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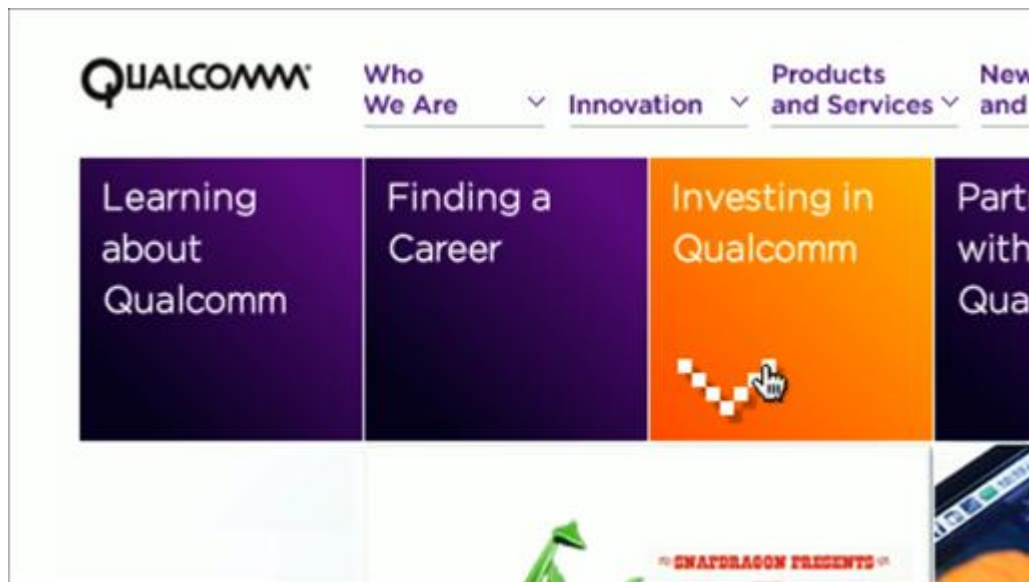
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TECHNOLOGY | OCTOBER 20, 2011

## A Look Inside Apple's iPhone 4S

By **ARIK HESSELD AHL** | All Things Digital

Apple's newest phone produces a big winner: Qualcomm, whose chips have replaced many from Intel's Infineon. ATD's Arik Hesseldahl has details on Digits.

From the outside, [Apple](#) Inc.'s iPhone 4S looks an awful lot like its predecessor the iPhone 4. But tear it apart, and there's a big difference – for one, there's less [Intel](#) inside.

Research firm IHS iSuppli took the new phone apart and found that chips made by [Infineon](#), whose wireless operations Intel bought last year, have been bounced out of the 4S in favor of a new set of chips from [Qualcomm](#) Inc.

"Qualcomm is the big winner here," said Andrew Rassweiler, an analyst with IHS iSuppli who conducted the teardown. "It is selling Apple a whole suite of chips that adds up to about \$14 to \$15 per iPhone."

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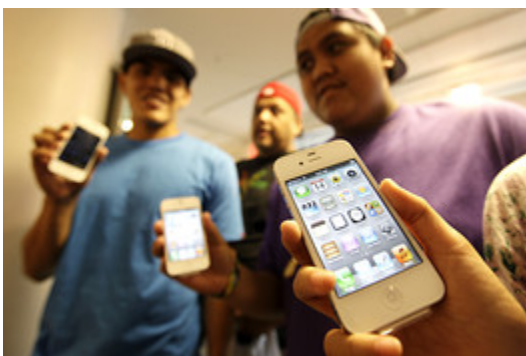
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Infineon had previously supplied Apple with a chip known as a baseband processor that helps connect the phone to wireless networks.

Infineon still has a small chip in the iPhone, but Mr. Rassweiler said it's far less significant,

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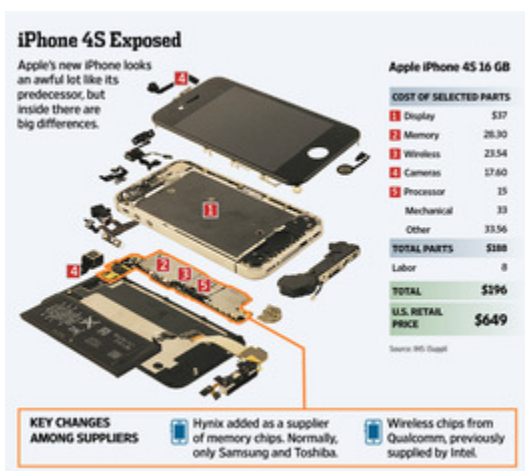
Associated Press

The Leon Guerrero family of Dallas show off their new Apple iPhone 4S phones they purchased at a Sprint store in San Francisco.



