

DRAM和NAND：在半导体产业的最前沿

《DRAM和NAND季度市场监测》 – 2021年第1季度

市场动态：

- 2020年存储器市场规模增长了15%，达到1220亿美元。
- 2020年第4季度NAND市场：
NAND市场的收益在2020年增长了28%。
NAND的竞争格局仍保持着令人难以置信的活跃动态。
随着NAND市场的发展，该产业也面临着许多重要问题.....
- 2020年第4季度DRAM市场：
DRAM市场的收益在2020年增长了6%。
DRAM市场正在不断发展和变化。
DRAM市场的未来有望和过去一样充满活力.....

存储器市场在2018年的收益超过1600亿美元时，当时的情况令人很容易相信这个出了名不稳定的半导体细分领域已经进入了一个新时代。然而过去两年证明，存储器市场中唯一能确定的就是不确定。由于DRAM和NAND的价格都下跌了近50%，2019年该市场的收益大跌，跌幅超过30%。

随着2020年新冠疫情的阴影笼罩全世界，这两个存储器市场继续这种灾难性跌势似乎已成定局.....但它们却没有。

NAND和DRAM这两个市场2020年的收益都有所增长，增幅分别为28%和6%，这再次证明了它们的变化无常。2020年结束之时，DRAM和NAND市场都有迹象表明它们在2021年的发展势头可能会更强劲。

我们是否正在步入又一个与2017年相似的存储器超级周期？尽管仍有许多变化不定的因素，疫情也尚未退去，这些都可能会改变市场的前景，但目前来看前途是光明的。

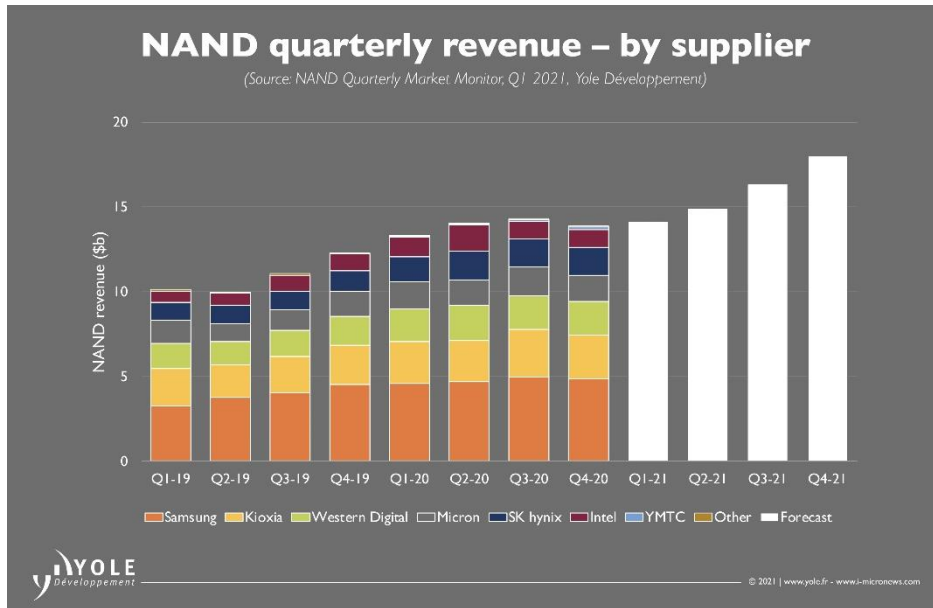
NAND控制芯片短缺将锁定2021年恢复

大趋势和对HDD¹的替换将把NAND推至新高

正如2021年第1季度《NAND季度市场监测》中所述，尽管季节性和周期性仍持续存在，但NAND市场的长期前景是积极的。供需失衡在短期内可能会导致市场波动，但那

¹HDD：硬盘驱动器

些驱动海量数据生成的新兴大趋势，以及用基于NAND的SSD²对HDD的持续替代，预计将把NAND推至新的高度。



根据Yole Développement (Yole) NAND与存储器研究副总裁Walt Coon的说法：

“控制芯片和其他NAND子组件的短缺正在导致供应链的不确定性，给ASP³带来上涨压力。三星位于美国德克萨斯州奥斯汀的工厂原本为其SSD生产NAND控制芯片，近期该工厂的关闭让缺货形势进一步加剧，有可能加速NAND定价恢复，特别是在PC SSD和移动市场中，因为控制芯片的短缺对这些市场影响最大。”

NAND的竞争格局仍保持着令人难以置信的活跃动态。三星正在利用其位于韩国平泽的大型工厂，同时其在中国西安的工厂也在扩产；铠侠及其合作伙伴西部数据在继续拓展其在日本的业务；SK海力士半导体正在收购英特尔的NAND/SSD业务；美光从浮栅向栅极替换技术过渡，不过它仍是3D技术领域的领袖。与此同时，一家新入局的公司崭露头角：来自中国的长江存储科技有限责任公司（YMTC），它或许拥有打破现状的潜力。

