

We understand silicon design, modulation and telecom network design. There are not many places in the world with that mix of skills.

You can find pockets of communications expertise all around England, from the north east, where RF Micro Devices has the GaAs fab it bought from Filtronic, down to Plymouth, where a reborn Plessey Semiconductors recently introduced a bipolar process to support advanced communications front ends. But there are two main centres of communications silicon in England: Bristol and Cambridge.

The University of Cambridge plays an important, if sometimes indirect, role in the east of England. IP supplier ARM, which found success in the communications space through Nokia's use of its architecture in the 1990s, traces its heritage back to the university through original parent Acorn Computers. Displaylink, the supplier of USB based video transmission devices, was cofounded by Cambridge alumnus Quentin Stafford-Fraser. He worked with Acorn cofounder Andy Hopper at the Olivetti Research Laboratory in Cambridge. Hopper himself helped found communications silicon startup Virata, ultimately acquired by Conexant Systems.

A cluster of design consultancies has helped give birth to many of the region's communications specialists. Set up by two Cambridge graduates in 1960, Cambridge Consultants helped give birth to one of England's most successful silicon producers CSR, a company that now has quarterly sales of approximately £100million. Another spinoff from the consultancy, AlphaMosaic, was bought by Broadcom in 2004.

Cambridge's other big design consultancy, The Technology Partnership, has become the focal point for another cluster of communications silicon and software development. TTPCom emerged from the consultancy as a separate entity in the late 1990s, selling IP to mobile phone makers before being bought by one of them. Although Motorola closed TTPCom only a few years after buying the Cambridge based IP developer, its influence continues.

One clear descendent of the legacy is Cognovo, headed by TTPCom's founders.

# A tale of two cities



Cambridge and Bristol are driving the global communications industry. By **Chris Edwards**.

Charles Sturman, now vice president of sales and marketing at Cognovo, was employee number 15 at TTPCom. After the company closed, he says: "I found myself at ARM, commercialising the Ardbeg processor technology."

A conversation with Sturman's former employers, who had set up a new company to address software defined radio, led to ARM deciding to transfer Ardbeg technology to Cognovo.

Other former employees of TTPCom are now working for a group of Far Eastern chipmakers – companies that bought the TTPCom IP before Motorola closed the operation in 2008. Mediatek, MStar Semiconductor and Sunplus Technology now have subsidiaries in Cambridge doing high level designs for the chipmakers.

"Along the way, they built a local team to work on the IP they had licensed. When TTPCom closed down, they pulled a number of staff into these locations to do

high level design in Cambridge," says Sturman.

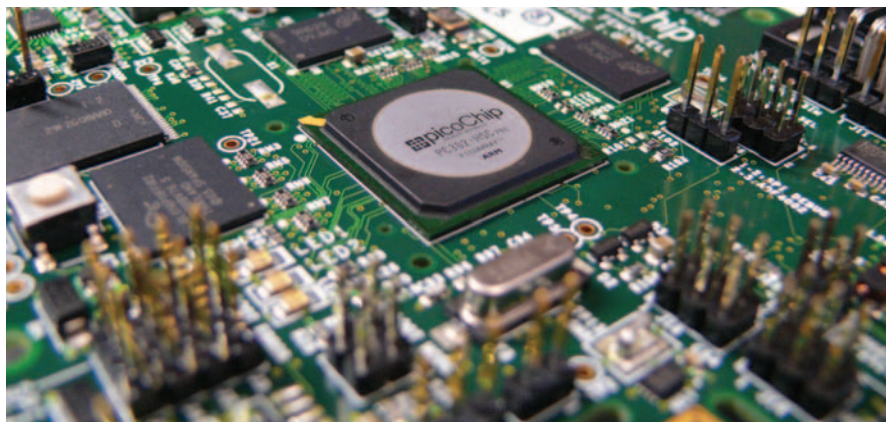
In contrast to the government driven efforts to attract foreign firms to set up design centres, Fry calls these moves 'serendipitous inward investment'.

Like ARM, Cognovo is an IP supplier, rather than a fabless chipmaker. Richard Fry, vp of business development, says: "The balance is shifting towards IP licensing. The sums of money needed are less than for a fabless company."

