# Implications of HP's Miniature "Memory Spot" Technology

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In 2006, Hewlett Packard launched a prototype of miniature technology that could make the electronic world, currently only available to PCs and the Internet, part of our everyday physical existence. This paper will discuss the possible implications of the Memory Spot chip – both good and bad – given it gains widespread use in the world. Some of these effects include social, privacy, biological, and environmental issues.

The Memory Spot chip is a quite small (roughly about 2mm²) storage device. It stores about 4 megabits of information and boasts a 10 megabit/second transfer rate. For comparison, BlueTooth transfers data about 1 megabit/second. Its small form factor allows it to be embedded in nearly anything, from pictures, hard copy documents, ID cards, hospital patients wristbands and more. Its data capacity gives it the ability to store a small audio or video clip, changes/additions to a text document as well as the document itself, and even medical records for a patient (1).

Let's take a tour of the future with the Memory Spot in widespread usage. You just exit the high school where you teach 10th grade geometry. On the way to your car you see Frank's new 2030 Hummer H8; seeing it in blue makes you wonder what it'd be like to have one. Knowing you can't afford it, you approach the SUV anyway, pulling out your cell phone. You lower your phone to the driver's side bumper give it a beat and pull your phone back flipping it open. You're greeted with all the vehicle's information: class, body style, layout, platform, wheelbase, dimensions, transmission, fuel capacity, mpg and more esoteric attributes. They sure bury the price don't they, you think. Finally there it is: $43,130. Your wife Beth calls, interrupting your daydreaming, asking you to stop at the store to pick up a few things for dinner.

On your way to the milk, you stop off in electronics remembering the batteries for your son's birthday present. You also grab a 36-pack of MemSpots. At the counter you pay for your items and set your phone on the counter waiting for the receipt to be transferred. The teenage clerk speaks up in the meantime.

"You're old enough. How did you guys live without the MemSpot when you were young." Trying to ignore his obviously unintentional insulting remark, you smile and reply.

"My son's turning 3 and my parents live out in New York and we've got some cool video pics we want to send them."

"Ah…cool. Sorry about the age thing." Your phone beeps indicating it received the receipt. It will be automatically entered into your iPhone's budget app.

In the background, one of the store's TVs is tuned to a news channel. You barely hear it as the announcer continues. "…John Duarte, marine biologist says the Chinook salmon numbers in the Columbia have been on the decline: 40% down from 10 years ago. Duarte is quick to point out that recycling programs were not introduced soon enough after the initial release and explosion in usage of the MemSpots. Duarte also mentions cases of reduced algae populations. The biologist is not hopefully that the programs will be able to undo the damage already done. In related news, millions of students are facing copyright violations with their distribution of textbooks in digital format. And finally, in Clackamas a woman is rescued by her dog after…" You leave the electronics section and snag the remaining items on your list. After you pay you open your phone and are assaulted by a local cigar and pipe shops for a free tobacco sample with purchase of another at the same or greater price. Stupid MemSpot receipts—gotta love 'em—gotta hate 'em, you think.

You suddenly remember you have to make copies of tomorrow's homework assignment for the class. You find the store's copy machine and pull out your combination flash drive and rewritable MemSpot on your key chain. After swiping your credit card, you hold the key chain's digital content up to the photo copier's reader and push 5-2 on the keypad. Soon the printer is making 52 perfect copies of the newest homework assignment.

On your way home, you notice you need gas. Pulling into the gas station, you have the attendant fill it up. Ring. Ring. It's Frank calling about the poker game on Friday night. You look forward to the group's usual smoke in his garage on game night You shoot the breeze with Frank and before you know it the attendant is at your window with your receipt. Reaching out quickly with phone still in hand, you take the receipt.

You pull your phone back and realize yet another annoying advertisement has been pulled into your phone from the receipt. This time it's for the gas station's adjacent car wash. You quickly delete it and resume your conversion.

