THE IBM STORE SERIES

"GIVE YOUR BUSINESS THE BENEFITS OF TOUCH"

GIVE YOUR BUSINESS THE BENEFITS OF TOUCH

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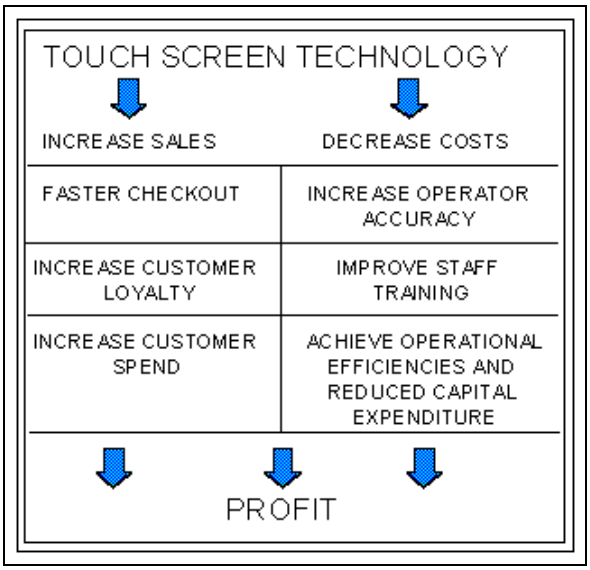
Give Your Business the Benefit of Touch

In the ever changing retail industry, retailers are continually faced with a myriad of decisions when choosing or upgrading their point-of-sale (POS) systems. While consumer buying behaviors, retail formats and information technology are changing at an extremely rapid pace, a dedicated focus on fundamental business issues ensures that retailers can effectively evaluate alternatives in order to quickly capitalize on new opportunities and gain competitive advantage.

When evaluating the various input devices of a point of sale system - touch screens, combined screen/keypad devices or distributed CRT/Keyboard configurations - consideration must be given to the effect of each on profit margins through their impact on productivity, customer service, and cost levels. As touch is a naturally occurring human behaviour, touch technology input devices offer a vast array of advantages over the more traditional alternatives.

The application of touch technology within the retail environment presents retailers with some unique opportunities to increase their profit margins. As highlighted in Table 1, this is achieved by increasing sales through faster checkout, improved customer loyalty and increased customer spend whilst reducing costs through increased operator accuracy and improved staff training and by achieving operational efficiencies and reduced capital expenditure.

Table 1 - Profiting from touch technology.



Having chosen to take advantage of the benefits which touch technology can bring to a business, retailers must also come to terms with the vast array of touch technologies available and what impact each of these may have on their business.

This paper aims to highlight the business benefits which touch technology can bring to the retail environment and to provide a clear understanding of each of the touch technologies available on the market today.

Increase sales through faster checkout.

A significant proportion of increased sales can be attained through achieving greater customer throughput at the checkout. The faster an operator can process each transaction, the more customers that can be moved through the checkout.

Speed of checkout is not only a function of POS equipment processing speed, for example, it is also a function of operator productivity. Input devices must be efficiently and effectively used by the operator in order to achieve maximum productivity levels. Touch technology can positively influence the speed of operation through the optimization of eye-hand coordination, by reducing homing time and through customization of the interface.

Eye-hand coordination and homing times

As multiple devices (keyboard, keypad, and monitor) are not required when using a touch screen, economy of motion is achieved. With touch input, the user keeps his/her hands and eyes on the same area, the screen. As a result the movement between the eye and hand is optimized (Hall and Cunningham, 1987).

By optimizing the movement between the eye and the hand, homing time is reduced. Homing time is the amount of time taken by a user to find the location for their eye to read or the location for their hand to respond when performing a task.