Fry says the potential money from a successful initial public offering for a fabless company is high. "But you have to get into a tier one player to make it work. But tier ones are very concerned about logistics and supply chains. There is a very big hurdle to get over. You have somehow got to get big enough to over that. IP provides for a much softer start."

Bristol's Icera provides an example of the level investment that can be needed

*picoChip's silicon devices are being aimed at the rapidly developing market for femtocells.*

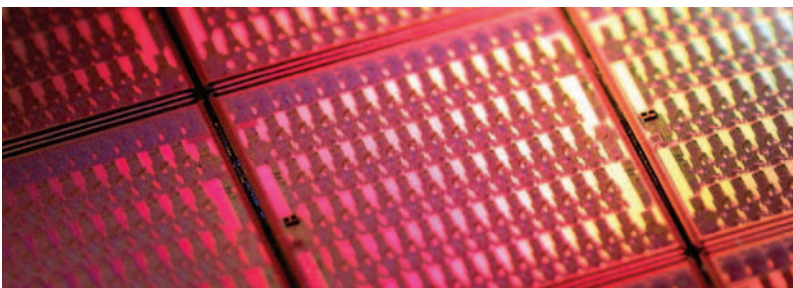




for a fabless company specialising in wireless communications. Competing with majors such as Qualcomm, Icera has raised over the course of eight years some \$260million.

Based in nearby Bath, Picochip remains a chipmaker, but has moved increasingly into software provision. Equipment builders who have traditionally bought ics have decided to spend less on development themselves and push that work onto the silicon providers. Picochip, which started off 10 years ago developing a general purpose architecture for communications, is now homing in on a specific market: femtocells.

“We now have to architect the devices with an incredibly deep system level understanding. Someone has to go and analyse the requirements for a femtocell and turn that into a chip,” says Andy Gothard, pictured above, director of communications at Picochip. “We can do what we do because of the blend of skills in the south west. We need to understand silicon design, modulation and telecom network design as well.



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Bristol gained its recent silicon heritage from Inmos, which was absorbed into STMicroelectronics, which in turn put the Transputer inside set top box chipsets. But the rise of mobile communications companies along the M4 corridor has helped to promote systems expertise in communications.

“For years, we bemoaned the fact that we didn’t have a home grown chip industry. Perhaps we didn’t have the focus that making semiconductors was, in and of itself, an interesting thing to do. What we do have is a focus on building systems, making things that work,” says Gothard.

“The most highly prized guys here are those that take the step back and work out what the overall system requirement is and how it all fits together.”

The question for the English communications silicon industry is whether the current crop of companies is the last. The recession saw a number of VC firms pull out of even active investments, forcing those startups to shut up shop. And new companies are not finding it any easier.

Graham Curren, ceo of Berkshire based ic design specialist Sondrel, says: “Apart from the established companies, such as CSR or those with long standing VC funding, such as Icera or Picochip, there are virtually no large digital designs being done in the UK.”

Because an increasing number of large, digitally oriented designs are now being done in China, Sondrel has opened a design centre there. “It’s not easy having a base in China, but I think it is vital to address the Asia network and you have to have a local presence.”

*Gothard, left: “The most highly prized guys here are those that take the step back and work out what the overall system requirement is and how it all fits together.”*

*Below: The University of Cambridge plays an important role in electronics in the east of England.*



All of the fabless chipmakers have some level of involvement in the China market. Some, such as digital tv specialist Frontier Silicon, have moved a large part of their operations to China.

VCs have recommended a move away from digitally intensive designs, with a focus on specialist markets such as ultralow power wireless as possible target areas that do not need the level of investment that cellular communications demand. And startups have appeared.

Carson Bradbury, founder of startup network Cre8Ventures, points to companies such as Blu-Wireless in Cambridge and Southampton based Cascoda as examples of early stage companies putting together their own

communications devices. Like a number of startups in today’s funding poor environment, Cascoda works in design services to maintain an income stream while the company works on its own project.

As the number of available sockets declines with the advance of silicon integration, England may provide a microcosm of the rest of the communications silicon industry. In an environment where the big get bigger, former chipmakers vie to provide IP to the majors and a network of much smaller suppliers takes on the specialised interfaces before they themselves are mopped up by the majors.