Color Business Report

Color, Computers, and Reprographics

Tonejet Readies Print Engines for Packaging and Book Markets

Ink jet is not an overnight technology. But this year we have seen some new names enter the business. Even though Silverbrook's MemJet developments became public in 2007, they have been under development for at least ten years. Likewise, Kodak emerged this year with a line of photo ink jet printers, but by virtue of its Diconix line from about 15 years ago, the company can be counted among the ink-jet pioneers. The latest "old" new name is **Tonejet Limited** (Melbourne, UK), which is coming to market with ink jet printers that rely on electrostatic deposition to form and project droplets. Tonejet applied for its core patents in 2001, and its R & D team presented at conferences such as IS&T's International Conference on Digital Printing Technologies a year later. Now, after five additional years of development, Tonejet is ready to license its technology beyond its initial (and still un-announced) partners. "We are expanding conversations we are having with users," said Tonejet's Guy Newcomb, Manager of the Printing Technology Division. The technology should be in the field in about a year.

Pulse Separates Pigment from Carrier

Newcomb explained the basics. Tonejet's ink consists of charged pigment and resin particles suspended in isopar. As the ink is passed through the Tonejet print head, an electric field is applied to the ink. "That field pulls the charged particles through the liquid, pulls them out of the liquid, and generates a jet, which lands on the substrate," said Newcomb. As the particles are pulled out of the liquid, they become concentrated. "The liquid that is flowing around in the print head has a low viscosity," said Newcomb, "and the liquid which goes onto the metal or plastic or paper has

a high viscosity."

The shape of the print head is one of the key developments. The head is shaped in such a way that the fluid inside the head forms a meniscus. Behind the meniscus is an electrode. When a pulse is applied to the electrode, the particles are pulled out of the ink. "It is an open structure," said Newcomb, "so that the ink flows through it." Tonejet describes the print head as "nozzle-less." Guy Newcomb said that the component is easy to manufacture. Due to the electrostatic firing method and simple head design, Tonejet has wide latitude in ink composition.

RSA and TTP

Tonejet did not provide a photo or illustration, but interested readers can find U.S. Patent Number 6,260,954, which contains some drawings. Patent 6,245,139 describes the ink. Both patents were issued to Tonejet Corporation Pty. LTD, of Eastwood Australia. The earliest work was done by Louis Lima-Marques of Research Laboratories of Australia, who is named as inventor on patent 6,260,954. Research Laboratories of Australia, a chemistry developer, brought The Technology Partnership (TTP, Cambridge, UK) on as a partner to add hardware-development expertise. The Tonejet joint venture is about ten years old. Tonejet is a subsidiary of TTP, and approximately 30 of TTP's 250 employees are part of the Printing Technology Division that Newcomb manages.

One Meter per Second

Newcomb said that printing with viscous inks produces high-quality images on non-absorbing

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substrates such as metal, glass, and plastic. In addition, Tonejet can control the amount of ink ejected. "The longer the pulse, the more liquid goes down," Newcomb said. "So you have effectively a continuous grey-scale control." In its current implementation, dots in the range of 10 microns to 80 microns in diameter are possible, which corresponds to drop volumes from 0.06 pl to 32 pl. Newcomb expects that the in-the-field operating dot-size range will be between 12 microns and 15 microns. The printer does not have to slow down to vary dot size. Tonejet has produced heads as wide as 170 mm (roughly 6.7"), printing images at 600 dpi with 16 grey levels. The technology is capable of high production, with print speeds in the one-meter-per-second neighborhood. The thrust of current development is toward four-color systems, but additional colors, including white, can be added.

Tonejet will supply print engines and ink. To date, the development of media-feed systems has been a joint activity between Tonejet and its partners. Early applications of the technology might be in packaging and book printing. Newcomb said, "We offer a combination of cost, quality, and throughput that lets us meet the needs of mass printers. You have to be able to offer a cost per print that is comparable to what the customer is paying at the moment." That cost hurdle, so far, has been an elusive target, but it is *everyone's* target. Newcomb said the crossover point after which conventional (flexo or litho) technology is less expensive than Tonejet is at about 100,000 pieces. Assuming that one can deliver prints at an attractive cost, one must then produce prints of sufficient quality. Newcomb sees opportunity in packaging markets—high-quality packaging is a way of providing a store-shelf demonstration of product quality, which is important in justifying premium product prices. Finally, there are the benefits to be derived from demand printing. Newcomb does not expect runs of one. "But there are a lot of applications where people want 5,000 of something," he said, "and it is difficult and expensive to do that on conventional systems." Newcomb pointed out that, since very few books are produced in batches of more than 100,000, the Tonejet technology could address virtually the entire book market.◊

Printers

On July 16, 2007, **Kyocera Mita America** (Fairfield, NJ) introduced the KM-C4035E, a color MFD that prints color pages at 35 ppm. A day later, the company announced the KM-C3232E, KM-C3225E, and KM-C2525E. The KM-C3225E prints both color and monochrome pages at 32 ppm. Both the KM-C3225E and KM-C2525E print 25 color pages per minute. They differ in their black-and-white print speed: the KM-C3225E prints 32 monochrome pages per minute, while the black-and-white speed of the KM-C2525E is 25 ppm.

