



## Medical Applications

### High Reliability Touch for Medical Applications

As technology progresses, computers and electronic user interfaces have become commonplace in operating rooms and medical offices. Touch-screen technology is rapidly becoming the interface of choice because of its ease of use. With the ability to touch a screen to input data, rather than via keys, switches, or buttons; medical professionals are able to conduct procedures with greater efficiency, reliability, and cleanliness.

Depending on the application, certain measures have to be taken to maintain a sterile environment. Computer equipment must often be covered in plastic or other types of membranes to prevent environmental contaminants from entering the restricted area and further exposing the limitations of current touch-screen technologies.



For example, resistive touch-screen technologies can receive input from most any object. However, because the surface membrane is a key component of the design, light transmissivity and optical clarity is negatively impacted before any type of additional covering is placed over the panel.

Capacitive technologies suffer from similar limitations because it also requires a surface membrane. However, unlike resistive, capacitive inputs are limited to an uncovered / ungloved finger.

To achieve higher levels of optical clarity, durability, and reliability, F-Origin developed a touch-screen technology based on force input called zTouch™.

Since zTouch™ is force-based, it incorporates no surface membrane, therefore Inputs can be made with most any

type of object, e.g., a pen, stylus, plastic card, metal material, and a gloved / ungloved finger.

zTouch™ utilizes miniature force sensors which are positioned behind the system's touch surface and never come in direct contact with the user's input.

In addition to eliminating the surface touch membrane; water seals and other environmental enhancements can now be added. This further increases the durability / capability of the designs, e.g. IP54 and IP64 environmental standards are now possible to achieve without adding significant costs. Bezel or bezel-less designs are also available

Eliminating the surface membrane also increases light transmissivity, this can reduce backlighting requirements and power consumption. Touch panels can potentially be wrapped in plastic with minimal impact on the viewing area, while maintaining touch sensitivity.

Another issue for optical and wave-based technologies, such as surface acoustic wave (SAW) and Infrared (IR), is surface contamination. If there is a buildup of contaminants, degradation of performance or "dead zones" can occur. To avoid this issue, the touch surface needs to be cleaned on a regular basis. With no surface membrane to compromise, a zTouch™ design is not sensitive to potential performance issues created by the effects of surface cleaners.



Since zTouch™ measures location and input force of the touch, the system can be programmed for touch sensitivity. A variety of parameters and environmental conditions can be controlled, adding an additional dimension to the feature set.

### About F-Origin

F-Origin is the developer of zTouch™, an innovative force-based touch technology. zTouch™ delivers robust design advantages to OEMs and ODMs implementing touch screen, touch panel, and high durability touch user interface solutions. Founded in 2005, F-Origin is a privately held US company with headquarters in Research Triangle Park, North Carolina.



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### zTouch™ Benefits

Because panel surface membranes / films are eliminated from the design, there are a number of user benefits available to zTouch™ product developers and end users.

### Optical Performance and Durability

A touch-screen utilizing zTouch™ technology has an improved durability relative to resistive and capacitive systems because there is no surface-mounted film or membrane to wear out. The absence of a film also means no optical degradation of the display, so the screen is naturally brighter and clearer, enabling use in a broad range of indoor and outdoor environments. Additionally, the display is also more energy efficient, as less backlighting is required.

### Any Object Touch

zTouch™ works with a finger, gloved finger, stylus or any other object. In contrast, capacitive touch-screens require the touch to be from a finger or special stylus. Other technologies, such as optical-based systems, are also limited by the touch surface area.

### Design Flexibility

Since zTouch™ only requires that the touch surface be rigid, any surface material may be used (glass, plastic, metal, ceramic, etc). This provides a high level of design flexibility for touch-screen or panel-based products. The product designer can also select appropriate materials to meet enhanced durability requirements for their end product. zTouch™ is also well suited for applications that require dust and water seals.

### Handwriting and Gestures

zTouch™ supports both finger and stylus touch. Along with a high touch resolution, frequency coordinate reporting and software-defined touch and click force levels, zTouch™ is an excellent technology for handwriting and gestures.

### 3DTouch™

The zTouch™ touch-screen system supports an alternative form of multi-touch. In addition to detecting the touch coordinates, the system also determines the force level of that touch. In other words, the force of the user's touch is measured and can be used as another application input.

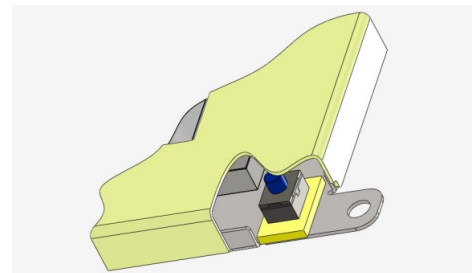
This three-dimensional touch input can be applied to fixed thresholds, where a soft touch represents mouse movement, and a force larger than the threshold represents a mouse click. The force input levels may also be used for smoothly variable input controls, such as the heat setting of a cook top or the volume setting of an audio control.

### Cost

Since the sensors in a zTouch™ system do not cover the touch screen area, the product cost is not a function of surface area, resulting in a highly cost effective solution as the touch screens/panels grow in size.

### zTouch™ Description

The core system components are; force sensors, signal amplification, and a micro controller unit. Not only can the overall system cost be kept very low, the manufacturing and assembly process is straightforward and scalable.



Close up illustration shows the placement of a force sensor in a corner behind the LCD front bezel.

The sensors are normally placed under each corner of the touch surface, where they record force changes lower than 1 mN. The zTouch™ software continuously records the sensor data and “quadrangulates” the touch coordinates. In order to ensure accuracy, a number of filtering, compensation and calibration functions are included in the coordinate calculation. The touch coordinates and touch forces are communicated at 200 points per second over USB or any other appropriate interface.