DRAM火箭飞船已加满燃料，准备好一飞冲天

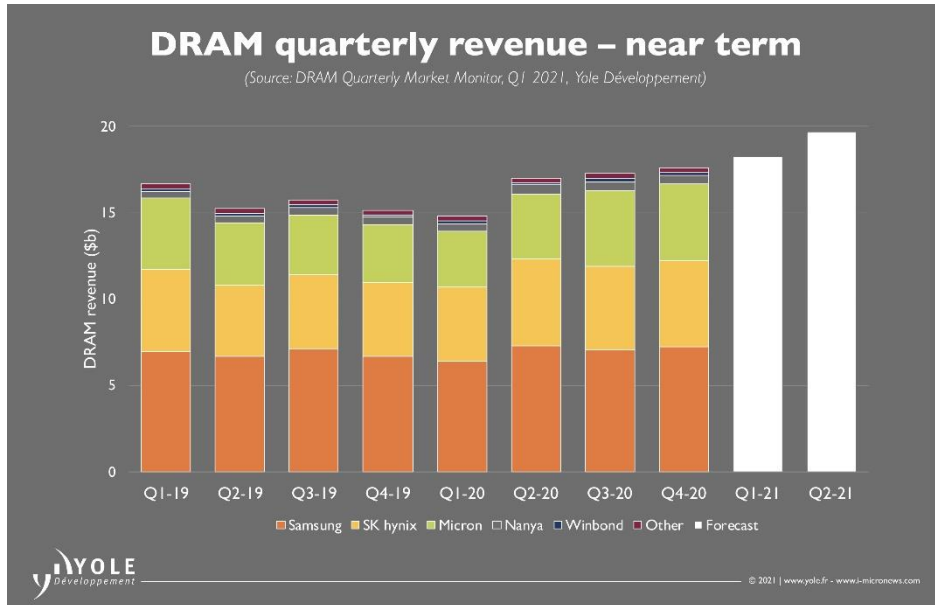
大趋势正推动DRAM在产品中得到更多应用

有限的供货量加上需求复苏已为DRAM火箭飞船加满燃料，准备好一飞冲天，截至2022年达到1200亿美元的市场规模。

²SSD：固态硬盘

³ASP：平均售价

推动整个半导体产业的长期大趋势对存储器市场，特别是DRAM市场有非常积极的影响。整体手机业务，特别是其中的5G革命，以及超大规模数据中心、AI⁴和机器学习，还有自动驾驶都在推动DRAM的应用，且未来五年中比特需求的CAGR⁵超过20%。



Yole的DRAM与存储器研究副总裁Mike Howard在《DRAM季度市场监测》中称：“DRAM市场一直在发展和变化。近期的市场波动就是明证。新的中国供应商拥有最终打破市场格局的潜力，新兴的内存技术很有可能吞下大量的DRAM需求，而过去的需求驱动因素（PC和智能手机）会失去力量，并不再推动行业需求。”

DRAM市场的未来有望和过去一样充满活力。

DRAM和NAND产业：前景乐观。但是.....|《季度市场监测》

毫无疑问，存储器是半导体产品的主要细分市场之一。然而，NAND和DRAM市场的不确定性依然存在，这正是Yole Développement (Yole)在其最新的存储器检测报告，2021年第I季度《NAND季度市场监测》和《DRAM季度市场监测》中所强调的。现在，距离新冠疫情开始传播已过去了一年，本市场研究与战略咨询公司诚邀您一道发现这些市场的现状.....您可以在i-Micronews上阅读全文。

接下来会怎样？

尽管新冠疫情的影响让原本预期中2020年的NAND市场复苏无法实现，而且该市场最终也未能克服中美之间日益恶化的贸易紧张形势，但它似乎还是蓄势待发，将在2021年反弹。疫情之后的需求量恢复和供应量的有限增长应该会在今年拓展市场规模和盈利。从长远来看，成本降低会让基于NAND的存储解决方案进一步渗透传统HDD市场

⁴AI：人工智能

⁵CAGR：年均复合增长率

，而NAND的收益预期也将随之增长。在技术方面，尽管有层数的增加和四层单元技术（QLC）的出现，但随着工艺和生产上的复杂性不断增加，由技术驱动的位增长将放缓。

随着世界慢慢走出新冠疫情，市场也逐渐恢复正常，DRAM市场形势看起来非常乐观。过去两年对新产能投资不足，这将导致DRAM供应紧张，再加上需求恢复，会令整个DRAM市场的价格上涨，前景也会更加光明。我们可能即将步入DRAM市场的又一个巨大上升周期。