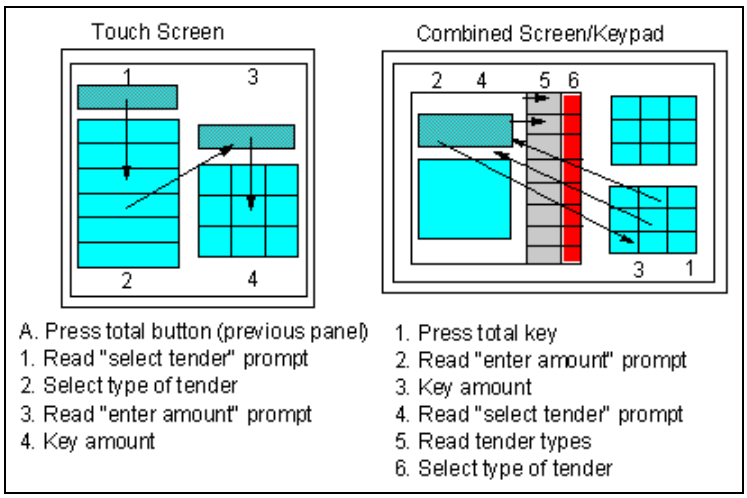
As a result, user interfaces which are designed to optimize eye-hand coordination and reduce homing times, such as touch screens, speed user task performance and minimize errors.

To evaluate the impact of optimized eye-hand coordination and reduction in homing, IBM Human Factors researchers compared user performance on a touch screen to that on a combined screen/keypad device while performing a frequent cashier task, tendering.

Using an equivalent prototype application on both devices, the steps required to perform the tendering task were roughly the same across the two systems, however the average time to perform a cash tendering task, using experienced cashiers, was 53 seconds for the touch screen and 75 seconds for the combined screen/keypad device. Similar time savings were found with other tendering tasks, such as tendering check and charges.

Figure 1 demonstrates how touch screens optimize eye hand movements by having the visual information and response actions organized into the same area.

Figure 1 - Eye-hand coordination comparison - touch screen vs combined screen/keypad.



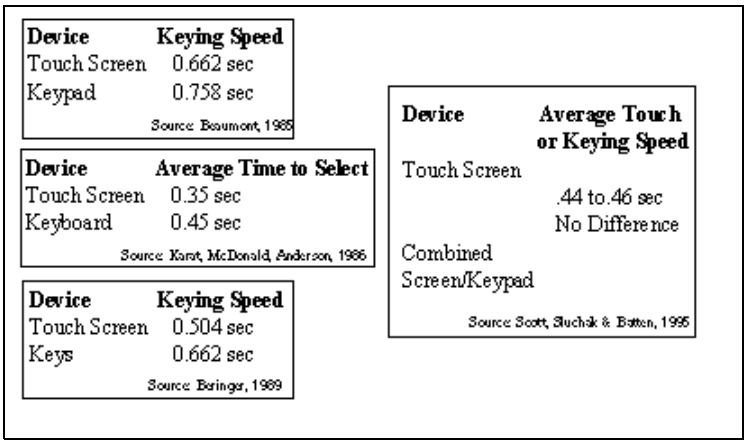
Further demonstrating the effectiveness of touch screens in improving user productivity and therefore customer throughput, several scientific studies have shown that touch screen input can be faster than keying and selection using keypads or keyboards. Results from these studies are displayed in Figure 2.

In the Beaumont (1985) study, one of four symbols or letters were displayed and the test participant responded by touching or keying the correct response. With regard to measured response/reaction time Beaumont concluded that "Clear superiority was demonstrated for the touch screen".

Karat, McDonald and Anderson (1986) presented twenty menu selection tasks that the test participant responded to with a touch screen, keyboard or mouse with results demonstrating that "The performance of subjects using the touch panel was better than that for the keyboard or mouse."

Beringer (1989) tested user response to a single target. A circle appeared next to one of six keys on the side and bottom of a screen and the user pressed the corresponding key; in the touch screen test, a single target open square appeared at various locations on the screen and user touched the target. Reaction time was found to be far superior using the touch screen.

Figure 2 - Speed comparison of retail input devices



While the above studies investigated item selection and reaction times, an IBM internal retail-specific Human Factors research study (Scott, Sluchak and Batten, 1995) found that when experienced cashiers key long strings of numbers like a UPC code on a touch screen keypad or combined screen/keypad (mechanical keypad), the keying times for both devices were even faster (.44 to .46 seconds on average per digit) than the times reported in the general studies. No significant difference was found between average touch keying speed and combined screen/keypad keying speed; demonstrating that keying with a touch screen keypad can be as fast as keying with a mechanical keypad.

