

Memjet Customers, Roadmap Start Taking Shape

PC OEMs and camera makers could be among the customers for Memjet's revolutionary inkjet printers that were first [disclosed last week](#). Meanwhile, the company has already started talking about taking the Silverbrook technology roadmap to 360 pages per minute in as little as two years' time.

While Silverbrook's 60-pages-per-minute printing technology seems revolutionary enough, company executives said they plan to increase its output sixfold in two to three years, to a theoretical output of 360 pages per minute from an ordinary printer.

And who will be making and selling these? OEMs from the personal-computer and consumer-electronics markets, specifically digital camera companies, said executives from Memjet, the company actually selling the Silverbrook-designed components. Memjet executives also said they will welcome the refill industry with open arms, allowing third-party ink suppliers to participate.

Memjet also has set its sights on the commercial printer market, hoping to change newspaper and magazine printing. Future plans include a commercial printer capable of an unheard-of 64,000 pages per minute.

It's unclear whether Memjet will be able to deliver on their dramatic promises. At the present time, the company has only produced prototype machines that Silverbrook has demonstrated to analysts and customers.

Executives said they're in discussions with PC OEMs and consumer-electronics makers who are looking to differentiate themselves in a cutthroat market. They refused to comment, however, when asked about specific names, such as Dell, which has marketed its own branded printers. However, the small startup has worked more than a decade on building the perfect printer.

According to Kim Beswick, the vice president of marketing for Memjet, the company's 100-patents-per-year rate was dismissed by its more established competitors, who wondered if the Australian startup was simply amassing research technologies. To a point, that's true; Silverbrook's engineers – many of whom boast three degrees, Beswick said – are funded by licensing. Memjet, the company that will market the printer technologies, will fund Silverbrook's ongoing research.

Silverbrook was founded by Kai Silverbrook, who has spent a decade perfecting the technology. The U.S. Patent Office has approved 1,452 patents with Silverbrook's name on them, more than Thomas Edison. The third most recent? A patent for placing a printer in a cellular phone – which Silverbrook has demonstrated a working model of as well, said Bill McGlynn, the chief executive of Memjet's home and office business.

"Early on, these patents were fairly low level, not enough to grab anyone's attention," Beswick said. "Nobody expected a company in Sydney to have anything significant; they thought - Silverbrook - was patenting for patent purposes.

"In 2005 and 2006 we shot up; we started passing HP and Epson in inkjet patents, and we were right up there with Canon," Beswick added. "People started asking questions."

Those questions began to be answered last week, when Memjet announced its product plans: a photo printer, which the company hopes to sell for less than \$150 by the end of the year or early 2008; the 8.5-inch x 11-inch (A4) color inkjet, due to arrive at the end of 2008 for under \$200; a label printer; and a large-format photo printer, expected to cost about \$5,000, and capable of printing poster-sized prints at

rapid speed. A photo kiosk will be trialled later this year.

The problem for Memjet, according to McGlynn, is that no new printer maker is going to be to establish a successful brand against the likes of HP and Canon. When asked about comparisons to the Tucker automobile, which burned bright than ultimately failed, McGlynn pointed out that Tucker tried to take on General Motors, not sell its technology to them.

"We can use other brands in the market, already known for their product quality," McGlynn said. "We don't have to worry about it. The battle will be taken to market by other brand names."

Memjet will sell its components to "growth-oriented" consumer-electronics and PC companies, Beswick said, agreeing that digital camera makers would be "a natural fit". The company's customers are encouraged to have a unique view of the market, and design products that could be unique, rather than knockoffs of one another.

Memjet is working with the "biggest names in the world," McGlynn added.

Embracing the refillers

Beswick and McGlynn declined to name names, citing confidentiality agreements. A partnership announcement is tentatively scheduled for the end of 2007 or early 2008, when the first manufacturer of the small-format photo printer will be disclosed, Beswick said. The only announced partner so far is Photo-Me International, a French photo-kiosk manufacturer which will be testing the Memjet technology – from another subsidiary, Memjet Photo Retail – this fall.

According to Beswick, the Memjet A4 printer design includes five 50-ml ink tanks, far more than the 20-ml cartridges used by HP and its rivals. A great deal of effort on the part of inkjet companies has been spent making sure that only the OEM is the source of refills, and not third-party ink suppliers. But in Germany, where the company presented its technology last week, refillers make up 40 percent of the market, executives said.

Memjet views the world differently. While its licensees are permitted to design the cartridges how they want – including designing a standard 20-ml cartridge – Memjet is prepared to allow the refill companies to participate, executives said. Moreover, the company tentatively plans to allow a "Netflix"-like model, where empty cartridges would be shipped back to the partner, refilled, and sent back, with Memjet and the partner splitting the profits. The \$10-\$15 cartridges are being designed to operate for six months.

"Our technology's in the print head, and we're asking you to pay a bit more for it," McGlynn said. "Not the ink."

Moore's Law and printers

Unlike a conventional printer head, the Memjet printer heads span the width of the page, each measuring 22-mm across by 0.72 mm. Taiwan Semiconductor Manufacturing Co. (TSMC), the foundry responsible for many of today's PC graphics and communication chips, will manufacture the heads, while IBM is fabricating the driver chip, Beswick said. The printer chips themselves are made up of tiny micromachined nozzles, each capable of squirting a picoliter-sized drop of ink at 20,000 times per second, or 20 KHz.

The ink used is dye-based, although a pigment-based ink is being developed in conjunction for the A4 printer launch next year, McGlynn said. Ink clogging, always the problem with inkjets, is minimized by the design of the chip; McGlynn said the ink tends to retreat inside the print nozzle, minimizing clogging.

"It's the Achilles heel of all inkjet printers," McGlynn said. "If you don't get that right, you're done for."

Conventional inkjet heads are sometime sprayed with a solvent, or the ink itself is used to loosen the clog. Memjet executives would not disclose exactly how their printer technology unclogs the head, although the process takes only about two seconds, Beswick said. Exactly how often the head will need to be cleaned is still being tested, she said.

In semiconductors, the key to improving the technology is the continual die shrinks that allow microprocessors and other components to offer faster speeds or else lower power. The Memjet technology depends on something else: the rate at which the ink can be squirted through the micronozzles.

And Memjet executives said they're already thinking about the future. "This is not a one-trick pony," McGlynn said.

The Memjet heads cycle at 20 KHz, enough to produce the 60 pages per minute on the A4 printer. "But that's not that fast," McGlynn said.

Other inkjets cycle at 24 KHz. Memjet's plan is to develop a 120-KHz cycle head in two to three years, increasing the print speed sixfold to 180 pages per minute at photo quality, 360 pages per minute at normal color quality, and 720 pages per minute in draft mode.

Another thing the company could do is add more rows of nozzles. Already, the company uses 10: two each for the CMYK (Cyan, Magenta, Yellow, Black) inks, plus an additional back-ink nozzle. There's no reason why a customer couldn't "stack" the nozzles in four or five series of rows, placing more rows of inks on the paper and speeding up the process even further. One of Memjet's customers are talking about placing heads on the front and back, doubling the Memjet effective output by printing in duplex mode, Beswick said. Another is considering a black-and white office printer, she added.

And then there's the medium: yet another Memjet project is to allow the printers to connect digitally to a network, and print on newsprint and on the stock paper magazines use. The 64,000-page-per-minute commercial printer is also a planned project.

"By the time the current inkjet vendors figure out their design to work against us, we'll be six times faster and a lot more flexible," McGlynn said.

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