

## Display Week 2014 Daily News Items

by Geoff Walker

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### Display Week Touch Poll Shows Surprising Disconnects Between Industry Direction and User Preference

During [Monday's Seminar S1](#), "Issues, Insights, and Interactions on Touch HMI," by Geoff Walker and Gary Barrett), the speakers asked the audience the questions listed below. The audience responded by raising their hands. Because of the size of the audience (134 people), exact answer counts weren't possible, so estimates were made. (Before the questions started, the speakers made everyone in the audience raise their hand as a warm-up exercise, which helps increase audience participation in the polls.)

1. **Question:** Which would you rather do: (a) Hover your finger above the screen to view choices and then touch to select, or (b) Press lightly to view choices and then press harder to select?

**Answer:** Hover = 1/3; Pressure = 2/3

All the p-cap touch controller suppliers are implementing (or have already implemented) hover as the industry's preferred solution to the need for mouseover emulation, since nobody has successfully developed absolute pressure-sensing for p-cap yet. This audience response shows a definite preference for pressure sensing, which is not where the industry is headed.

2. **Question:** For those of you that write Kanji characters on a smartphone screen, how many of you are comfortable using your fingers, and how many would prefer to use a stylus?

**Answer:** Fingers = two people; Stylus = the great majority

This answer was quite surprising, since the speakers were under the impression that Asian users are generally happy using their fingers to write Kanji characters on a smartphone, particularly since the software suggests characters based on partial input (the same way that English words are suggested based on partial input using an onscreen keyboard). This answer strongly supports the idea that use of a stylus (probably a passive stylus) is likely to move into the mainstream.

3. **Question:** Are you more likely to want a stylus on a smartphone or a tablet?

**Answer:** Smartphone = almost nobody; Tablet = almost everybody

Taking notes, making sketches and drawings, using a stylus as a high-precision pointing device – all of these activities make more sense on a tablet than a smartphone, so the audience's preference is easily understandable.

4. **Question:** Do you see a need for simultaneous stylus and touch.

**Answer:** Yes = 25%; No = 75%

Microsoft is working hard on enabling simultaneous stylus and touch (which is not a native capability of Windows 8), but most people don't see a need for it (yet), probably because of the lack of an obvious consumer application.

5. **Question:** How many of you are completely satisfied with the way touch works today on your smartphone and tablet?

**Answer:** Zero people held up their hand.

This audience response was stunning. The fact that nobody is completely satisfied with touch today really brings into question the common OEM/ODM practice of supplying touch that's "good enough." Clearly "good enough" isn't.

6. **Question:** Who has more impact on touch, Windows/Microsoft or Android/Google?

**Answer:** Windows/Microsoft = 6 people; Android/Google = everybody else

While this is not a very surprising audience response, the speakers pointed out that Microsoft has had quite a large influence on the touch industry over time due to the fact that it has set a lot of technical specifications on touch.

7. **Question:** Has anyone seen a demo of a flexible touchscreen on top of a flexible OLED display?

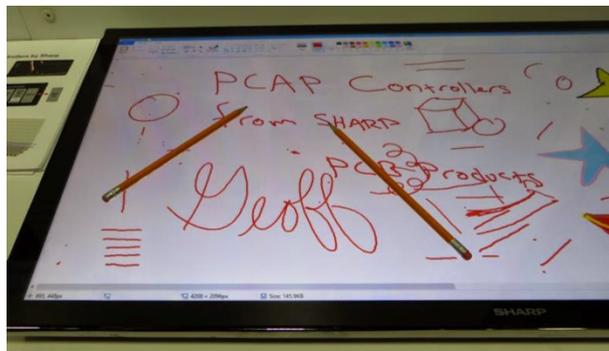
**Answer:** Zero people held up their hand.

Everyone has seen demos of flexible OLED displays, and everyone has seen demos of flexible touchscreens (for example, built on Corning's 100- $\mu$ m Willow glass). But nobody in the audience (or the speakers) has seen the two combined yet. It's not clear if the reason is a technical impediment, or simply the lack of a real-world application.

8. **Question:** How many of you have seen a tablet that has a passive stylus with a 1.5 mm tip instead of today's big, ugly, uncomfortable 7 mm rubber tip?

**Answer:** Eight people held up their hand

All of the p-cap touch-controller suppliers have increased their signal-to-noise ratio (SNR) to the point where you can now touch with a very fine-tipped passive stylus. In fact, on the show floor Sharp was demonstrating a 22-inch touch p-cap touchscreen that worked perfectly with a #2 pencil. The problem is that very few OEMs have rolled out products that offer this capability so far. By the end of this year, that situation should have changed significantly. The photo below shows a section of Sharp's 22-inch touchscreen with two #2 pencils.



**Sharp's 22-inch touchscreen** (using one of Sharp's new series of p-cap touch controllers) works with a #2 pencil as the touch-object. Interestingly, one of the two pencils shown on the display even worked with the eraser (not just the pencil tip), probably because it was worn down more than the other one. Photo by author.

