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Pressing ahead

Empowering the next generation of smartphone displays with Cambridge Touch Technologies

Looking to bring affordable pressure-sensitive multi-touch technology to billions of smartphone and tablet users worldwide, Cambridge Touch Technologies is a company with a vision. Catalyst spoke to CEO and co-founder Corbin Church about the story so far and the road ahead.

In a little over ten years, interacting with our smartphone or tablet screens via touch technologies has become a habitual act ingrained into the fabric of our daily lives. From bus stops to boardrooms, the way we organise our schedules, manage our relationships and stay connected to the wider world is defined by the swipe or tap of the screen never far from our sides.

Despite the rapid and almost ubiquitous uptake of the smartphone, manufacturers have to date been unsuccessful in their attempts to add the obvious next dimension to the touchscreen offering: pressure-sensitive touch technology which can be used with multiple fingers. Which is, in essence, the reason behind the formation of Cambridge Touch Technologies (CTT), as CEO and co-founder Corbin Church goes on to explain.

“Myself and the other two co-founders [Arokia Nathan, Chief Technology Officer, and S.B. Cha, Chairman] have each been in this industry for 15 to 20 years now, and we spotted an opportunity,” he says. “We certainly weren’t the first people to come up with the idea of being able to measure the pressure of finger touches on a mobile phone – many have tried but failed to make it a commercial reality. We came together in 2011 because we believed that our combined experience gave us a real understanding of what was required to make pressure-sensitive technology interesting and feasible in terms of mass production.”

Currently, touchscreen technology is based around an approach known as projective capacitive (PCAP) touch, to be found in all the leading smartphone and tablet brands. A piezoelectric film is incorporated into the display stack-up which changes its properties and delivers a charge when a touch is applied to it. With the correct sensing electronics, the level of charge delivered is proportionate to the amount of pressure applied, which makes pressure-sensitive technologies an achievable reality. Nevertheless, the mainstream adoption of such a technology had proved elusive until the launch of the iPhone 6s in September 2015.



We want to be one of the key technology enablers for cost-effective, scalable, mass-deployed 3-D touch technology.



“By that point, we’d been working on our pressure-sensitive technology for a few years and had some interesting IP and had made some IP filings, but this changed everything,” says Corbin. “The fact that Apple, the world’s biggest brand, had decided to invest in this kind of technology was really positive in terms of how it is perceived as an integral part of a smartphone’s capabilities. It generates demand.”

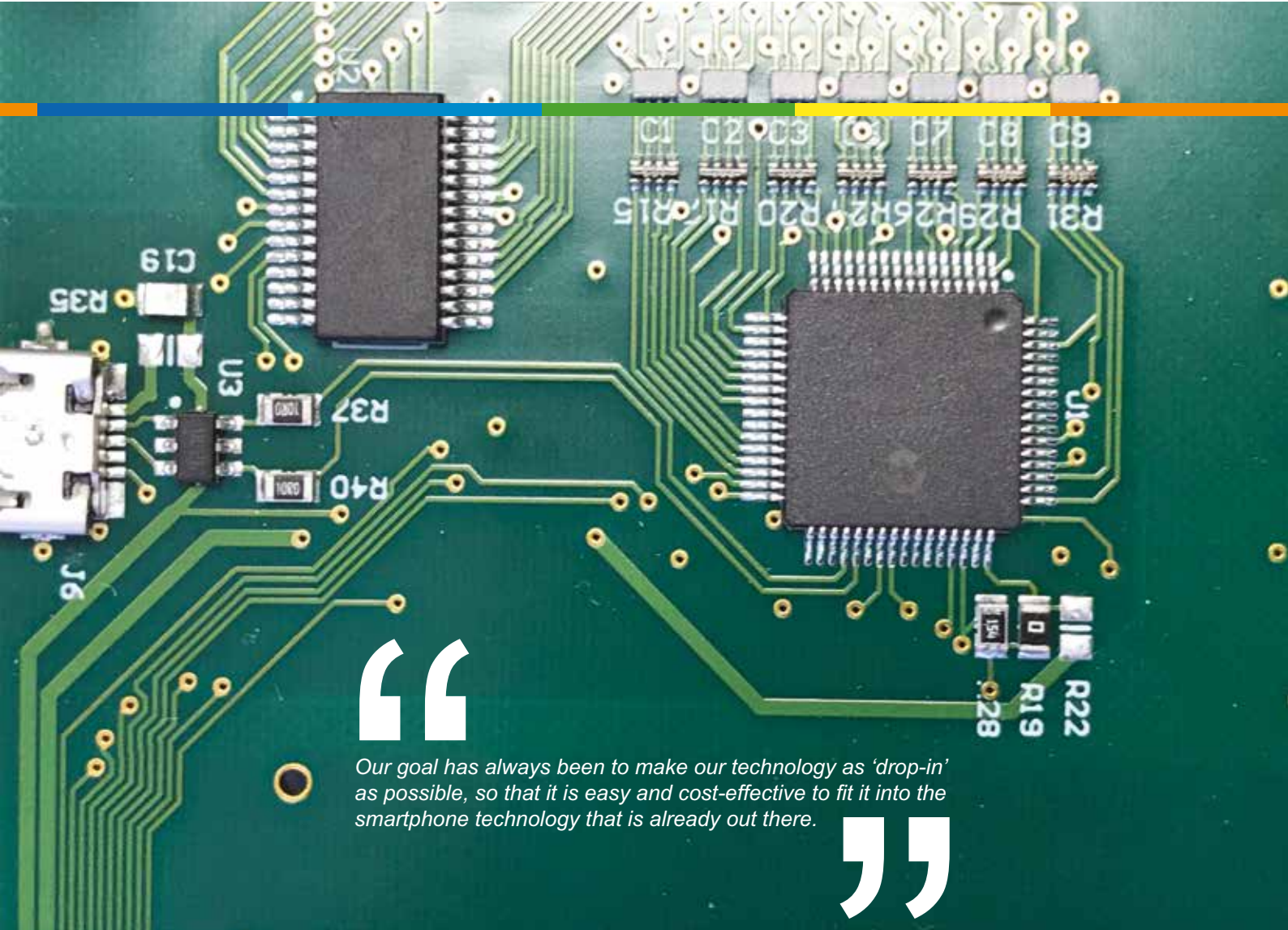
As with most first-generation technologies, however, there are some significant drawbacks to Apple’s 3-D touch system, as Corbin points out. “It’s a very complex technology which makes it not very scaleable in terms of product size,” he says. “At the moment, it’s not incorporated in anything larger than a smartphone. It’s also very expensive, so that means it’s only going to be available in a few premium smartphone models such as the latest Apple or Samsung products.”



