

## OTP Applications and Markets:

2009 – 2014

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**Web-Feet Research, Inc.**

## *Key Findings*

Inexpensive and high capacity mobile storage has become the norm. Increasing numbers of consumers are using Flash memory and removable memory cards to store digital content on their electronic devices. Digital content is now delivered over the Internet directly to a device or to a PC Hard Drive or is physically stored on a memory card that is quickly eliminating the need for CDs or DVDs. Although, internet downloads of music and movies have drastically reduced the sales of CDs and some DVDs, many consumers still want to have their content on physical media. In years past Flash competed against floppies and CDs in vying to be the storage media of choice in a few applications, now with its small size and no need for a drive mechanism Flash memory competes virtually against itself in all mobile applications and in many portable and stationary applications.

The exceptions to the dominance of Flash memory are the One Time Programmable (OTP) memory devices that do not allow the stored content to be altered. Most of the growth of OTP card products to date has been somewhat 'under the radar' in terms of making any substantial impact on the Flash card market or the removable storage market in general. These OTP storage devices are beginning to play an increasingly important role in the future of content delivery for the consumer, mobile and computing markets, especially as these maturing markets seek to lower cost and add value.

Given their characteristics and lower price points, OTP cards can be utilized in place of NAND flash based cards for content storage that requires low capacity memory (64MB-4GB) at a low cost. This is especially true when storing files, images, video, records and programs as well as content that are to be archived rather than reused or reprogrammed. NAND mainstream capacities are continually migrating to higher capacities (16GB-64GB) and obsoleting any NAND components below 8Gbit or cards below 1GB. Currently, NAND pricing is fairly high and is expected to remain so for this year and next, which provides an opportunity for OTP memory to fill this low capacity card niche.

OTP cards are sold in two forms: as blank cards and as pre-programmed cards with various types of preloaded content. The pre-programmed cards include a small extra cost for programming the content into the card but do not include the cost of the content. Nearly all of the current thirteen OTP applications use pre-programmed content and a few provide blank cards that allow the users to store their own information on the card. As a result of their low cost, small form factor size and high density, the applications for OTP cards are as diverse as is the content that is stored on these cards.

In the early years of the OTP market forecast, computing applications make up the largest market share for OTP cards with highest portion comprised of pre-programmed content cards and blank OTP cards for archiving promotion, and eBooks. Gaming use of OTP cards in portable, handheld, and console systems is the largest volume user for all

applications. eBooks, Promotions, Recovery, GPS, Toys, and Archiving records and files make up the other computing applications. These applications store maps, look-up tables, toy programs, operating systems back-ups, promotions/advertising and files needed as backup and other files that cannot be altered as legal documents. Recovery (operating systems, applications programs, manuals), Promotions (non-wireless or USB), GPS, Toys, and Games predominantly use pre-programmed content, while the archiving systems want only blank cards to store their proprietary data.

In the video markets, Digital Video Camcorders (DVC) are ideal new candidates and markets for OTP memory cards. Personal Media Players, Digital TV, and Digital Video Recorders can view pre-loaded OTP cards with video, TV programs, and movies on their respective devices. The low cost, high density and mobile or small sized storage media offered by OTP memory is perfect for lowering cost, increasing mobility, and protecting digital content from alteration and copying.

By far the largest volume Memory card market has been, and will continue to be, the usage of cards in cell phones. All the emerging OTP card suppliers continue to address the huge cell phone market. Of particular interest to the OTP card suppliers are the service providers who determine the business models, establish the content and pricing plans, and design the phone configurations with or without slots are beginning to see the potential benefits of utilizing low cost and OTP cards for a variety of uses beyond simply storing music and images. Many of the OTP cards used in promotions add a 'call-to-action' feature by including a one click to connect the user to the advertiser's internet site to purchase additional content or services. Additionally, the providers now are seeing new opportunities to utilize OTP cards in promotions and other forms of advertising where they can offset the cost of these cards through subsidies or another form of cooperative marketing.