Studies show that users state they often prefer touch screens for selection tasks because they can perform them faster (Karat, McDonald and Anderson, 1994). Businesses that implement touch screens notice an increase in throughput, indicating that users can increase their response speed when using touch.

Customizing the interface

Operator productivity can also be directly linked to the "appropriateness" of the input device. Customizing an interface to map directly with a user's individual needs can significantly improve operator productivity levels.

Since the software driving touch screens is not coded to hard keys, there is much flexibility in customizing the interface. It is easy to make changes to the user interface of each POS terminal because the features are controlled in the software. For example, icons and words can easily be changed (translated) into other languages and/or the various options can be reorganized by user preference, frequency of use, in alphabetical order or can be oriented for left or right handed users.

This unique feature allows retailers to create different individual user profiles to customize a POS terminal to suit every sales associate. For example, an associate who works a station in the

morning speaks English and is left handed. When this associate signs onto the system the prompts are in English and the actions keys are on the right hand side of the screen. However a different associate who works the same station in the afternoon, speaks Spanish and is left handed. In this case the screen prompts come up in Spanish and the action keys are on the left hand side of the screen.

Customization of the touch interface ensures that no one operator is at a disadvantage, therefore ensuring that every individual is capable of achieving maximum productivity levels and faster customer throughput.

Increase sales through improved customer loyalty.

Building a loyal customer base is a key concept among successful retailers today and is an essential element in increasing sales levels.

While increasing the speed at which an operator can process transactions improves sales through greater customer throughput, it also has a significant influence on developing customer loyalty. Increasing the speed at which a customer is served directly affects customer satisfaction levels, which will ultimately influence their decision to return to the store in the future.

In addition, personalized marketing is recognized throughout the retail industry as a valuable means of generating customer loyalty. Building customer profiles allows retailers to understand who their customers are, what they purchase and what motivates them to repeat purchase. As a result, retailers can employ one-to-one marketing techniques to target specific individuals in order to build customer loyalty and generate additional revenue.

The nature of touch technology offers retailers an ideal opportunity to employ true personalized marketing and increase sales. With direct access to an electronic database through the touch screen, sales associates can access or enter individual customer details both quickly and efficiently. Instead of using hardcopy format, all relevant information about a customer can be kept in one place - information about individual services performed, special occasion purchases, birthday's or preferred products, that can improve relationships, increase service levels and build customer loyalty.

As customer details are available to every staff member at any time, the opportunity to build both customer loyalty and generate additional revenue are maximized.

Customer loyalty can be directly improved through the use of individual targeted promotions. Touch screen technology allows for efficient and cost effective promotions to preferred customers by allowing "on the spot" promotions. For example, a touch screen system can clearly prompt any sales associate to offer a particular client a personalized incentive in recognition of their continued patronage, based on number of visits or dollar amount spent, etc. As a result, relationships are improved and customers are incented to repeat purchase, all without having to incur any additional costs, such as those associated with conducting customer mailings.

Revenue can be further maximized through direct access to customer details. For example, add-ons which an individual customer usually buys can be prompted to the sales associate to offer to the customer at the point of purchase. While these add-ons can significantly contribute to revenue they are often easily overlooked. The advantage here is twofold - customer service levels are improved by fulfilment of the customers specific needs and additional revenue is generated for the retailer.

Increase sales by increasing customer spend.

While building customer loyalty in order to generate repeat purchasing in the future, it is also important to consider the value of generating additional revenue by increasing customer "spend" during each visit.

Opportunities to increase customer spend can be identified throughout the shopping experience, from store entry through to the purchase transaction. The extended functionality of touch screens presents retailers with the ability to successfully take advantage of these opportunities and generate additional revenue.

At the point of purchase, touch screens can be used to guide operators through the sales process adding suitable prompts to help increase add-on sales. By incorporating a series of either written or graphical prompts into the system, retailers need not rely on a sales associate's ability to remember each add-on and convey this to every customer. Touch screens allow retailers to take advantage of every opportunity for achieving add-on sales.

The multimedia capabilities of touch screens allows for the display of high quality graphics and video footage. This provides a unique opportunity for retailer to further target their customers whilst in the store. When not in use as a POS terminal, touch screens can display advertising material (either static images or video footage), enhancing the possibility of additional purchase through impulse buying.