Assembled 4.3" force sensing touch platform. The thin glass force sensor is seen at the top, and built using a high volume manufacturing process for smartphone touch panels (Photo courtesy of Cambridge Touch Technologies)

In contrast, the 3-D Multi-Touch technology devised by CTT is simpler, more powerful, more scaleable and cheaper. Using a low-cost force sensor that needs no external power, it can detect both force and location of touch at the same time without adding any extra thickness or weight to the display. Unlike Apple’s offering, the 3-D Multi-Touch approach also responds to two or more touches simultaneously, offering potentially huge new opportunities to developers looking to create powerful multi-finger apps for gaming and other sectors.

“We consider ourselves as a next-generation technology which is more capable than what is currently on the market because we have multi-



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Our goal has always been to make our technology as ‘drop-in’ as possible, so that it is easy and cost-effective to fit it into the smartphone technology that is already out there.

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CTT technology resides inside a silicon integrated chip (Photo courtesy of Cambridge Touch Technologies)

touch capability,” says Corbin. “Our approach is less complex, so it’s simpler, cheaper and uses less power, meaning longer battery life. It’s also highly manufacturable. This means it can be scaled and will work not just in smartphones, which is where Apple is limited to today, but it could also go into tablets, automobile displays and so on. Our goal has always been to make our technology as ‘drop-in’ as possible, so that it is easy and cost-effective to fit it into the smartphone technology that is already out there. That’s the key to getting it adopted on a truly global scale.”

Currently, CTT is in the initial commercialisation stages and is working with well-known smartphone manufacturers and their supply chains to develop the engineering samples which are a precursor to market entry, expected as early as next year. The company expects to grow its current team of 12 to about 15 to 20 employees within the next six months. As it draws towards its first commercial application, it’s an exciting time for CTT, but not one without challenges.

“The smartphone business is notoriously fast with extremely short design cycles,” explains Corbin. “So we’re always trying to move as fast as our customers want to move, matching those very short design cycles. And to do that, we need to be able to grow and to find the right people to work with us – even in a great talent pool like Cambridge, that is not always easy.”

Nevertheless, the opportunities are vast, as Corbin points out when describing at where he hopes CTT will be in five years’ time. “I think if we can hit the price points we’re aiming for, then you’re going to start seeing this kind of 3-D pressure-sensitive touch technology being adopted in all kinds of devices, not just in premium phones,” he says. “We want to be one of the key technology enablers for cost-effective, scalable, mass-deployed 3-D touch technology, working with multiple OEMs [original equipment manufacturers] and partnering with them (and their app

developer ecosystem) to develop improved and exciting new experiences for people using their smart devices.”

It’s an ambitious vision, but one which has been endorsed by some big hitters in the investment world. As a VC-backed company, CTT’s three current investors are Cambridge Enterprise (the funding arm of the University of Cambridge), Amadeus Capital Partners (co-founded by Cambridge hi-tech entrepreneur Hermann Hauser) and Parkwalk Advisors of London.

Aside from smartphones and tablets, Corbin also sees huge potential for 3-D touch technology in other sectors. “Because the technology measures how hard the sensor is touched, it could be a really important safety mechanism to gauge whether an instruction is deliberate or not,” he says. “So this could be really valuable in automotive displays, or in medical or defence applications for example.”

Having begun in what he describes as a “classic, nimble start-up” model, CTT is ready to move to a new level of exposure and influence in one of the world’s most valuable markets. “It’s exciting to be developing technology that we believe will be adopted on literally hundreds of millions, if not billions, of touch devices,” says Corbin.

“It’s going to influence how people interact with their devices and in small ways it will help improve their day. They may get some added convenience, they may be using a 3-D touch app that makes them smile, they may save some battery life which helps keep them connected for longer. Once this kind of technology becomes ubiquitous, then we will really see what it’s capable of.”

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