



## TouchSense® Solution for Personal Computers

Personal computer manufacturers are increasingly adding advanced touch features and multimodal capabilities as the popularity of touch screens evolve to ever richer media. With TouchSense haptic (touch) feedback solutions for personal computers—virtual keyboards, widgets, music, and games come to life—transforming the user experience.

### Touch feedback for touch screens

Touch screens are quickly emerging as the preferred interface in a broad range of Consumer Electronics devices from personal media players to digital still cameras and mobile computing. As these touch surfaces replace old style buttons, the role of haptics becomes even more critical to restore the sense of touch feedback to your digital devices. Without the familiar feel of mechanical buttons, usability and user satisfaction are reduced for many touch screen applications.

Immersion's TouchSense tactile feedback solutions for personal computers:

- **Transform the User Experience** with unique and customizable touch feedback effects.
- **Excite the Senses** in games, video and music.
- **Improve Safety** by overcoming distractions.
- **Restore "Mechanical" Feel** providing intuitive and unmistakable confirmation.
- **Expand Usability** when audio and visual feedback are ineffective.



You can use the touch screen's flexible display and the TouchSense system's customizable haptics to guide and even delight the user.

#### **Transform the User Experience**

You can use the touch screen's flexible display and the TouchSense system's customizable haptics to guide and even delight the user. With tactile feedback, physics-based scrolling, which suggests mass and mechanical action, is even more intuitive, interactive, familiar, and conveys a higher sense of control. For example, a tactile pulse marking each item orients the user much like scrolling through a list. A subtle bounce effect can be applied to feel the beginning or end of the list. Adding haptic sensations to simple tasks like flipping through pages or screens offers personal engagement and perceived quality.

#### **Excite the Senses**

Combined with graphics and sound, tactile feedback can be used to create a palpable atmosphere to strengthen the illusion of games, music or videos. It adds drama, suspense, and intensity with a sense of realism that brings the medium to life. Fully immerse yourselves in games with realistic feel of road vibrations on a cobblestone street, the ricochet of a pinball off a bumper or the varying sensations of a humming light saber. A "haptic track" supplies big sound-system-like bass for music, movie soundtracks, and videos. Feel the whirling thud of a helicopter blade, the rapid fire of a machine gun, or varying intensity of an explosion.

#### **Restore "Mechanical" Feel**

Supplying touch feedback for button presses offers unmistakable confirmation. It restores the familiar sensation of pressing and releasing the key—with a "finger down" and "finger up" touch effect the user immediately understands when their input is received. An intuitive tactile response for a virtual keyboard is a perfect application of the technology and can be uniquely customized for a specific feel such as an electric typewriter, manual typewriter, or light bounce.

#### **Expand Usability**

Touch screens efficiently combine control and display functions, but their ability to provide confirming feedback is challenged when audio and visual feedback are ineffective. Sound cues can be drowned out by music and video entertainment or be too disruptive to others. Visual cues are often hard to see in direct sunlight and are easily obscured by fingers. The result is that the user cannot be certain that the device took their input, which can be frustrating and distracting. Tactile feedback improves usability at times when audio and visual feedback are limited by giving the user certainty that the system is keeping up with their selections.

## How it works

In response to presses on a touchscreen, TouchSense software and firmware control an actuator to produce a wide variety of vibrations or effects.

The TouchSense system components include:

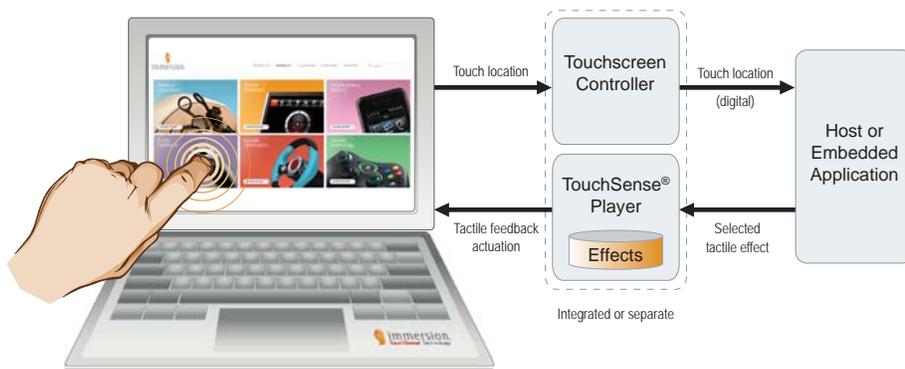
- TouchSense player
- Off-the-shelf actuator
- Tactile effects library for common touchscreen actions

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 the actuator in playing one of a wide range of tactile effects. These effects can be as varied as reproducing the press and push-away characteristics of mechanical switches or complex nonlinear vibrations. The actuator, a component standard in billions of mobile phones, transfers its vibrations to the touchscreen, which gives the user the perception of pressing a button, flipping a switch, or sliding a scrollbar.

The compact TouchSense player and tactile effects library are embedded in a microcontroller that has been field-tested in tens of millions of products. The library contains predefined effects that can be customized to provide distinctive feedback for various user-interface functions, such as button location, button press, slider actions, and list navigation. Consisting of readily available components, the entire haptics subsystem is fast and easy to implement. Detailed electromechanical design and integration guidelines help ensure an optimal implementation in the target device.



Intuitive tactile response for Fast Forward, Rewind, Step, and Pause or Play is a perfect application for TouchSense technology, especially for small virtual buttons.





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## 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, 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 product's touchscreen, visit [www.immersion.com/products/touchsense-tactile-feedback/2000-series](http://www.immersion.com/products/touchsense-tactile-feedback/2000-series) or e-mail: [touch@immersion.com](mailto:touch@immersion.com).

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