Technology Overview

Dispersive Signal Technology

A Revolutionary New Touch Technology from 3M

Dispersive Signal Technology provides a new, innovative technology choice for retail, point of sale (POS), finance, hospitality, and gaming applications. Setting new standards for the touch industry, this patented technology delivers exceptional optics, extreme durability, and stylus support combined with great accuracy and fast touch response.

Dispersive Signal Technology works on the premise of measuring the mechanical energy (vibrations) within a glass substrate that is created when someone touches the surface of the glass. Sensors, generally placed on the backside of the glass, convert the vibrational energy into electrical signals. Using advanced proprietary signal processing algorithms, the Dispersive Signal Technology system determines the location of the touch, taking into account the profile of the vibration, glass dispersion effects, and other characteristics of the substrate. Although never before applied to touch applications, a related methodology has been used for over ten years as an evaluation technique in structural analysis circles.

The Difference is "Through" the Substrate

Where other touch technologies distribute a field across the front surface of the touch screen and rely on a touch to interrupt the field, Dispersive Signal Technology waits passively for a signal created by a touch. This fundamentally different approach means that contaminants, such as dirt, grease, and solids, can accumulate on the surface and around the edge of the screen without a significant effect on the performance of the touch screen. It also scales readily, using similar electronics for all sizes of glass. Furthermore, surface damage such as scratches or gouges generally will not affect performance, making Dispersive Signal Technology ideal for unsupervised public access as well as food service and gaming applications.

Exceptional Optics, Contaminant Resistance, and Much More

Since the substrate is pure glass with no metallic coatings, ridge reflectors, or opto-electronic components, Dispersive Signal Technology provides exceptional optical clarity and light transmission, and can be sealed to prevent contaminants from entering the touch screen enclosure, protecting the display and other internal components. Vikuiti™ Light Control or Solar Reflecting Films can be applied to the glass to keep sensitive on-screen data private from prying eyes, or to block external light in high sunlight applications.

Key Benefits

- Exceptional Optical Characteristics
- Stylus Support
- Enhanced Palm Rejection
- Scalable
- Contaminant Resistant
- Durable Glass Surface
- Performance Generally Not Affected by Surface Damage

Stylus Support

Since Dispersive Signal Technology measures the vibration created by a touch, nearly any object – finger, prosthetic device, pen, credit card, most gloves – can be used to activate the touch screen. This is particularly useful in retail and restaurant applications where the user may use different types of objects to operate the touch screen. Dispersive Signal Technology also provides enhanced palm rejection – a user can rest their hand or other objects on the touch screen during use without activating the touch screen unless they tap the surface. This unique capability is universally beneficial, but particularly useful for signature capture, bartop gaming, and kiosk applications, where users tend to rest the edge their palm against the surface of the touch screen. Enhanced palm rejection is one of many break-though capabilities 3M plans to deliver with Dispersive Signal Technology to innovatively change the touch screen industry.

Sophisticated, Yet Fast

Although Dispersive Signal Technology uses intricate, proprietary software algorithms, its touch response time rivals the fastest in the industry. In retail, POS, and entertainment applications, where users are particularly adept and quick, the faster the response of the touch screen, the more transactions occur per hour increasing productivity or profitability, and customer satisfaction.

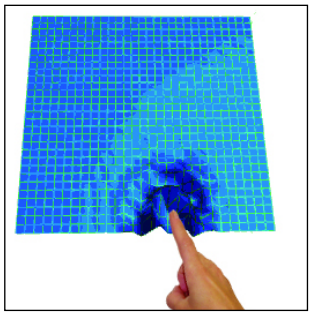
The Innovation Continues

The fundamentally different approach of Dispersive Signal Technology promises to further expand the opportunities to use touch screen technology. It brings together the unique combination of exceptional optics with stylus support and contaminant resistance, never before seen in the touch industry. Adopters of Dispersive Signal Technology will not only benefit from all the capabilities they've come to expect with other touch technologies, they will realize new benefits from advanced features such as enhanced palm rejection – the first of what will be a stream of innovative break-throughs that 3M provides with Dispersive Signal Technology.

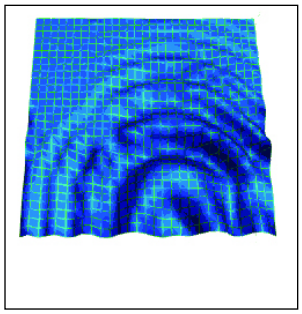
Dispersion Explained

Dispersion is the phenomenon that the velocity of a bending wave propagating through solid material is dependent upon that wave's frequency. A vibration caused by a touch generates a number of bending waves within the substrate, all at different frequencies. Because of dispersion, these bending waves propagate out to the edges of the glass at different speeds rather than in a unified wave front. The sensors at the edges sense the high frequency waves first – the lower frequency waves arrive later, with the sensors receiving a formation of waves that resemble nothing like the original pulse. This smearing effect is compounded by the reflections off the internal surfaces of the glass substrate. The net result is a seemingly chaotic mass of waves all interfering with one another throughout the substrate.

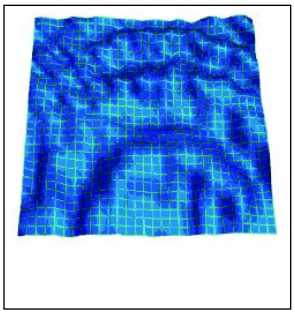
3M has successfully harnessed this technology by developing a set of proprietary algorithms that accounts for the dispersion effect, gleaning from the mass of chaos a clear, precise touch location. These algorithms are the result of extensive R&D effort providing a highly accurate and sensitive solution. No other touch technology works quite this way.



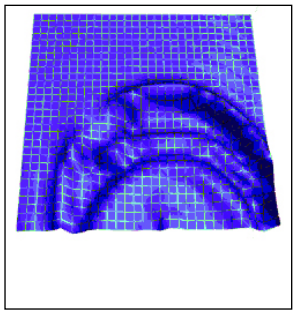
Initial Touch Down



Progressing Dispersion with the Beginning of Reflection Effects



Highly Complex Dispersion Pattern with Reflections



Post-Algorithm Pattern

3M Touch Systems
3M Optical Systems Division
300 Griffin Brook Park Drive
Methuen, MA 01844 USA
1-866-407-6666

www.3Mtouch.com

Worldwide Manufacturing Plants:

Methuen, Massachusetts
Milwaukee, Wisconsin
Vancouver, BC Canada

For more information on 3M touch products, visit 3Mtouch.com