Apple Said to Be Exploring Switch From Intel Chips for Mac

By Adam Satariano, Peter Burrows and Ian King
Nov. 6 (Bloomberg) -- Apple Inc. is exploring ways to
replace Intel Corp. processors in its Mac personal computers
with a version of the chip technology it uses in the iPhone and
iPad, according to people familiar with the company's research.
Apple engineers have grown confident that the chip designs
used for its mobile devices will one day be powerful enough to
run its desktops and laptops, said three people with knowledge
of the work, who asked to remain anonymous because the plans are
confidential. Apple began using Intel chips for Macs in 2005.
While Apple is now committed to Intel in computers and is
unlikely to switch in the next few years, some engineers say a
shift to its own designs is inevitable as the features of mobile
devices and PCs become more similar, two people said. Any change
would be a blow to Intel, the world's largest processor maker,
which has already been hurt by a stagnating market for computers
running Microsoft Corp.'s Windows software and its failure to
gain a foothold in mobile gadgets. A move by Apple may lead
others to follow suit.
"Apple is a trendsetter, and once they did their own chip
many others may pursue a similar path," said Sergis Mushell, an
analyst at Gartner Inc. "If mobility is more important than
functionality, then we will have a completely different
environment than we are dealing with today."
As handheld devices increasingly function like PCs, the
engineers working on this project within Apple envision machines
that use a common chip design. If Apple Chief Executive Officer
Tim Cook wants to offer the consumer of 2017 and beyond a
seamless experience on laptops, phones, tablets and televisions,
it will be easier to build if all the devices have a consistent
underlying chip architecture, according to one of the people.

ARM Technology

Bill Evans, a spokesman for Cupertino, California-based
Apple, declined to comment. Intel referred questions on Apple's
plans to Apple.
Intel shares fell 0.5 percent to the equivalent of $21.72
in German trading at 10:59 a.m. Frankfurt time, while Apple
climbed 0.4 percent to the equivalent of $587.15.
Apple announced the switch to Intel chips seven years ago
because they ran faster and generated less heat than the
products built by Motorola Inc. and International Business
Machines Corp. that Apple had used. The Mac maker has in the
past few years acquired chip companies, added engineers and
created designs based on technology from ARM Holdings Plc for

its best-selling iPhone and iPad.

ARM, based in Cambridge, England, licenses chip designs and the technology behind them to phone-chip companies such as Qualcomm Inc. ARM shares rose 4.8 percent to 728 pence at 10:10 a.m. in London, after jumping as much as 5.8 percent.

'Ambitious Plans'

Semiconductor development was part of Apple's management overhaul announced Oct. 29. Chip research is being led by Bob Mansfield, whom Cook put in charge of a new group called Technologies. In the statement announcing the leadership changes, Apple said that its semiconductor teams have "ambitious plans for the future."

Mansfield has overseen Apple's investigations into other chip alternatives, though he didn't have authority over some of the computer scientists who specialize in writing the software that govern these chips, according to one person. These people formerly worked for software chief Scott Forstall, who left the company in the management shakeup.

While Forstall was focused mostly on improving the mobile iOS operating system his group created, Mansfield has been more interested in melding iOS with the Mac to create a more uniform experience for all Apple devices, this person said. Craig Federighi, who now runs development of all of Apple's software, is also considered likely to push for this more integrated experience, the person said.

Thinner, Smaller

The shift is part of Apple's push to make products thinner and smaller without sacrificing performance. It is aiming to move computing tasks that now require separate parts into the central chip, said one person, who said this has long been an interest of Mansfield's.

To make this switch, Apple could hire a contract manufacturer such as Taiwan Semiconductor Manufacturing Co. to build the Apple-designed component based on ARM's technology, similar to how Samsung Electronics Co. now builds the semiconductor inside the iPhone and iPad. Intel manufactures its own chips. Apple's $121.3 billion in cash and investments would give Cook the ability to tap new suppliers.

In addition, Cook has experience managing such a sweeping technological shift. When Apple made the switch to Intel, Apple co-founder Steve Jobs put Cook in charge, having him negotiate terms of the deal with Intel and organize the supply chain so the products were ready for release on time.