Additionally, the use of touch screens can be extended to include utilization as interactive customer terminals. Because touch screens are not intimidating and can easily be switched between languages and user preferences they are ideally suited to use as customer kiosks or information stations. By providing shopping assistance and/or self purchase opportunities through simple step by step touch operation, customer spend can be assured even in the absence of a sales associate.

By using touch technology to provide additional purchase opportunities throughout the store, retailers can maximize each customer's send per visit.

Reduce costs through improved operator accuracy

A large majority of "shrinkage" experienced within a store occurs at the point of sale and is usually as a direct result of operator inaccuracy. Therefore, the ability to improve each operator's

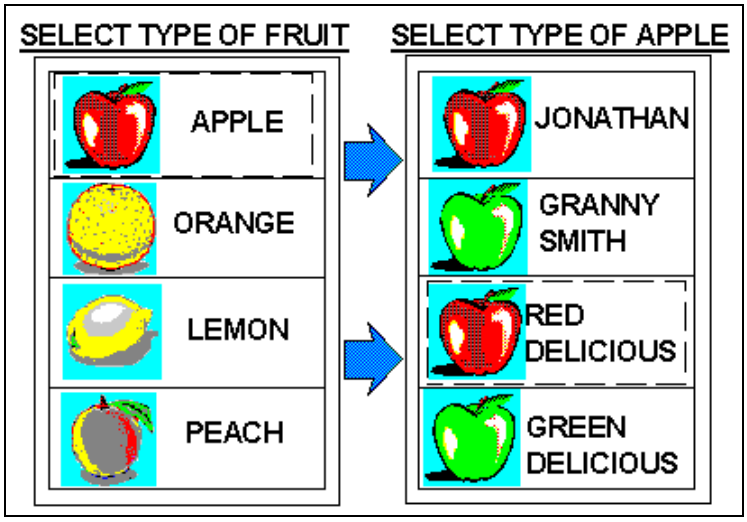
accuracy, whilst maintaining optimum checkout speeds, is of paramount importance in the quest for substantial cost reductions.

When a touch interface is properly designed, for example, when touch targets are of optimum size and are appropriately placed on the screen, there is no trade-off of checkout speed for operator accuracy. Users can respond quickly without making significant errors. Studies have shown users of well defined screens are typically capable of touch accuracy rates of 97% to 99%, while some users can achieve accuracy rates of 100% (Hall & Cunningham, 1986).

As previously discussed, increased operator accuracy is achieved through the optimization of eye-hand coordination and reduction in homing times which reduce the possibility for error when performing a task.

In addition, touch technology allows for design of simplistic user interfaces that take advantage of touch's natural mapping and cueing (Hall and Cunningham, 1987; Shneiderman, 1993) which contributes significantly to improving operator accuracy. Natural mapping and cueing can best be described as "what you see is what you touch." Figure 3 illustrates the advantages of touch as a natural user interface, using fresh produce selection as an example.

Figure 3 - Touch - a natural user interface.



A natural mapping is created between the list of choices (what the user sees) and the response. Only the product choices which are currently available in the store are displayed keeping the options simplified. Cueing in the form of icons and words assists response. Cueing requires only recognition and selection rather than entering memorized codes or commands. By eliminating the need to memorize keystroke sequences the margin of error created by entering incorrect codes or by mis-keying codes is reduced.

To further assist in ensuring accuracy, touch screens provide immediate auditory and visual feedback when a selection has been made to indicate to the user that the input has been accepted. For example, the selected option can be highlighted (as per the "Apple" option in Figure 3) and a beep can be emitted from the terminal.

Reduce costs through improved staff training

One of the greatest obstacles facing retailers today is frequency of staff turnover. With a workforce that is continually changing, retailers are under constant pressure to improve the availability of a skilled workforce without incurring increased costs as a result.

In order to stem the increased cost of training a constantly changing workforce, staff must be trained and returned to the work environment as quickly as possible. However, speed of training should not come at the expense of effectiveness as having to retrain employees merely increases costs further.

Through the implementation of natural and intuitive touch interfaces, retailers can cut training times to achieve reduced costs whilst continuing to cultivate more effective employees.

