

Kent Displays Begins Roll-to-Roll Production of Flexible Reflex™ LCDs In Ohio Facility

By Al Davis, Sr. Director, Sales & Marketing, Kent Displays
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The display industry is changing right before our eyes. Every day brings design and manufacturing advances that allow displays to be used in new and exciting applications. Many of these new applications have the potential to literally change the way we live our daily lives.

Kent Displays, manufacturer of Reflex LCDs, is one of the companies at the forefront of these advances. Founded in 1993 in Kent, Ohio, the company experienced steady growth over its first 15 years, primarily through its line of bistable glass LCD modules. Based on that solid foundation, Kent Displays embarked on a major capital project in 2008 that stood to have a dramatic impact on both the direction of the company and the entire display industry itself. This project was the design of the world's first roll-to-roll plastic display manufacturing line, installed in October of 2008 at its Kent headquarters.



Kent Displays installed a roll-to-roll production line in October 2008, believed to be the first in the world for manufacturing flexible LCDs.

Installation of that line is now complete and final commissioning is in its last phase. The line is on target to reach full production capabilities early in the third quarter of 2009, positioning the company to be a market leader in the flexible display industry. The Kent facility has capacity to add more lines in the future as product demand increases.

Unlike traditional sheet-based methods for flexible display production, the roll-to-roll line produces finished Reflex displays from rolls of plastic. The highly automated process has many advantages over its labor intensive predecessor. In addition to much higher output capabilities, per unit cost and waste water/chemicals are substantially reduced. Ultimately, the line truly opens the door to the commercialization of flexible displays on

plastic substrates, the applications for which are nearly endless. Many of these applications were previously unachievable with glass displays and cost-prohibitive with existing flexible displays production methods.

Flexible Reflex displays are ideally suited for a myriad of new and unique applications because of their conformability, thinness, ruggedness, and light weight. When these features are added to those common of all Reflex displays — excellent optical

characteristics, no power image retention and sunlight-readability – the potential applications expand even further. Of the new applications in which flexible Reflex displays can be utilized, there are three initial areas of focus for Kent Displays: smart cards, electronic writing tablets and electronic skins.

Smart Cards



The feature set of flexible Reflex displays makes them ideal for smart card applications.

Perhaps no other application utilizes the total feature set of flexible Reflex displays more than smart cards. This feature set, combined with the Kent Displays' capability to meet production volume requirements of card manufacturers, brings real viability to mass market smart cards with stored value, one time password, promotional and medical record systems capabilities. While Reflex displays include the flexibility that all smart card applications require, their other characteristics —no power image retention, thinness (less than .3mm typical), durability and segmented or graphic output — are equally important in making smart cards a true commercial reality.

Electronic Writing Tablets



The eNote LCD writing tablet has received strong initial response from consumers and industry groups.

Electronic writing tablets represent the second initial focus application for flexible Reflex LCDs. For this application, Kent Displays has developed its own direct-to-consumer product, the eNote™ LCD writing tablet. A cost-effective, environmentally-friendly alternative to traditional pen and paper, the eNote tablet incorporates a pressure sensitive, flexible Reflex display that responds to various styli (even a finger) and erases at the touch of a button. Power is required only to erase (provided by an internally-sealed battery rated at 50k erasures), not to retain an image

eNote tablets have many uses in the classroom, office, home and even on the athletic field. They are ideal for student practice exercises (e.g., handwriting, arithmetic), sketching/doodling, game playing (e.g., tic tac toe), list making, play

diagramming and general memo writing. Initial market response to the eNote tablet has been strong and includes the inaugural FLEXI product development award for most innovative development in 2009.

Electronic Skins



Artist conception of a cellular phone with an integrated Reflex electronic skin from Kent Displays.

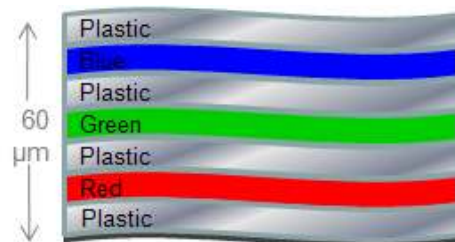
Electronic skins are the third initial focus application for flexible Reflex displays. Electronic skins provide a new way to personalize cell phones, media players, notebook computers and other personal electronic products, one that allows the user to dynamically change the product color/appearance to match their mood, clothes, preference or device state (e.g., visual ring tone, visual voice mail indicator).

Permanently molded to the outer case of the product, electronic skins offer consumers and product manufacturers numerous advantages over current static personalization options such as plastic cases, adhesive skins and appliquéés (beads/stickers).

For consumers, electronic skins provide a permanent personalization solution that allows spontaneous appearance changes without the purchase of accessories or a similar product in a different color. As a device status indicator, electronic skins provide a new level of functionality unavailable in similar previous products. Based on general consumer response to other product advances in the past, it is likely this type of new functionality will be highly valued. For product manufacturers, electronic skins represent a paradigm shift in the way they can differentiate their products. Electronic skins also offer the potential for them to increase revenue previously captured by providers of after-market personalization products (through increased incremental sales of products with skins and/or higher prices for them).



An engineering kit for Reflex electronic skins is now available.



Reflex electronic skins measure just 60 microns thick and utilize a stacked design for high brightness and optimal color.

A Major Player in a New Era

“Following a significant investment of labor and capital in the development and manufacturing of plastic substrate displays, Kent Displays is now realizing the fruits of its labor in the form of mass-produced, flexible Reflex LCDs,” states Dr. Albert Green, CEO, Kent Displays. “The display markets have been waiting patiently for products of this type that are conformable, cost effective and rugged. With flexible Reflex displays, Kent Displays is positioned to be a major player in ushering in this era.”

To learn more about Kent Displays complete line of Reflex displays, including our portfolio of glass-based products, visit www.kentdisplays.com or the Kent Displays booth (#265) at the SID Display Week conference in San Antonio, Texas, 5/31- 6/4, 2009.

About Kent Displays

Founded in 1993 by Dr. J. William Doane, director emeritus of Kent State University’s Liquid Crystal Institute (LCI) and William Manning of Manning Ventures, Rochester, N.Y., Kent Displays is a world leader in the research, development and manufacture of no power liquid crystal displays for unique, sustainable applications. Push Green™ represents our commitment to sustainable products and manufacturing processes.

About Al Davis

Al Davis is the Senior Director of Sales and Marketing for Kent Displays. Al is a display industry veteran having pioneered the sales and marketing of touch panel, plasma, microdisplay and other technologies actively offered in the markets today. Al began his career in sales at IBM and held senior sales and marketing positions with various technology companies such as Fujitsu, Three-Five Systems, Carroll Touch, S-Vision and Clairvoyante.

Al has a Bachelor of Business degree (Marketing) from the University of Georgia and a Master of Arts (Management) from Pepperdine University.