



TouchSense® Solution for Digital Cameras

Camera makers are increasingly adding advanced features and large displays to their products, reducing the space available for discrete mechanical controls. Touch screens seem the perfect solution, offering both display and flexible user interface that presents only the information relevant to the immediate task. However, touch screens have a significant drawback—there is no tactile feedback.

Already common in touch screen mobile phones, touch feedback increases users' confidence by restoring the familiar feel of pressing physical buttons. Independent research* shows that a touch screen incorporating touch feedback:

- Increases speed and accuracy of data input
- Reduces cognitive loading
- Reduces user frustration
- Increases user satisfaction

Highlights

- Allows touch screens to “touch back,” supplying intuitive yet unmistakable confirmation
- Improves usability, user engagement, and satisfaction
- Solves UI design problems and provides a superior user experience

*For a summary of recent published findings on the value of tactile feedback in human-computer interaction, see the Immersion white paper *The Value of Haptics*, available at www.immersion.com/docs/Value-of-Haptics_Jun10-v2.pdf.



Tactile feedback is helpful and distinctive, giving users simpler, more intuitive interactions, and easy access to your products advanced features, another key differentiator.

Clear confirmation, less distraction

Touch screens are efficient for both user input and data display, but providing effective feedback presents a challenge. Their sound cues can be hard to hear over noise, and visual cues are often hard to see in direct sunlight and can be obscured by fingers. The result is that the user cannot be certain that the device took their input, which can be frustrating and distracting. A common reaction is to repeatedly press the touch screen — or to press much harder to get a response — which can increase wear on the device.

Touch feedback for digital camera touch screens can lead to fewer and less forceful touch screen presses because the user immediately understands when their input is received: the touch screen touches them back. TouchSense tactile feedback is very much like the familiar sense of confirmation that mechanical buttons provide.

Adding touch feedback can both increase touch screen longevity and reduce mechanical failures. Tactile confirmation increases user satisfaction and more effectively supports new complex user interfaces within a limited space.

Competitive advantage

You can use the touch screen's flexible display capability and the TouchSense system's natural interaction to guide and even delight the user. For example, on a touch screen you can provide physics-based scrolling through folders of images and camera options. Physics-based scrolling is characterized by a more mechanical-like behavior and a feeling of mass. Adding a slight pulse or the feel of small detents during this interaction supplies a sense of familiarity and gives the user more sense of control. When the user reaches the end of the scroll list, a unique haptic effect can intuitively and silently provide an alert that there are no more list items. It's the kind of subtle detail that fosters more of an emotional connection because it's helpful and caring.

Immersion's haptic feedback technology makes touch screen interactions simpler and more intuitive—which means that users are more likely to use your product's advanced software features. More extensive use of advanced features emphasizes product differences and increases its value.

In response to presses on a touch screen, TouchSense software and firmware control an actuator in producing a wide variety of vibrations or effects.

How it works

TouchSense system components include:

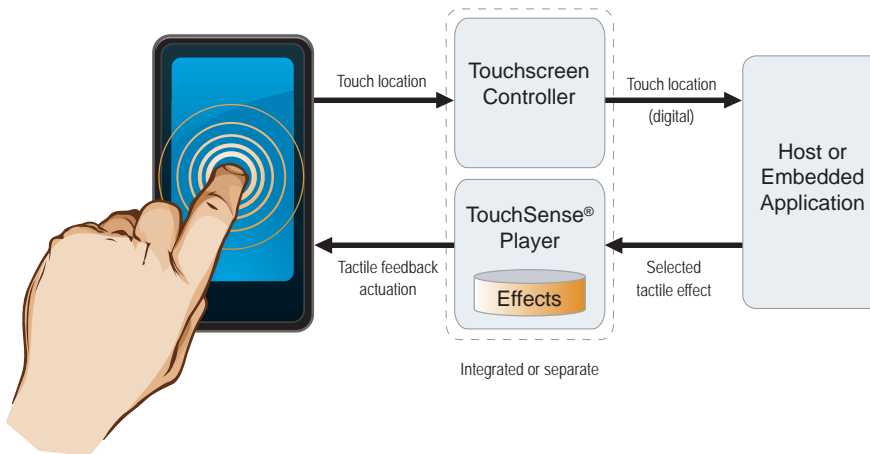
- TouchSense player
- Off-the-shelf, eccentric rotating mass (ERM) actuator
- Tactile effects library for common touch screen actions

When the user touches the screen, a position signal is sent to the host application. The host application interprets this signal and commands the TouchSense player to control an actuator in playing a specified tactile effect. The actuator's vibrations transfer to the touch screen, which gives the user the perception of pressing a button or sliding a scrollbar.



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TouchSense technology provides high-speed control over standard vibration actuators like those used in billions of mobile phones. It tunes the output of the actuator to enable a wide range of tactile effects — from those that reproduce the press and push-away characteristics of various mechanical switches to complex nonlinear vibrations — enabling a rich tactile feedback vocabulary.





About Immersion

Haptic technologies are transforming digital devices everywhere. Electronics manufacturers are providing digital controls with authentic tactile confirmation. Industrial and commercial manufacturers are increasing the accuracy, efficiency, and safety of the user experience. Content developers are creating a more engaging experience for mobile handset users. Game developers are captivating users with more intense and enjoyable entertainment. Medical schools and hospitals create a more realistic and engaging multisensory experience for surgical simulation training. Immersion technology puts the sensation of touch in the hands of visionary manufacturers worldwide.

Founded in 1993, Immersion Corporation is the recognized leader in digital touch technology and products. Immersion's technology is deployed across automotive, consumer electronics, entertainment, industrial, medical training, and mobile products. Immersion holds more than 900 issued or pending patents in the U.S. and other countries.

For more information about adding tactile feedback to your camera models, visit www.immersion.com/products/touchsense-tactile-feedback/2000-series/ or e-mail us at touch@immersion.com.

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