The new models appear to use the same basic print engine, since the paper handling is just about identical. However, the KM-C4035 is slightly larger than the

Kyocera Mita KM-C4035E/3232E/3225E/2525E Product Specifications

	KM-C4035E	KM-C3232E/3225E/2525E
Color Print Speed	35 ppm	KM-C3232E: 32 ppm KM-C3225E: 25 ppm KM-C2525E: 25 ppm
B & W Print Speed	40 ppm	KM-C3232E: 32 ppm KM-C3225E: 32 ppm KM-C2525E: 25 ppm
Print Resolution	600 dpi (256 levels)	600 dpi (256 levels)
Scan Resolution	600 dpi, 400 dpi, 300 dpi, or 200 dpi	600 dpi, 400 dpi, 300 dpi, or 200 dpi
Processor	800 MHz PowerPC 750GL	600 MHz PowerPC 750FL
PDLs	PRESCRIBE, PCL6 (PCL XL, PCL 5c), PS 3 emulation, HP-GL/2 emulation	PRESCRIBE, PCL6 (PCL XL, PCL 5c), PostScript 3 emulation, HP-GL/2 emulation
Memory	768 MB, expandable to 1 GB	768 MB, expandable to 1 GB
Storage	40-GB hard drive	40-GB hard drive
Networking	10/100BaseTX	10/100BaseTX
Paper Handling	1,100 pages standard input, 4,100 max. Two 500-sheet drawers 100-sheet multi-purpose tray	1,100 pages standard input, 4,100 max. Two 500-sheet drawers 100-sheet multi-purpose tray

Paper Weights	500-sheet drawers: 16 lb. to 28 lb.
	  (60 to 105 gsm)
	Multi-purpose tray: 16 lb. bond to
	  120 lb. index (60 to 222 gsm)
	Duplex: 16 lb. to 28 lb. (60 to 105 gsm)
	ADF (opt.) 9 lb. to 42 lb. (34 to 156 gsm)
		500-sheet drawers: 16 lb. to 28 lb.
		  (60 to 105 gsm)
		Multi-purpose tray: 16 lb. bond to
		  120 lb. index (60 to 222 gsm)
		Duplex: 16 lb. to 28 lb. (60 to 105 gsm)
		ADF (opt.) 9 lb. to 42 lb. (34 to 156 gsm)

Paper Sizes	500-sheet trays and multipurpose tray:
	  5.5" by 8.5" to 11" by 17"
	Large-capacity tray (opt.): 8.5" by 11"
		500-sheet trays and multipurpose tray:
		  5.5" by 8.5" to 11" by 17"
		Large-capacity tray (opt.): 8.5" by 11"

Duty Cycle	150,000 pages per month	100,000 pages per month
Size	23.82" W by 29.33" H by 26.33" D	23.82" W by 29.33" H by 25.98" D
Weight	222.7 lbs.	216 lbs.
Base Price	$13,109	KM-C3232E: $10,711 KM-C3225E: $9,722 KM-C2525E: $9,062

Source: Kyocera Mita

other three, has a faster printer-controller processor, and has a higher duty cycle. The KM-C4035 appears to be the MFD version of the FS-C8100DN printer Kyocera Mita introduced in March 2007. The KM-C3232E and KM-C3225E are "enhanced" versions of the KM-C3232 and KM-C3225 introduced in April 2006. The KM-C2525E is an addition to the line. The KM-C2520 (20-ppm color, 25-ppm black and white), also introduced in April 2006, remains in the line.

The new products have an "E" in their name because they offer enhanced PDF functionality. While scanning to PDF from the machine, files can be compressed and encrypted.

Counting the earlier models of the new products, which are still listed on the web site, Kyocera Mita now has eight color MFDs in its line. All but one have a maximum sheet size of 11" by 17", which means the line is positioned for business use. Without the ability to do full-bleed 11" by 17" on 12" by 18" or 13" by 19" paper, markets such as quick printers and many applications in graphic arts will be closed off. Kyocera Mita's lone larger-than-tabloid MFD is the KM-C4008, a single-engine, 8-ppm color/40-ppm B & W product.◊

On June 12, 2007, **Canon USA, Inc.** (Lake Success, NY) introduced the Color imageRunner C5185, a replacement for last year's C5180. The 51-ppm print engine and paper handling remain unchanged. The new iR C5185 has a speedy 100-image-per minute single-pass duplexing automatic document feeder. Among the technical challenges for Canon in developing the faster scanner were on-the-fly color matching, and developing