## Japan Display, Inc., Reveals Embedded Touch Strategy



***Japan Display, Inc.’s (JDI’s) latest “Pixel Eyes” hybrid in-cell/on-cell embedded touch is shown here in a 7-inch display with 1,200 x 1,920 pixels, which is 323 ppi. The circles on the screen (drawn as fast as possible with a 1 mm-tip passive stylus) demonstrate quite good performance, with only a couple of lost points. Photo by author.***

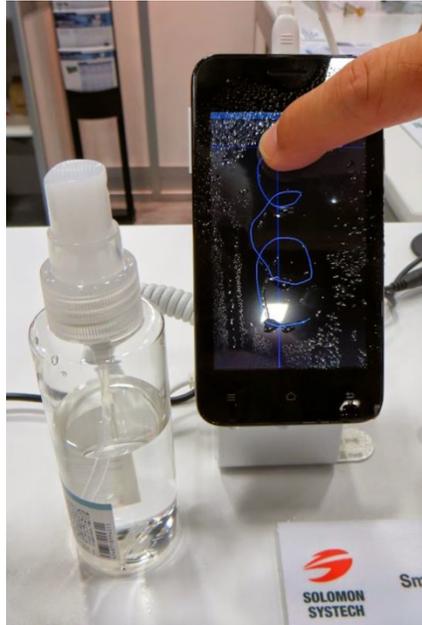
Japan Display, Inc. (JDI) demonstrated the latest iteration of “Pixel Eyes”, its branded hybrid in-cell/on-cell embedded touch. This embedded touch architecture was first described in the [Information Display article](#) covering Touch at Display Week 2012, and then updated in the [Information Display article](#) covering Touch at Display Week 2013.

I had the opportunity to spend a few minutes with Hiroyuki Ohshima, JDI’s Chief Strategy Officer and Deputy Chief Technology Officer. During our conversation, Ohshima-san made the following comments:

- JDI plans to stick with the hybrid in-cell/on-cell construction rather than moving to on-cell or true in-cell. Hybrid construction has high sensitivity, it works well with a fine-tipped stylus, the manufacturing process has been perfected, it can be produced with high yield, and it can be scaled easily. [This answer of “we’re sticking with what we know” is the same reason that many discrete touch-panel manufacturers give for sticking with a particular stack-up such as GFF, G1F, or GG. Once one gets good at something, there’s a lot to be said for continuing to leverage it even though other alternatives are available.]
- JDI is definitely going to use Pixel Eyes in a 10-inch tablet. There are no technical impediments; all the engineering and manufacturing problems have been solved so it’s just a matter of business strategy. JDI is currently delaying introducing a product in order to make sure that it has a fully differentiated solution.
- JDI believes that it could definitely produce a 13.3-inch display with Pixel Eyes (i.e., for use in an Ultrabook), but doesn’t participate in that market and doesn’t know the market requirements. Plus, JDI also views the touch notebook market as being too small. So even though it’s technically possible, it’s unlikely that JDI will use its hybrid in-cell/on-cell embedded touch technology in displays larger than 10 inches.

- JDI believes that ALL display makers are working on some form of embedded touch because of the revenue and profitability that it brings. While I characterized the battle between the display-makers and the touch-panel makers as a “war”, Ohshima-san wasn’t willing to go quite that far.

## Water-Resistant Algorithms



***Solomon Systech demonstrated water-resistance on a 4-inch, true single-layer, mutual-capacitance smartphone touch panel. Note the spray bottle of water on the left and the large number of water droplets on the screen. Photo by author.***

Demonstrations of touch-panel water resistance can be seen in a number of booths at Display Week this year; it's part of the trend of enhancing projected-capacitive (p-cap) touch to make it more environmentally resistant.

Most often, water-resistance is achieved by operating a touch-panel in two modes and switching back and forth between them: self-capacitance (using only the top electrode layer) and mutual capacitance (using both electrode layers). Self-capacitance is unaffected by water, while mutual capacitive sees water as a touch.

[Solomon Systech](#), a Hong-Kong-based touch controller supplier, demonstrated water resistance using only algorithmic support on a 4-inch, true single-layer, mutual-capacitance p-cap touch-panel. This is an achievement because it's very difficult to distinguish water droplets from touches using only mutual capacitance. I asked if perhaps the Solomon Systech controller was using only a portion of the single-layer electrode in self-capacitance mode, and the booth representative insisted that the water resistance was accomplished purely via mutual-capacitance algorithms running on the touch controller.

True single-layer mutual-capacitance touch-panels have rapidly become the configuration of choice for low-end smartphones due to their low cost; Solomon Systech's ability to support more advanced functionality such as water-resistance purely through mutual-capacitance firmware provides an interesting illustration of how the capability of p-cap touch is continuing to expand even at the very low end.