaking fundamental research crucial to the industry's future.

Glasgow, for example, is a leading player in a £23m European project focusing on how to make reliable chips at the nanoscale.

The project, called MODERN – MOdelling and DEsign of Reliable Nanoelectronic devices – is developing tools and methodologies to help bring high yields from unreliable devices.

Professor Asen Asenov, a device modelling expert, is leading Glasgow's involvement. He said: "We invested heavily in variability research and in the development of variability simulation tools at a time when the industry was not fully aware of the gravity of the forthcoming variability problem. Now we are in the position to make significant contribution in tackling the variability challenge."

While the UK electronics industry is clearly enjoying the benefits of recovery in the global demand for semiconductors, there remain several challenges for the future. Boyd listed some. "Cost; while the UK is part of a global industry, it isn't a low cost location. Talent; we have a problem in that we are educating foreign nationals, rather than growing our own talent. Government awareness; other governments, such as those in India, China, France and the US, are making major investments."

Since the semiconductor industry is truly global, the UK faces competition on the business, science, engineering and technology fronts from around the world. While the investments being made to challenge US dominance by many regions around the world present a market opportunity, they also present a competitive threat.

Funding for start ups remains a continuing concern. Devices designed for leading edge processes require a huge amount of investment, often over several years. The recent financial crisis has seen many investors who were previously keen to back electronics companies turn their attention to other, apparently less risky, sectors. While

money is available, many venture capitalists are far more selective than in the past – even pulling the plug on current investments – and their relative lack of enthusiasm is not helped by the suspicious nature of global stock markets when it comes to flotations.

But one of the overriding concerns for the UK electronics industry remains skills. The UK's electronic engineering community is getting older and fewer people are entering the industry. There are, nevertheless, talented graduates.

Boyd: "The industry is showing resilience, with renewed investment, more recruitment and a quite spectacular market share growth for companies such as Imagination and ARM."

Boyd noted: "I recently received an Honorary Doctorate from The University of Glasgow in front of 374 graduates from Faculty of Engineering. Many of those were graduating in electronics. I couldn't fail to be impressed by the bright and talented young people graduating. One person is completing his PhD in nanophotonics and staying with the university to look at commercialising his research; another with a first class Masters in Avionics is joining Rolls-Royce, while another is going to complete her Masters at MIT. I'm sure this is not unique to Glasgow. If we can harness the emerging talent pool, then the future is bright."

Boyd and organisation like the National Microelectronics Institute recognise that, to be successful in the future, the industry must choose activities in which it can lead the world and sustain that lead. Public investment will play its part and there is concern that long term investment may be sacrificed in favour of short term expediency.

"With a strong framework supporting innovation and excellence," Boyd concluded, "the UK will be up for the challenge and ideally placed to thrive in 21st Century."