MP3 users consume pre-programmed music, talk shows and other content on these OTP cards for the forecast period of 2006-2014.

In conclusion, the demand for mobile removable storage especially for video, music, gaming, recovery, promotions and text on mobile terminals shows a powerful growth potential for OTP cards throughout the forecast period. The major inhibitors for this growth are the questions of availability of high-capacity, low cost OTP components, the lack of consumer and business awareness and the potential challenge of lower prices from Flash media. Also the saturation of Flash cards in some of these mature markets may lead to Flash Card manufacturers drastically dropping prices to capture some of this emerging OTP card market share. Conversely, more usage is expected to come since Flash may not be available at low prices to undercut the price of OTP memory, and more OEMs will like the content protection offered with OTP unalterable memory. As more mobile applications like Netbooks, MIDs, and Digital Frames need back-up, O/S software and electronic 'green' manuals in a physical non-CD format, then OTP cards should have an opportunity to provide a low cost medium for these millions of applications. Finally, many business/government/legal agencies need archiving that will last 50-100 years in an unchangeable format that OTP memory can provide, so the future for OTP is vast.

## *Analysis and Reporting Methodology*

The OTP Component and Card Forecast for 2006-2014 provides revenue, units, Average Selling Prices (ASP), and total MegaBytes shipped in removable storage devices. OTP Card formats could include all the Flash card form factors, but mainly micro-SD and USB Drives. Given the above, revenues, units, ASPs and MBytes have been calculated from 2006-2014 for the main capacities of the OTP cards.

The report analyses the OTP card markets from two perspectives: the 'tops-down' macro-perspective and the 'bottoms-up' application-perspective. Both the OTP Cards and their memory components have been forecast by capacity from 2006-2014 in thirteen major applications. The net forecast presents the consolidated results of these individual markets for revenue, units, Average Selling Prices (ASPs), and MegaBytes shipped for the overall OTP card market, by the OTP card capacities and again by the capacities of the OTP memory components.

Web-Feet Research discusses the evolution in segmenting the end-use markets from a function-based model to a device-based model and eventually to a true use-based model. For simplicity sake, this study will organize the end-use application markets into four device-based markets: video, imaging, audio, and computing. Within each of these four sub-markets the respective individual end-use applications are forecast separately for pre-programmed and blank cards and then the combined OTP card revenue, units, and MegaBytes are totaled by capacity.

The End-Use market application forecasts were built from research and interviews conducted by Web-Feet Research. Each of the thirteen application market forecasts has a unit forecast for that application providing historical statistics for 2006 - 2008 and then a forecast for 2009-2014. In many applications, the different architectures of that application are presented and possibly the different types of subcategories that are listed within that major end-use application market.

Each application forecast provides the memory card acceptance rate of the percentage of the application units that have OTP cards. Then the OTP card attachment rate is listed to show how many OTP cards are purchased for the life of the application. The resultant calculation of the OTP card acceptance rate and attachment rate provides an OTP card unit volume for each category of the end-use application. This OTP card unit volume is broken out by the capacity of the OTP cards. Next, the ASP for each of the OTP card capacity is listed by the application category. The revenue is calculated for each OTP card capacity, then the unit summary is provided by capacity. Following these calculations, the MegaByte (MB) summaries are calculated by multiplying the units by the card capacities. Finally, the normalized price per MegaByte (\$/MB) is calculated by dividing the revenue by the total MBs shipped but only for the total OTP card shipments and not broken out by application.

Exclusive for the toy market, the embedded volume of OTP components is summarized, since the OTP card market is very small for toys.

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## *About Web-Feet Research*

**Web-Feet Research (WFR)** 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 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, 3-bit/4-bit per cell NAND, serial NOR Flash and Storage Class Memories.

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.

Web-Feet Research also provides custom studies, technology evaluation and competitive analyses of mobile, portable and stationary technologies, products and industry trends. The professional services and syndicated studies give Web-Feet Research, its clients and its clients' clients a competitive edge in their respective markets.



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