**ABSTRACT**

**TOUCH SCREEN**

First computers became more visual, and then they took a step further to understand vocal commands and now they have gone a step further and became ‘TOUCHY’, that is skin to screen.

A touch screen is an easy to use input device that allows users to control PC software and DVD video by touching the display screen. A touch system consists of a touch Sensor that receives the touch input, a Controller, and a Driver. The most commonly used touch technologies are the Capacitive & Resistive systems. The other technologies used in this field are Infrared technology, Near Field Imaging & SAW (surface acoustic wave technology). These technologies are latest in this field but are very much expensive.

The uses of touch systems as Graphical User Interface (GUI) devices for computers continue to grow popularity. Touch systems are used for many applications such as ATM’s, point-of–sale systems, industrial controls, casinos & public kiosks etc. Touch system is basically an alternative for a mouse or keyboard.

The market for touch system is going to be around $2.5 billion by 2004. Various companies involved in development of touch systems mainly are Philips, Samsung etc. Even touch screen mobile phones have been developed by Philips.

**INTRODUCTION**

A touch screen is an easy to use input device that  allows users to control PC software and DVD video by touching the display screen. We manufacture and distribute a variety of touch screen related products.

A touch system consists of a touch Sensor that receives the touch input, a Controller, and a Driver. The touch screen sensor is a clear panel that is designed to fit over a PC. When a screen is touched, the sensor detects the voltage change and passes the signal to the touch screen controller. The controller that reads & translates the sensor input into a conventional bus protocol (Serial, USB) and a software driver which converts the bus information to cursor action as well as providing systems utilities.

As the touch sensor resides between the user and the display while receiving frequent physical input from the user vacuum deposited transparent conductors serve as primary sensing element. Vacuum coated layers can account for a significant fraction of touch system cost. Cost & application parameters are chief criteria for determining the appropriate type determining the system selection. Primarily, the touch system integrator must determine with what implement the user will touch the sensor with & what price the application will support.

Applications requiring activation by a gloved finger or arbitrary stylus such as a plastic pen will specify either a low cost resistive based sensor or a higher cost infra-red (IR) or surface acoustic wave (SAW) system. Applications anticipating bare finger input or amenable to a tethered pen comprises of the durable & fast capacitive touch systems. A higher price tag generally leads to increased durability better optical performance & larger price.

The most commonly used systems are generally the capacitive & resistive systems. The other technologies used in this field are Infrared technology & SAW (surface acoustic wave technology) these technologies are latest in this field but are very much expensive.

***TOUCH SCREEN***

A touch screen is a computer display screen that is also an input device. The screens are sensitive to pressure; a user interacts with the computer by touching pictures or words on the screen.

There are three types of touch screen technology:

* **Resistive:** A resistive touch screen panel is coated with a thin metallic electrically conductive and resistive layer that causes a change in the electrical current which is registered as a touch event and sent to the controller for processing. Resistive touch screen panels are generally more affordable but offer only 75% clarity and the layer can be damaged by sharp objects. Resistive touch screen panels are not affected by outside elements such as dust or water. The **resistive system** consists of a normal glass panel that is covered with a conductive and a resistive **metallic** layer. These two layers are held apart by spacers, and a scratch-resistant layer is placed on top of the whole setup. An electrical current runs through the two layers while the monitor is operational. When a user touches the screen, the two layers make contact in that exact spot. The change in the electrical field is noted and the coordinates of the point of contact are calculated by the computer. Once the coordinates are known, a special driver translates the touch into something that the OS can understand, much as a computer mouse driver translates a mouse's movements into a click or a drag.
* **Surface wave:** Surface wave technology uses ultrasonic waves that pass over the touch screen panel. When the panel is touched, a portion of the wave is absorbed. This change in the ultrasonic waves registers the position of the touch event and sends this information to the controller for processing. Surface wave touch screen panels are the most advanced of the three types, but they can be damaged by outside elements. On the monitor of a **surface acoustic wave system**, two **transducers** (one receiving and one sending) are placed along the x and y axes of the monitor's glass plate. Also placed on the glass are **reflectors** -- they reflect an electrical signal sent from one transducer to the other. The receiving transducer is able to tell if the wave has been disturbed by a touch event at any instant, and can locate it accordingly. The wave setup has no metallic layers on the screen, allowing for 100-percent light throughput and perfect image clarity. This makes the surface acoustic wave system best for displaying detailed graphics (both other systems have significant degradation in clarity).
* **Capacitive:** A capacitive touch screen panel is coated with a material that stores electrical charges. When the panel is touched, a small amount of charge is drawn to the point of contact. Circuits located at each corner of the panel measure the charge and send the information to the controller for processing. Capacitive touch screen panels must be touched with a finger unlike resistive and surface wave panels that can use fingers and STYLUS. Capacitive touch screens are not affected by outside elements and have high clarity. In the **capacitive system**, a layer that **stores electrical charge** is placed on the glass panel of the monitor. When a user touches the monitor with his or her finger, some of the charge is transferred to the user, so the charge on the capacitive layer decreases. This decrease is measured in **circuits** located at each corner of the monitor. The computer calculates, from the relative differences in charge at each corner, exactly where the touch event took place and then relays that information to the touch-screen driver software. One advantage that the capacitive system has over the resistive system is that it transmits almost 90 percent of the light from the monitor, whereas the resistive system only transmits about 75 percent. This gives the capacitive system a much clearer picture than the resistive system.