One of the top draws to Apple's iPhone 4S is its new speech recognition software, called Siri, that's designed to talk back. In San Francisco, Ian Sherr hears some new owners' favorite questions.

device.



[Toshiba](#). In the phone that Mr. Rassweiler's team tore down, however, the memory chips came from Samsung rival Hynix Semiconductor.

That's unusual, iSuppli said, because Hynix isn't typically seen as a first-run supplier, a position reserved more the most reliable vendors.

and a lot less costly, than the one it supplied Apple before.

"It's almost like Apple threw them a bone with a 50-cent part after they lost a much more high-profile chip that cost about \$10," he said.

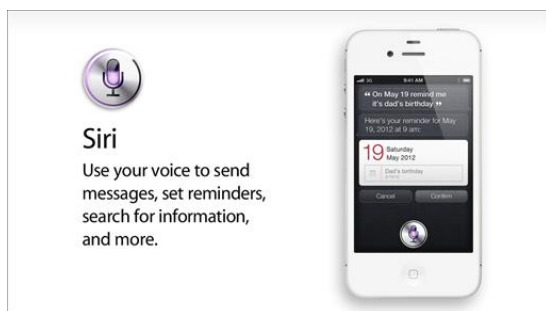
The switch is a setback for Intel Corp., which dominates chips for desktops and servers but has struggled to get a foothold in the exploding market for smartphones and tablets. Intel spent \$1.4 billion to acquire Infineon's wireless chip operations last year in a move seen as an attempt to help close that gap. The chip giant has struggled to win business for its own Atom line of mobile-device microprocessors.

Intel spokesman Chuck Mulloy declined to comment. Apple didn't respond to a request for comment.

Phone manufacturers routinely prevent their suppliers from disclosing their role publicly, so iSuppli regularly tears up devices to figure out who the vendors are and price out each part. The exercise can reveal details of who's up and who's down in the supply chain and give a fair idea of how much money Apple makes on each

In the case of the iPhone 4S, Mr. Rassweiler estimates that Apple buys parts worth \$188 for the 16-gigabyte version, \$207 for the 32-gigabyte version and \$245 for the 64-gigabyte version. Apple sells the phones in the U.S. for \$649, \$749 and \$849, respectively – although carriers will cover \$450 of the price if buyers sign up for a two-year service plan.

The costliest components are the ones that determine the price: Memory chips. Apple has been known in the past to rely mostly upon South Korea's Samsung, the world's largest supplier of memory, and from Japan's



It's what's inside that counts - such is true in the case of the new iPhone, the iPhone 4S. Should you upgrade? Walt Mossberg gives his assessment and tests the personal assistant feature, Siri, live on today's special edition of Digits.

Warning against a conclusion that Apple has bounced Samsung out of the phone, Mr. Rassweiler said memory chips are a commodity and can differ from iPhone to iPhone, as handset makers like to maintain diverse supply.

Also, Samsung appears to have maintained its more important role as manufacturer of the Apple-designed A5 processor, which provides the iPhone 4S – as well as the iPad 2 -- with most of its computing horsepower.

Apple started using its own chip designs in the iPhone and iPad beginning in 2010 with the release of its first tablet, and has turned to Samsung to make them.

Some in the industry have speculated that Apple might extend its legal dispute to the factory floor by taking its manufacturing contract to Taiwan Semiconductor Manufacturing Co., the huge chip manufacturing foundry. But Mr. Rassweiler says there's no sign of that on the latest A5 chips.

The new iPhone's highly regarded 8-megapixel camera is another mystery. It's the one part whose vendor Mr. Rassweiler couldn't identify, and he said Apple appears to have taken pains to hide the supplier's identity.