Yole的《NAND季度市场监测》和《DRAM季度市场监测》将在每年三月（第1季度）、六月（第2季度）、九月（第3季度）和十二月（第4季度）发布。我们之所以提供这些服务，是为了深入报道快速变化的市场动态和主要竞争企业的态势与战略。



此外，市场研究与战略咨询公司Yole还发布了其年度存储器技术与市场报告：《2020年先进存储器产业现状——聚焦铠侠》。敬请关注-Micronews，以获取我们关于高级封装、半导体制造与存储器的更多精彩活动信息！

借此机会，何不与我们共同关注DRAM和NAND存储器这两个正在积蓄力量的市场——我们是否正在进入下一个超级周期？市场简报在线直播，由Walt Coon和Mike Howard于2021年4月7日星期三作讲演。敬请通过i-Micronews注册。

最后，不要错过2021年4月27日（星期二）凌晨2:00点至凌晨4:00点的Intermag2021：第12届MRAM全球创新论坛，特别是题为“我们需要怎样才能将MRAM提升到新高度？”的专题座谈。敬请通过i-Micronews注册。

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About the memory team at Yole Développement

Walt Coon joins Yole Développement's memory team as VP of NAND and Memory Research, part of the Semiconductor & Software division. Based in the US, Walt is leading the day-to-day production of both market updates and Market Monitors, with a focus on the NAND market and semiconductor industries. In addition, he is deeply involved in the business development of these activities. Walt has significant experience within the memory & semiconductor industry. He spent 16 years at Micron Technology, managing the team responsible for competitor benchmarking, and industry supply, demand, and cost modeling. His team also supported both corporate strategy and Mergers & Acquisitions analysis. Previously, he spent time in Information Systems, developing engineering applications to support memory process and yield enhancement. Walt Coon earned a Master of Business Administration from Boise State University (Idaho, United-States) and a Bachelor of Science in Computer Science from the University of Utah (United-States).

Mike Howard is a member of the memory team at Yole Développement (Yole) as VP of DRAM and Memory Research. Mike's mission at Yole is to deliver a comprehensive understanding of the entire memory and semiconductor landscape (with special emphasis on DRAM) via market updates and Market Monitors. Mike is also deeply involved in the business development of all memory activities. Mike is based in the US. Mike has a deep understanding of the DRAM and memory markets with a valuable combination of industry and market research experience. For the decade prior to joining Yole, Mike was the Senior Director of DRAM and Memory Research at IHS. Before IHS, Mike worked at Micron Technology where he had roles in corporate development, marketing, and engineering. Mike earned a Master of Business Administration at The Ohio State University (United-States), a Bachelor of Science in Chemical Engineering and a Bachelor of Arts in Finance at the University of Washington (Washington, United-States).

Simone Bertolazzi, PhD is a Technology & Market analyst at Yole Développement (Yole) working with the Semiconductor, Memory & Computing Division. He is member of the Yole's memory team and he contributes on a day-to-day basis to the analysis of nonvolatile memory technologies, their related materials and fabrication processes. Previously, Simone carried out experimental research in the field of nanoscience and nanotechnology, focusing on emerging semiconducting materials and their opto-electronic device applications. He (co-) authored several papers in high-impact scientific journals and was awarded the prestigious Marie Curie Intra-European Fellowship. Simone obtained a PhD in physics in 2015 from École Polytechnique Fédérale de Lausanne (Switzerland), where he developed novel flash memory cells based on heterostructures of two-dimensional materials and high- κ dielectrics. Simone earned a double M. A. Sc. degree from Polytechnique de Montréal (Canada) and Politecnico di Milano (Italy), graduating cum laude.

Emilie Jolivet is Director of the Semiconductor, Memory & Computing Division at Yole Développement, part of Yole Group of Companies, where her specific interests cover package & assembly, semiconductor manufacturing, memory and software & computing fields. Based on her valuable experience in the semiconductor industry, Emilie manages the expansion of the technical and market expertise of the Semiconductor and Software Team. The team interacts daily with leading companies allowing semiconductor & software analysts to collect a large amount of data and integrate their understanding of the evolution of the market with technology breakthroughs. In addition, Emilie's mission focusses on the management of business relationships with semiconductor leaders and the development of market research and strategy consulting activities inside the Yole group. Emilie Jolivet holds a Master's degree in Applied Physics specializing in Microelectronics from INSA (Toulouse, France). After an internship in failure analysis at Freescale (France), she was an R&D engineer for seven years in the photovoltaic business where she co-authored several scientific articles. Enriched by this experience, she graduated with an MBA from IAE Lyon and then joined EV Group (Austria) as a business development manager in 3D & Advanced Packaging before joining Yole Développement in 2016.

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, reverse engineering and reverse costing



services and well as IP and patent analysis. 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...
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