Past Lessons

To be sure, no final decision has been made and Apple may opt to continue working with Intel for years to come. For Apple, the risk of turning its back on Intel is a repeat of its situation in 2005, when it had to abandon the PowerPC chips -- made by Motorola and IBM -- it had used in its Mac line. At the time, its processors had fallen so far behind Intel's in performance that it decided to team up with the chipmaker. The first Mac models running Intel chips were unveiled in January 2006.

Now, as consumers and businesses increasingly turn to smartphones and tablets, mobile devices like Apple's are playing a leading role in component development. Smartphone shipments rose 62 percent last year, while sales of the iPad and other tablets more than doubled, according to market researcher IDC. By contrast, the PC industry grew just 1.7 percent.

The lackluster growth is hurting Intel. The Santa Clara, California-based company recently reported its first sequential decline in third-quarter sales in two decades.

Intel's Challenge

While Intel so far has failed to parlay its more than 80 percent market share in PCs into a slice of the mobile-phone and tablet market, it has forced all of its rivals out of the PC-chip business except Advanced Micro Devices Inc.

Intel spent $10.8 billion on new plants and equipment last year and a further $8.4 billion on research and development, and says its manufacturing-process technology is more than a year ahead of other chipmakers'. Only South Korea's Samsung spends about as much on its facilities.

As the PC market evolves, Intel is increasingly designing its processors to work better while consuming less power, an effort to compete in the world of limited battery power and mobile devices. Its latest Clover Trail product is designed to fit into the thinnest tablets and laptops without requiring a fan to cool them.

Mobile Shift

Meantime, Apple's success in mobile computing has been central to the rise of ARM technology and its expansion into larger devices, such as tablets, that have challenged the role of larger computers running Intel chips. Apple engineers won a fight with Jobs to have the iPad built on phone chips --which use ARM technology -- rather than Intel's PC processors, according to Jobs biographer Walter Isaacson.

Apple's technologists have grown more concerned in recent years about Intel's ability to create lower-power chips. The computer maker has brought out thinner, lighter products such as the MacBook Air that have less room for the batteries needed to keep Intel's powerful chips running all day, according to three people familiar with the relationship.

The concerns came to a head in late 2011. Apple was working on thinner versions of its MacBook line, featuring its power-hungry high-resolution retina display, and Intel had failed to convince Apple executives it was serious about focusing on lower-power chips. Apple executives, including Mansfield, met repeatedly with their Intel counterparts to share their questions, and to tell the chipmaker it was examining ways to use its own chips in the Mac line, one of the people said.

Intel's Pledge

Intel helped allay some of Apple's most pressing concerns when it announced that it would develop chips that don't require as much power as existing chips, this person said. That pledge to prioritize power conservation led some within Apple to conclude the company has a few years before it would need to make any change, if it makes a switch at all, this person said. And if Apple can't design ARM-based chips that are far more powerful than current models, the company would probably need to stay with Intel to satisfy Mac power users, who need lots of computing performance for tasks such as developing software or doing high-end graphics.

"This is a geek technical issue, but the ultimate question is could Apple keep up with what Intel is doing in terms of speed and graphics?" said Tim Bajarin, an analyst at Creative Strategies Inc. "At this moment, I'm not sure."

Even so, Apple continues to explore moving in a new direction. The iPhone, iPad and Mac operating systems are increasingly sharing features. Yet the different chip technology makes it difficult to build features that work together seamlessly. For example, the thousands of applications for the iPhone and iPad and some of Apple's newest features, such as the Siri voice-command tool, don't work on Intel-based Macs.

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--Editors: Jillian Ward, Reed Stevenson

To contact the reporters on this story:
Adam Satariano in San Francisco at +1-415-617-7204 or
asatariano1@bloomberg.net;
Peter Burrows in San Francisco at +1-415-617-7191 or
pburrows@bloomberg.net;
Ian King in San Francisco at +1-415-617-7171 or
ianking@bloomberg.net

To contact the editor responsible for this story:
Tom Giles at +1-415-617-7223 or
tgiles5@bloomberg.net