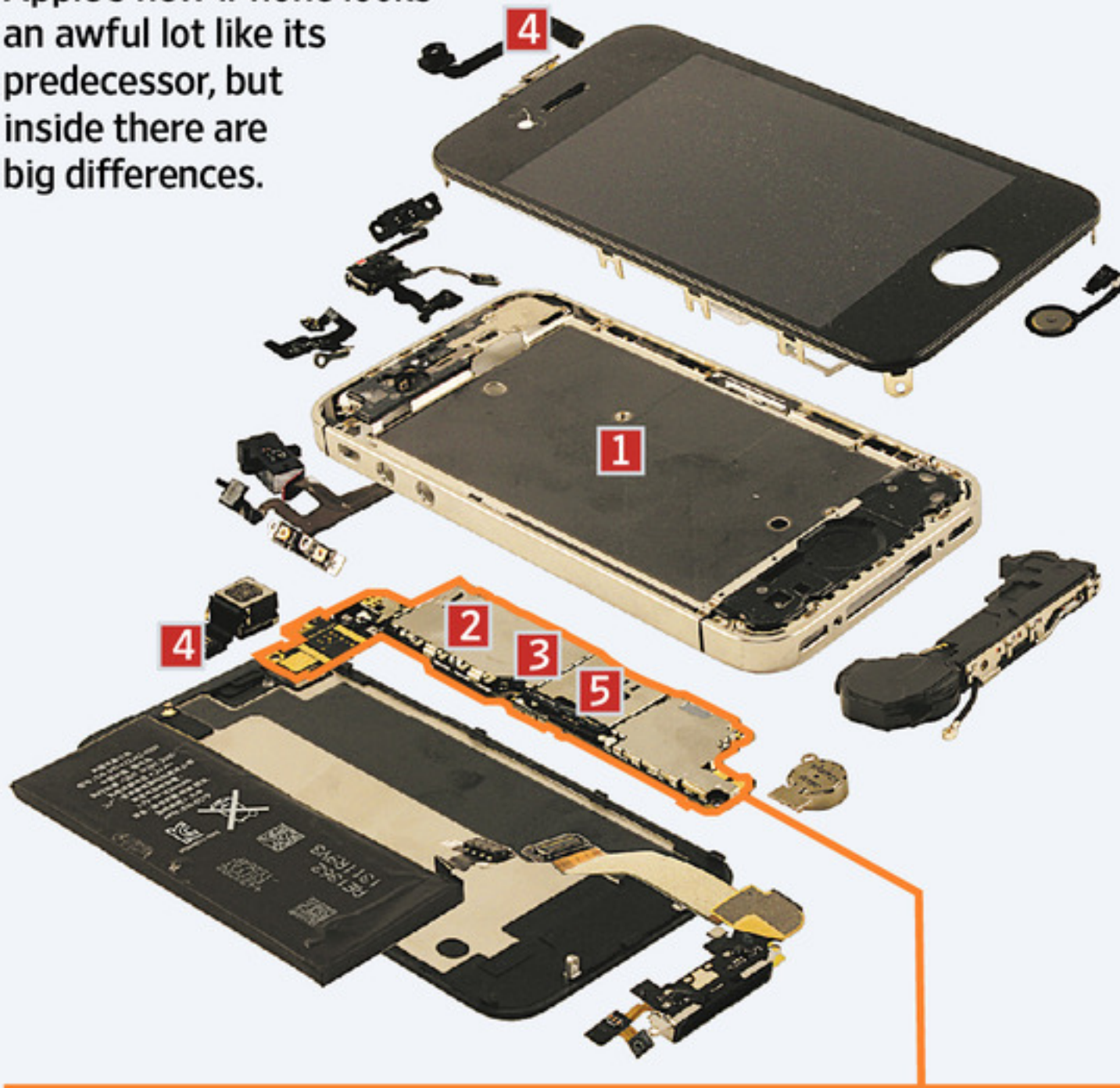
"We don't know exactly who makes it," Mr. Rassweiler says.

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# iPhone 4S Exposed

Apple's new iPhone looks an awful lot like its predecessor, but inside there are big differences.



## Apple iPhone 4S 16 GB

### COST OF SELECTED PARTS

<b>1</b> Display	\$37
<b>2</b> Memory	28.30
<b>3</b> Wireless	23.54
<b>4</b> Cameras	17.60
<b>5</b> Processor	15
Mechanical	33
Other	33.56
<b>TOTAL PARTS</b>	<b>\$188</b>
Labor	8
<b>TOTAL</b>	<b>\$196</b>
<b>U.S. RETAIL PRICE</b>	<b>\$649</b>

Source: IHS iSuppli

### KEY CHANGES AMONG SUPPLIERS



Hynix added as a supplier of memory chips. Normally, only Samsung and Toshiba.



Wireless chips from Qualcomm, previously supplied by Intel.