Press Release

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LYON, France

Application processor: All-in-one solution for the computing challenges of the next decade[1]

Quarterly Market Monitor

MARKET DYNAMICS:

- 2019 APU[2] market closed with total revenue of $31B.
- Seasonally weak Q1-20 expected to remain above $7B even as COVID-19 stresses the supply chain.
- Cost & ASP[3] declines at ~20% per year through 2021; slowing to ~10% per year for 2022+.
- Embedding processor cores specifically for AI[4] acceleration will add complexity to the design and manufacture of APUs, while adding value to the APU market.

Y2020 TRENDS

APU for smartphone: what is happening?

This year will see the first processors built with 5 nanometer foundry technology, bringing new APUs from chip designers Apple and Hisilicon. TSMC's 5nm process promises to bring more than 1.8 times the areal transistor density of the foundry's 7nm process. Additionally, 5nm will have 15% faster speed (at same power) or 30% lower power (at same speed), as compared to 7nm.

"As these manufacturing innovations manifest in chip maker's designs, at Yole, we will see a step up in computing capabilities and potentially a decrease in average die size on the first generation of 5nm APUs", explains **John Lorenz, Technology & Market Analyst, Computing & Software at Yole Développement (Yole)**…

WHAT'S NEXT?

The ghost of Moore's Law

The industry continues to innovate towards cheaper and smaller devices. In the consumer APU space, at the macro level, Yole's analysts really see die sizes getting smaller on the long run average, but they see more and more compute functionality added to processors. To understand the dynamic of this effect, the revenue generated in this space and place against

[1] Extracted from Application Processor Quarterly Market Monitor, Yole Développement, March 2020
[2] APU : Application Processor Units
[3] ASP : Average Selling Price
[4] AI : Artificial Intelligence

the number of transistors integrated in the SoCs can be analyzed. The resulting trend is interesting for a couple of reasons:

- 20% price declines per unit of compute, while not quite on the 'half every 2 years' pace, it is still a healthy regimen of progress that has led to the placement of AI inference in the palms of our hands.
- Looking ahead, expect this price decline to slow down to ~10% YoY, which will make for a shift in some designers' tendencies. Some designing for the highest tiers of smartphones may choose to continue their historical rate of functional improvement between generations and thus live at the higher end of acceptable die size for their segment. Others designing for the mid and lower tiers of smartphones will have to slow their rate of generational progress to remain within their tighter constraints of $BOM and die size…

Which logic nodes are critical for application processors over the next 12-24 months? What are the price and cost trends within the multiple tiers of the smartphone market? How many 10nm/7nm/5nm/3nm wafer starts are needed to satisfy the demands of the application processor market for the next 5 years? Who will have the necessary capacity to deliver for OEMs?... The market research & strategy consulting company Yole is unveiling today, within the Application Processor Quarterly Market Monitor, its Q1 2020 analysis.

Yole's Application Processor Quarterly Market Monitors will be published every beginning of March (Q1), June (Q2), September (Q3) and December (Q4). Aim of the Yole's Computing & Software team is to give a closer look at the main markets and players. In addition to smartphones, tablet and smartwatch, Application Processor Quarterly Market Monitor will include smart speaker, AR/VR[5], smart TV and Ultralight PC within its Q2 edition and automotive infotainment and smart assistant with the Q3 version. Analysts invite you to follow Yole's activities on i-Micronews, especially under this complex context due to the Covid-19 impact.

AI Computing for Automotive: Powering Autonomy - How technologies from smartphones help realize the dream of autonomous driving? Webcast on April 30 at 5.00 PM CET. Register today!

Stay tuned on i-Micronews *to follow our computing & software activities including webcasts, articles, interviews, reports and more!*

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[5] AR/VR : Augmented/Virtual reality

About the Computing & Software team at Yole Développement

John Lorenz is a Technology and Market Analyst within the Computing & Software division at Yole Développement (Yole), part of Yole Group of Companies. John is engaged in the development of market and technology monitors for the logic segment of advanced semiconductors, with an initial focus on processors. Prior to joining Yole, John held various technical and strategic roles at Micron Technology.
On the engineering side, his roles included thin film process development and manufacturing integration on DRAM, NAND, and emerging memory technologies and industrial engineering / factory physics for the R&D fab. On the strategic side, John ran the memory industry supply & capex model for corporate strategy / market intelligence, and established the industry front-end costing model within strategic finance.
John has a Bachelor of Science degree in Mechanical Engineering from the University of Illinois Urbana-Champaign (USA), with a focus on MEMS devices.

As a Technology & Market Analyst, **Yohann Tschudi**, PhD is a member of the Semiconductor & Software division at Yole Développement (Yole). Yohann is daily working with Yole's analysts to identify, understand and analyze the role of the software parts within any semiconductor products, from the machine code to the highest level of algorithms. Market segments especially analyzed by Yohann include big data analysis algorithms, deep/machine learning, genetic algorithms, all coming from Artificial Intelligence (IA) technologies.
After his thesis at CERN (Geneva, Switzerland) in particle physics, Yohann developed a dedicated software for fluid mechanics and thermodynamics applications. Afterwards, he served during 2 years at the University of Miami (FL, United-States) as a research scientist in the radiation oncology department. He was involved in cancer auto-detection and characterization projects using AI methods based on images from Magnetic Resonance Imaging (MRI). During his research career, Yohann has authored and co-authored more than 10 relevant papers.
Yohann has a PhD in High Energy Physics and a master degree in Physical Sciences from Claude Bernard University (Lyon, France).

About Yole Développement

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services as well as reverse engineering and reverse costing services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide… More

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