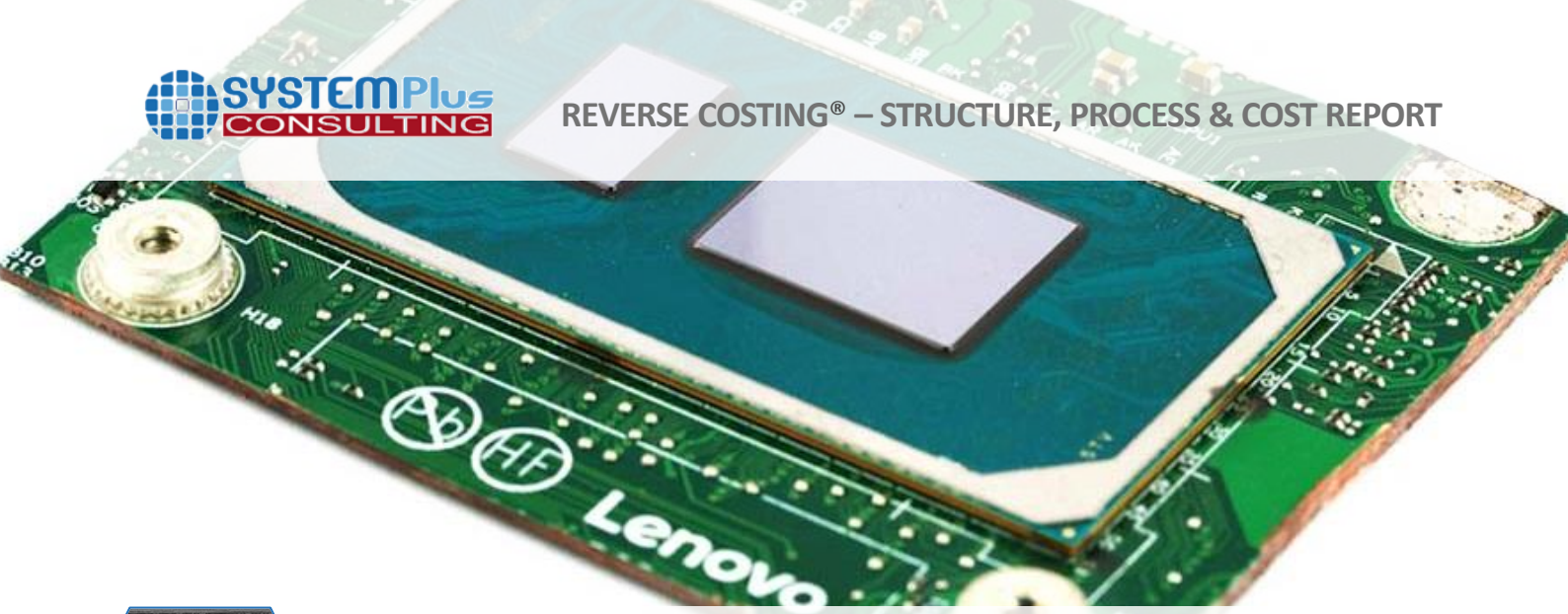
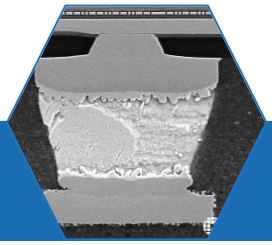
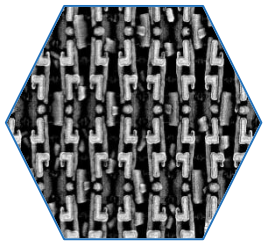




Intel Tiger Lake i7 CPU

Intel's 11th-generation core processor using its latest 10nm SuperFin process.



Title: Intel Tiger Lake i7 CPU

Pages: 130

Date: August 2021

Format: PDF & Excel file

Reference: SPR21636

The CPU market is constantly growing. According to Yole Développement's Processor Quarterly Market Monitor, the processor market generated more than US $60B in 2020, with more than 100 million CPUs shipped in Q1 2021. This market is competitive and dominated by a few major players, including Intel – whose next-generation processors could potentially increase the company's market share.

Tiger Lake is the name of Intel's 11th-generation core processor. It is the latest laptop processor from Intel and uses the company's 10nm SuperFin process technology and its 14nm processor chip. This 'two-chip solution' approach allows Intel to split off some functions into a less advanced, cheaper process node. The chips are designed for mainstream, powerful, ultralight laptops, and Intel's Tiger Lake i7 processors have enhanced performance coupled with lower power consumption. Moreover, the chip includes Intel's new XE graphics.

