

Flash Cards and Removable Storage:

2008 – 2013

Report Number

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Key Findings

Can the Flash card market sustain its long term growth? Flash cards and USB Drives have become commoditized throughout the electronics industry. As a mature product, Flash cards have always been able to store digital content and now they can be produced, or specialized, for use in different types of performance applications. In computing, fast and high endurance PCI Express cards can be used for Flash caching functions, an Express Card; or, by adapting a Compact Flash card, they can be made into a Solid State Drive. Flash cards have become the favored solution to satisfy ever increasing demand for mobile storage.

Review of the past few years' data reveals the Flash card market seems to operate in a cyclical pattern, though the annual process varies with fluctuating market conditions. Beginning in mid 4Q 2007, the market began to move in divergent directions. Although components were sold out through the end of the year, prices for components began another steep decline that eliminated all increases from Q2/3 as vendors sensed an oversupply coming in 2008. Card prices lagged behind components prices as they always do and remained fairly high for the holiday sales season.

By 1Q 2008, NAND component prices were dropping quite fast at around 40%, since Apple had not bought a big supply and there were not any new demand drivers. In 2Q, there were a few attempts to stimulate demand outside of normal channels, as Hynix and Micron announced they would be offering Flash cards to their mobile customers. Most card vendors were offering higher capacity cards at higher performance but with tremendous rebates and/or discounts.

Currently, the US economy is in a 'near' recession, the dollar is very weak and energy costs are at record highs; however, International sales are up, and the forecast for 2008 Flash card growth is mildly optimistic. Flash card revenue is projected to grow to over \$11 billion in 2008, and by 2013, market revenue will rise over \$22 billion, which produces a CAGR of 14.1% over the forecast period (2008 – 2013).

As mobile terminals like cell phones, Personal Media Players, GPS and portable gaming are being configured to use Flash cards for recording and viewing video and television, and PCs and notebooks become revitalized with USB Drives and Express cards, these two different markets will be further expanded as software becomes optimized to enhance their usage models. The resultant market size for removable storage by the end of the forecast period may counter balance other long term inhibitors. Much depends on changing the consumer's usage patterns and adopting newer card and storage technologies that can satisfy these consumer requirements.

Analysis and Reporting Methodology

The Flash Card and Removable Storage Forecast for 2006-2013 provides revenue, units, Average Selling Price (ASP), Normalized Price or \$/MB by capacity for each Flash Card and Drive and total Megabytes shipped in removable storage devices. Flash Card formats include PC-ATA, PC-Linear, Express Card, Express Card mini, Compact Flash, SxS cards, Multi-Media Cards (MMC, mini, micro), Smart Media/xD card, Secure Digital (SD, mini, micro), Memory Stick (MS, mini, micro), MegaSIM or HD SIM, USB Drives, USB Enterprise Drives and the USB card. The Other category of Removable Non-Flash cards and drives include: the 1.8"/2.5" small form factor HDD from Hitachi Global Storage Technologies, Seagate, WD, Toshiba and Samsung and the SanDisk Matrix-type and other OTP-type ROM cards. The 1.8"/2.5" HDD represents the last of the removable cards and drives. ASPs and \$/MB have been calculated from 2006-2013 for the main capacities of Flash cards, and separately for the major Flash card form factors.

This report analyzes Flash card and non-Flash card markets from two perspectives: the 'tops-down' macro-perspective and the 'bottoms-up' application-perspective. Both Flash and non-Flash cards have been forecast by form factor, performance and capacity from 2006-2013 in twenty three major applications. The net forecast presents consolidated results of these individual markets for revenue, units, Average Selling Prices (ASPs), Price per Megabyte, and Megabytes shipped for the overall Flash card and non-Flash card markets, by Flash card capacities and performance, and again by Flash card types and performance.

Each application forecast provides the Flash card acceptance rate of the percentage of the application units that have Flash cards. Then the Flash card attachment rate is listed to show how many Flash cards are purchased for the life of the application. The resultant calculation of the Flash card acceptance rate and attachment rate provides a Flash card unit volume for each category of the end-use application. This Flash card unit volume is broken out by the capacity of the Flash cards and then segmented into the different Flash card form factors like Compact Flash, Memory Stick, and the others listed above. Next, the ASP for each of the Flash card types (form factors) and their respective capacity is listed by application category. Revenue is calculated for each Flash card form factor and further segmented into standard or high (H) performance by capacity. Next, the unit summary is provided first by capacity: standard or high performance, and then by total units for each of the Flash card form factors segmented by standard or high performance.

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About Web-Feet Research

Web-Feet Research (WFR) is a professional services organization that assists clients in the semiconductor, electronics and finance industries build value, solve complex business problems, and enhance their ability to improve performance.

The company has consistently identified the emerging trends in the electronics industry and has been the first to forecast their impact in the Flash and nonvolatile memory markets since its inception in 2000. Some of WFR's firsts are in the following areas: SSD, Flash cache/Hybrid Flash, Embedded Flash Drives, Ultra Low Cost PC, Mobile storage, MP3, NAND MCP, USB Drives, Flash SIM cards, micro Flash cards, and serial NOR Flash.

The company offers a full complement of technology consulting services, management consulting services and market research for nonvolatile memory, solid state storage technologies and mobile hard disk drive products. Special emphasis has been focused on the development and growth of Flash memory, Flash cards and SSD markets.

The subscription services offered by Web-Feet Research concentrate on the Non-Volatile Memory and Storage Portfolio, which is segmented into three services: Manufacturing / Technology, Storage Systems, and Memory Components.

The company also organizes annual public and on-site presentations, the NVM conferences, which supplement the consulting and research services. These conferences focus on technology evolution, product development, storage markets and industry / economic trends.

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