

## TouchSense® Solution for Personal Media Players

Personal media player manufacturers are increasingly adding advanced features and large displays, reducing the space available for discrete mechanical controls. Touchscreens seem the perfect solution, offering both display and flexible user interface that presents only the information relevant to the immediate task. However, touchscreens have a significant drawback—there is no tactile feedback.

### Touch feedback for touchscreens

Without the familiar feel of mechanical buttons, usability and user satisfaction are reduced for many touchscreen applications. Immersion's TouchSense tactile feedback technology is the solution. It restores the familiar feel of pressing physical buttons, increases user confidence, and enables a better user experience. Independent research\* shows that a touchscreen incorporating touch feedback:

- Increases user speed and accuracy
- Reduces cognitive loading
- Reduces user frustration
- Increases user satisfaction

### Highlights

- Allows touchscreens to “touch back,” supplying intuitive yet unmistakable confirmation without interfering with entertainment sound
- Improves usability, user engagement, and satisfaction
- Supports operation by feel, easing use when users are engaged in other activities, such as exercising
- 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](http://www.immersion.com/docs/Value-of-Haptics_Jun10-v2.pdf).



You can use the touchscreen's flexible display and the TouchSense system's natural-feeling response to guide and even delight the user.

#### **Improve usability and user satisfaction**

Touchscreens efficiently combine control and display functions, but their ability to provide confirming feedback is challenged. Sound cues are disruptive to music and video entertainment. 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. A common reaction is to repeatedly press the touchscreen — or to press much harder to get a response — which can increase wear on the device.

Adding touch feedback to media player touchscreens can lead to fewer and less forceful touchscreen presses because the user immediately understands when their input is received: the touchscreen touches them back. This certainty can improve touchscreen longevity, reduce mechanical failures, and increase user satisfaction.

#### **Competitive advantage**

You can use the touchscreen's flexible display and the TouchSense system's natural-feeling response to guide and even delight the user:

- With tactile feedback, physics-based scrolling, which suggests mass and mechanical action, is even more interactive, familiar, and conveys more sense of control. A tactile pulse that marks each item orients the user much like the detents on a radio dial. It's a warmer, more emotional interaction not only because it's familiar, but simply because it's there — helpful and caring.
- Tactile feedback accompanying gestures, such as when browsing media libraries and zooming images, improves usability by giving the user certainty that the system is keeping up with their selections.
- Supplying touch feedback for button presses enables you to maintain usability for a greater number of buttons. Intuitive tactile response for Fast Forward, Rewind, Step, and Pause or Play is a perfect application of the technology especially for small virtual buttons.
- Haptics can add more to entertainment content, as well. A “haptic track” supplies big sound-system-like bass for music, movie soundtracks, and games.

## How it works

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

TouchSense system components include:

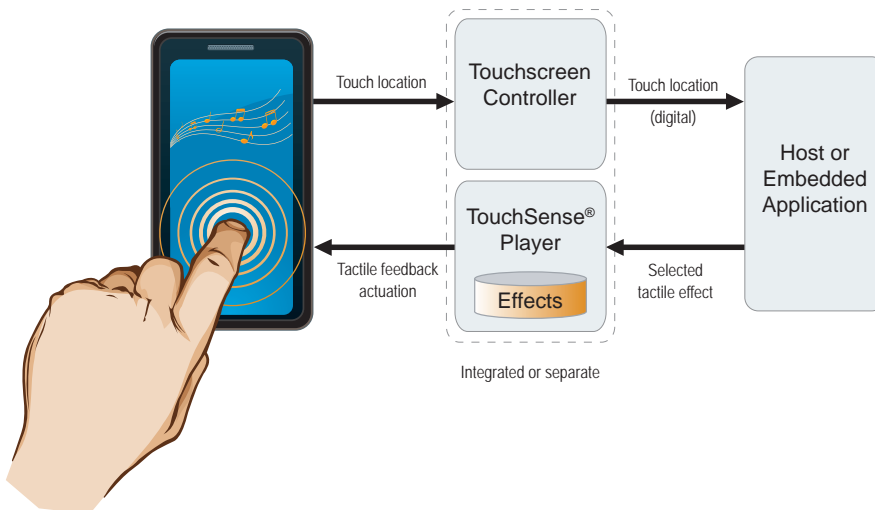
- TouchSense player
- Off-the-shelf, eccentric rotating mass (ERM) actuator
- Tactile effects library for common touchscreen actions

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

immersion.com | 408.467.1900 | 801 Fox Lane | San Jose, California 95131

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