**Ergonomics and usage**

### Finger stress

An ergonomic problem of touch screens is their stress on human fingers when used for more than a few minutes at a time, since significant pressure can be required for certain types of touch screen

### Fingernail as stylus

The human fingernail consists of keratin which has a hardness and smoothness similar to the tip of a stylus (and so will not typically scratch a touch screen). Alternately, very short stylus tips are available, which slip right onto the end of a finger; this increases visibility of the contact point with the screen.

### Fingerprints

Touch screens can suffer from the problem of fingerprints on the display. This can be mitigated by the use of materials with optical coatings designed to reduce the visible effects of fingerprint oils, such as the oleo phobic coating used in the iPhone 3G S, or by reducing skin contact by using a fingernail or stylus.

# [DEAD-TIME ELIMINATION FOR VOLTAGE SOURCE INVERTERS](http://techalone.com/2010/dead-time-elimination-for-voltage-source-inverters/)

A novel dead-time elimination method is presented in this paper for voltage source inverters. This method is based on decomposing of a generic phase-leg into two basic switching cells, which are configured with a controllable switch in series with an uncontrollable diode. Therefore, dead-time is not needed. In comparison to using expensive current sensors, this method pre­cisely determines the load current direction by detecting which anti-parallel diode conducts in a phase-leg. A low-cost diode-con­duction detector is developed to measure the operating state of the anti-parallel diode. In comparison with complicated compen­sators, this method features simple logic and flexible implementa­tion. This method significantly reduces the output distortion and regains the output RMS value. The principle of the proposed dead-time elimination method is described in detail. Simulation and ex­perimental results are given to demonstrate the validity and fea­tures of this new method.

1. **Introduction**

To avoid shoot-though in voltage source inverters (VSI), dead-time, a small interval during which both the upper and lower switches in a phase-leg are off, is introduced into the standard pulse width modulation (PWM) control of VSIs. How­ever, such a blanking time can cause problems such as output waveform distortion and fundamental voltage loss in VSIs, es­pecially when the output voltage is low.

To overcome dead-time effects, most solutions focus on dead-time compensation  by introducing complicated PWM compensators and expensive current detection hardware. In practice, the dead-time varies with the gate drive path propa­gation delay, device characteristics and output current, as well as temperature, which makes the compensation less effective, especially at low output current, low frequency, and zero current crossing. Several switching strategies for PWM power converters have been proposed to minimize the dead-time effect. A dead-time minimization algorithm was also discussed earlier to improve the inverter output performance. A phase-leg configu­ration topology proposed prevented shoot through. However, an additional diode in series in the phase-leg increases complexity and causes more loss in the inverter. Also, this phase-leg configuration is not suitable for high-power inverters because the upper device gate turn-off voltage is reversely clamped by a diode turn on voltage. Such a low voltage, usually less than 2 V, is not enough to ensure that a device is in its off-state during the activation of its complement device.

High-power inverters usually need longer dead-time than those low-power counterparts. Also due to complicated struc­tures and severe parasitic parameter variations, in practice, the dead-time for high-power inverters requires specific adjustment and/or compensation, and usually this process is time-con­suming. For general applications, automatically eliminating dead-time by gate drive technology is a desired and complete solution. Gate drives with intelligent functions are in high demand due to the emerging technology of power electronics building blocks (PEBB) and intelligent power modules (IPM) because smart functions can improve power devices’ modu­larity, flexibility and reliability.

In this work, an effective dead-time elimination method is proposed. This method is based on decomposing of a generic phase-leg into two basic switching cells, which are configured with a controllable switch in series with an uncontrollable diode. Therefore, dead-time is not needed. In this paper, the effect of dead-time in VSIs will be first introduced. The prin­ciple of the proposed method to eliminate dead-time effect is explained in detail. Simulation and experimental results are provided to demonstrate the validity and features of the proposed novel method. Flexible implementation methods are also discussed.