At home your wife has heated up the stove and is eagerly awaiting the new recipe you got at the store; it came with the chicken, digitally of course. She takes the packaged chicken over to the printer, holds the label up to the printer's reader, waits a

second until the printer begins whirring. She's back to the kitchen with the freshly printed recipe.

You know it'll be a half hour before dinner is ready so you head over to the computer where you have those short videos of your son Jackson. Your parents are going to love the new pictures. Hopefully they remember how to use the reader, you think. You'd rather not walk them through it yet again; if only they knew how simple it really is. You sure hope you don't get to their age and become ignorant about the latest and greatest technology. You pull out the 36 pack and grab the first one and put the small circular red sticker in the writer on the front of the computer. You click the video of him chasing the cat and drag and drop it onto the MemSpot writer's snazzy red icon. You reach over and grab a shot of him smiling on the desk. You pick out the small disc, pull the backing off and place it on the back of the picture. As you proceed through the pictures, your stomach begins to growl. Your thoughts are interrupted by the ear-cracking smoke alarm. Rushing out, you reach the smoke-filled kitchen and find the chicken burning. You quickly pull the white meat—now charred—off the stove wondering what happened to Beth. Beth strides in, with Jackson following close behind. You both sigh.

"You wanna get some takeout?" you ask.

"Sure," Beth replies, slightly disgusted with her lack of attentiveness.
The Chinese place down the street has a new menu and you're both excited to try it out. With the newest extraordinarily small-sized versions of MemSpot, now known as Specs, the technology has become digestible. You're anticipating getting the restaurants new recipes from the source—the actual food itself. The recipe for the Kung Pao you'll soon be ingesting will be readable; you can view the ingredients right at the dinner table with your cell phone. You both enjoy your late dinner and soon put Jackson to bed before retiring for the night.

Hopefully the reader has enjoyed the trip to the future of Memory Spot technology. It is quite obvious how ubiquitous information will become given widespread usage of such technology. The first implication is the accessibility of information (the school teacher gets the details on his dream). A second advantage, convenience, is illustrated by the receipt's automatic entry into your budget application is convenience.

On the converse side we can see possible implications in privacy, biological, environmental issues. Privacy as defined by Wikipedia is the ability of an individual to seclude themselves or information about themselves thus revealing themselves

selectively (2).  The Memory Spot can be used for targeted individual advertising which can be viewed as an invasion of privacy.  For example, the movie Minority Report shows this well with a scene with the protagonist's eyes being scanned and then shown advertising specifically designed for the protagonist.  Our geometry teacher had a similar experience being shown a tobacco advertisement because of his weakness for pipe tobacco.  With the extrapolation of the Memory Spot shrinking in size so much it is digestible; we can't help but wonder the biological consequences given sustained digestion over the course of years.  Could it lead to birth defects or worse cancer?  Also the University of Pennsylvania Gazette has documented certain instances of nanotechnology can be fatal to rats if inhaled in high concentrations.  They also note another instance where they can be clogged in fish brains (3).

This paper's extrapolation was an attempt to expose the implications of HP's Memory Spot technology.  It is show to have both positive and negative effects.  Given it's potential for misuse and environmental and biological consequences, will the positive effects of Memory Spot outweigh the negative?

## Author's Opinion

The author believes the Memory Spot to be a great advance in making information readily available literally anywhere.  I also believe some of its impacts may not be fully realized, such as environmental issues (where or how is it recycled, if at all), invasion of privacy with individually targeted marketing advertisements.  In addition the effects of biological issues regarding ingestion of Memory Spots may not be completely understood.  Invasion of privacy, copyright and environmental—probably only represent the first few ripples in the pond of future implications.

## References

1) "HP Unveils Revolutionary Wireless Chip that Links the Digital and Physical Worlds."  http://www.hp.com/hpinfo/newsroom/press/2006/060717a.html.  Accessed Jan 31, 2009.
2) Wikipedia. http://en.wikipedia.org/wiki/Privacy.  Accessed Feb 28, 2009.
3) "Small Technology, Big Promise."  http://www.upenn.edu/gazette/0505/feature014.html.  Accessed Jan 31, 2009.