How Synaptics TDsync™ Technology Eliminates Problems Caused by Display Noise in Smartphones and Tablets

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Introduction

Synaptics’ patent-pending TDsync™ technology coordinates and synchronizes the touch sensing and display update functions to eliminate problems caused by display-induced noise in the touch sensing subsystem. The result is a more responsive and reliable touchscreen with best-in-class capacitive sensing performance, delivering a better user experience.

Modern smartphones and tablets are required to detect the presence of objects that have very small touch signal strength, such as a gloved finger or a 1 mm passive stylus. In fact, the signal strength from these objects may be less than the magnitude of the display-induced noise. If not adequately mitigated, electrical noise from the display can interfere with touch sensing—reducing a device’s ability to accurately detect finger location and movement.

Inaccurate touch sensing can cause touches and gestures to be missed, requiring the user to repeat the action. Alternatively, the touch sensor may report a “ghost finger”; in effect, an unintended touch or gesture, which can be even more problematic. Imagine inadvertently launching an app which you must then close, or worse, accidentally completing a banking transaction that you intended to cancel. In these situations, users are forced to conclude that the device is slow, unresponsive, or even malfunctioning, resulting in higher levels of frustration and dissatisfaction.
Completely Avoiding Display Noise

The source of display noise is the on/off switching of the crystals in the LCD. Synaptics’ TDsync technology synchronizes the touch sensing and display update functions to occur during distinct timing intervals, thus eliminating the problems caused by display noise. Even a small amount of noise makes it difficult to detect the tiny capacitance signals associated with advanced touch features such as a passive stylus or proximity detection.

Most touchscreen designs employ at least some means of mitigating display noise, including the use of fixed-interval touch/display synchronization, a higher touch transmission voltage and/or sophisticated waveform analysis algorithms. However, these methods can impose design trade-offs and increase production costs.

As display resolutions increase, so too must display driver performance in order to maintain image quality with an acceptable refresh rate. However, recent display driver advances have outpaced increases in resolution, and a screen refresh can now occur in less time than is allotted by a standard 60 Hz or 120 Hz refresh rate. This creates intervals of time during which the display is not being driven, and is thus free of electrical display noise. TDsync algorithms interleave touch sensing with display updates so that sensing always occurs when the display is idle and absent of any display-induced noise.

The TDsync Advantage

The superior touch performance enabled by TDsync technology is available with Synaptics In-Cell touchscreen controller implementations. Focused engineering investments and strategic acquisitions have made Synaptics the industry leader in display integration. With state-of-the-art touch-and-display engineering and technology, Synaptics is uniquely positioned to deliver the optimum user experience by satisfying both the need for display driver performance and touch controller synchronization.

To learn more about TDsync technology and display integration, please visit Synaptics on the Web at www.synaptics.com or send an email to info@synaptics.com.
About Synaptics

Synaptics is the pioneer and leader of the human interface revolution, bringing innovative and intuitive user experiences to intelligent devices. Synaptics’ broad portfolio of touch, display, and biometrics products is built on the company’s rich R&D and supply chain capabilities. With solutions designed for mobile, PC and automotive industries, Synaptics combines ease of use, functionality and aesthetics to enable products that help make our digital lives more productive, secure and enjoyable. (NASDAQ: SYNA) www.synaptics.com.

Revision history

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<tr>
<th>Revision</th>
<th>Reason for Change</th>
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<td>Initial release.</td>
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