This 11th-generation core processor uses a 10nm FinFET process with enhanced performance compared to the previous 10nm process. The chip includes a large, embedded graphic – in fact, the Intel Iris XE graphics section occupies close to a third of the chip area. For improved power management and low-power performance, the Intel Tiger Lake design includes several fully integrated voltage regulator blocks. The Intel Tiger Lake i7 SoC also features a very large graphics processing unit.

A full teardown was conducted to provide insights regarding the Intel Tiger Lake i7 CPU, and this report details the die layout in the package and features multiple analyses, including the 3D x-ray images. A package analysis reveals a BGA package that integrates two processors in flip chip position. This package includes two of Intel's chips: one CPU using 10nm SuperFin and another CPU using14nm FinFET. Our floorplan analysis reveals the high-level chip architecture and an estimation of IP block area. Our front-end analysis uses a high-resolution TEM cross-section to expose Intel's 10nm process, along with delayering images, while our back-end analysis uses CT-scan (3D x-ray) to reveal the layout structure of the package and the dies. Furthermore, this report provides high-resolution images, a materials analysis, and a detailed manufacturing process. Lastly, an estimation of the wafer cost, die cost, and component cost is furnished.

COMPLETE TEARDOWN WITH

- Detailed photos
- Precise measurements
- Materials analysis
- Floorplan
- TEM on 10nm die
- 3D x-ray images
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis

TABLE OF CONTENTS

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Belinda Dube *is working for System Plus Consulting as an Engineer & Analyst, Semiconductor Memories. Belinda is also engaged in the development of reverse engineering & costing analyses with the power electronics and compound semiconductors team.*

Don Scansen *has partnered with System Plus Consulting to launch the new die architecture and front-end process analysis of advanced SoC devices including APU, CPU, GPU, and FPGA. Don previously supported clients ranging from individual patent owners to Fortune 500 companies providing competitive analysis and intellectual property support. He holds a PhD in electrical engineering.*

Véronique Le Troadec *has joined System Plus Consulting as a laboratory engineer. Coming from Atmel Nantes, she has extensive knowledge in failure analysis of components and in deprocessing of integrated circuits.*

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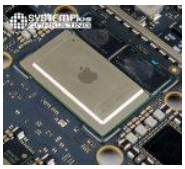

Apple M1 System-on-Chip

A deep-dive analysis of Apple's first in-house CPU for Mac.
December 2020

Qualcomm Snapdragon 888 System on Chip with 5G Modem

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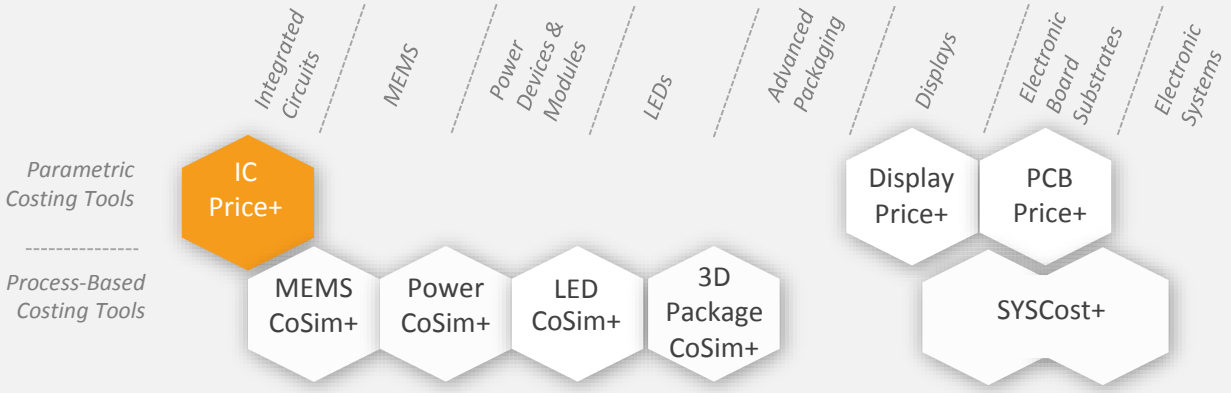

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