March 18, 2010

Technical announcement

SEIKO's 'Future Now' project delivers a new generation E-Ink watch. The world's first EPD watch with an active matrix system.

At Baselworld 2005, SEIKO unveiled the world's first 'Electronic Ink' watch. It offered an entirely new kind of display which was ultra-thin, high contrast, and which allowed much higher visibility from a much wider angle (almost 180 degrees). In addition, it required a very low level of power while having a virtually unlimited size of display. This "E-Ink" or EPD* watch excited great interest and won a prize at the "Grand Prix d'Horlogerie de Genève" award ceremony in autumn 2006. Since then, this technology has become much more widely understood and appreciated by consumers, thanks to the increasing popularity of 'electronic' books.

Today, SEIKO takes this exciting new technology into a new age, with a new generation watch that has an active matrix display. This new display system retains all the legibility benefits of the original, but allows for a much richer range of imagery and data to be displayed on the watch dial.

*Electrophoretic Display

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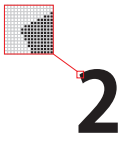
80,000 pixels, each capable of four different shades, deliver 300 dpi* of display

SEIKO is the first and only company to be able to harness Active Matrix EPD technology in a watch. Its display is strikingly clear. Each item of information is three times finer than anything achievable via conventional LCD watch technology and the system allows figures, text and graphics to appear on the dial in a much smoother and infinitely programmable way. For example, the date can be re-sized or laid out differently, according to the amount of information to be displayed in a fixed area. The 2006 'E-Ink' watch had an EPD display made of a few hundred pre-positioned segments, just in black-and-white, while the new one has 80,000 pixels, each capable of displaying in one of four grey scale shades.

- The 300 dpi resolution delivers sharp, clear images, even in small sizes.

Comparison of Segment system vs Matrix system

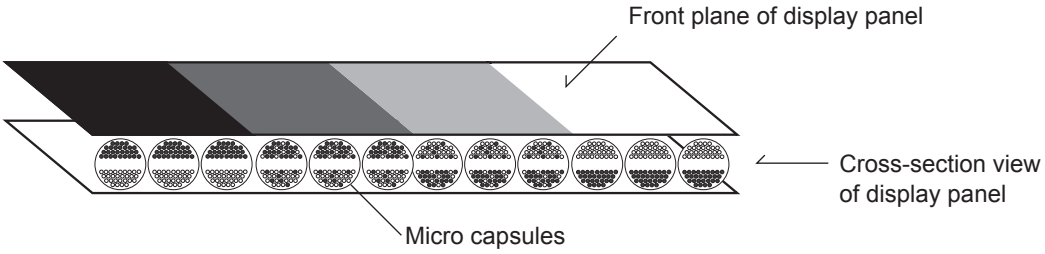
Segment system: to display with pre-set segments in specific shapes at a specific position



Matrix system: to display with multitude of tiny dots, capable of showing any shapes in any position

- Four-shade grey scale realizes rich graphical expression with perspective.

Conceptual rendering: to control the number of black & white particles (sub-capsules) in the micro capsules



Screen image

*dots per inch

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Unequalled power efficiency

As users of e-Books will know, the relatively high power consumption of devices with full sized screens limits their power reserve. With this new, second generation EPD watch, however, there is no such concern. SEIKO has succeeded in reducing the power consumption very considerably, such that the watch requires just 1/100th of the power needed to run a same sized display using the current e-Book technology. The key to this achievement lies in SEIKO's expertise in IC and other hi-tech electronics. Three innovations made it possible.

1. A TFT*, which controls the signals to the display
2. A low energy IC to control the TFT
3. An EPD driver to maximize the potential of E-Ink technology

Large panel display

The real challenge in the design of the watch was to achieve both a large size of panel which can do justice to the almost infinite display capabilities of the new E-Ink Active Matrix technology, and to make the watch easy to wear. This has been achieved by making the surrounding area of the display as small as possible. It is just 1mm wide, and the screen area is thus maximized.

This watch is a technology demonstration prototype. The watch to be marketed in autumn 2010 will be a modified version.

*The microcapsule of this electronic ink display is "Vizplex™ Imaging Film" by E-Ink Corporation.

*Thin Film Transistor

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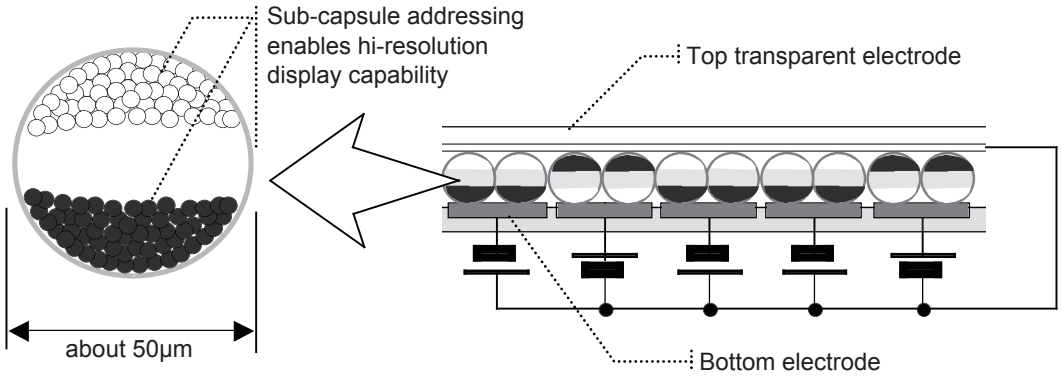
Technology of EPD

EPD stands for Electrophoretic Display, a method of display with electronic ink technology. Electronic ink is a proprietary material that is processed into a film for integration into electronic displays. Although revolutionary in concept, electronic ink is a straightforward fusion of chemistry, physics and electronics to create this new material. The principal components of electronic ink are millions of tiny microcapsules, about the diameter of a human hair. Each microcapsule contains negatively charged white particles and positively charged black particles suspended in a clear fluid. When a negative electric field is applied, the white particles move to the top of the microcapsule where they become visible to the user. This makes the surface appear white at that spot. At the same time, an opposite electric field pulls the black particles to the bottom of the microcapsules where they are hidden. By reversing this process, the black particles appear at the top of the capsule, which now makes the surface appear dark at that spot.



Note: Image not drawn to scale - for illustration purposes only.

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