Since touch is a natural response mechanism, to the user it is more intuitive. The action of pointing is an intrinsic behavior that occurs from an early age. In fact, pointing is one of the most natural multicultural forms of communication understood by people of all ages.
As a result, when touch is implemented in graphical user interfaces, benefits occur with regard to user acceptance and training time.

Because touch technology is intuitive and requires no special skills to learn, it is less intimidating to a novice than other input devices. For example, with the implementation of touch screens, Electrolux staff found the graphical touch interface less intimidating than a keyboard (Chain Store Age Executive, 1992). Touch screen applications guide users in a logical flow through the transaction process, presenting only the decision points which are applicable at that point in the transaction. As a result users are not mentally overwhelmed when learning a task.

Training time can be drastically reduced when using touch screens. For example, Big 5 Sporting Goods halved its training time by reducing training time from 8 hours to 2-4 hours (Wilder, 1992). Similarly Coca-Cola factory training was cut by an impressive 97% - from 18 months to 2 weeks - with the introduction of touch screens (Bernardinis, 1993).

The multimedia capabilities of touch screens can further improve user training through the implementation of video footage as a help function. Videos can be used to visually demonstrate a particular function, such as how to insert a check into the printer for printing or endorsement. As a result, user education can continued even after the initial training is complete

In addition, the incorporation of help and prompt screens with easy to read graphics and plain language helps to guide users easily and quickly through all operations when using touch screens.

Consequently, changes in store procedures and/or introduction of new front end functions can be implemented efficiently.

Reduce costs through gaining operational efficiencies and reduced capital investment.

The flexibility of touch technology can significantly contribute to cost reductions through the simplification of procedures to create operational efficiencies and by eliminating the need for additional capital investment.

Touch screens allow for simplified product changes by removing the need to physically distribute and install new overlay membranes on keyboards. This procedure can be an inefficient and costly task, particularly for stores with many terminals or where product changes are frequent - for example, in quick service restaurants where menus can change from breakfast to lunch to dinner. When utilizing touch screen technology, product changes can be downloaded to multiple terminals in a single action which optimizes operational efficiency and eliminates associated expense.

Retailers who invest in touch technology hardware enjoy a financial advantage as a direct result of the terminal's 'multiple device' characteristics. The functionality of touch technology extends far beyond that of the point of sale. Therefore a single investment in touch screen hardware provides the retailer with the benefits offered by multiple devices without any addition in expenditure.

While touch screens can accept alphanumeric input through properly designed touch screen keypads, other interfaces such as combined screen/keypad devices require the purchase of a separate keyboard if alphanumeric input is required. The combination of alphanumeric input together with full screen graphic capabilities extends the functionality of touch screens to include browsing internal web sites, performing extended searches and even sending/receiving email. Retailers can enjoy the advantages of these functions whilst minimising hardware expenditure.

Similarly, as discussed earlier, retailers can take advantage of promotional opportunities such as in store video advertising and/or the provision of interactive customer kiosks without increasing capital expenditure simply by utilizing inactive touch screen point of sale terminals.

The Touch Technology Advantage

In the ultimate pursuit of increased profit margins, touch technology is leading the way. The unique characteristics of touch technology provide retailers with immeasurable opportunities for substantially escalating sales and lowering costs, turning this pursuit into an achievable reality.

Table 2 summarizes the advantages which touch technology can bring to a retail business by creating faster customer checkout, increased customer loyalty, maximizing customer spend, improving operator accuracy and staff training and finally by creating operational efficiencies and reduced capital expenditure. And the result for the retailer? Profit.

Table 2 - Achieving Profit Through The Implementation of Touch Technology.

Business Benefit	**The Touch Technology Advantage**
Faster Checkout	•Optimized eye-hand coordination •Reduced homing time •Increased response speeds •Interface customization
Increased Customer Loyalty	•Faster customer service •Direct database access •"On the spot" targeted promotions •Individualized add-on sales
Increased customer spend	•Prompts for add-ons •High quality graphics for terminal advertising •Multimedia capabilities for video display •Interactive customer terminals/kiosks
Increased operator Accuracy	•Optimized eye-hand coordination •Reduced homing time •Natural mapping and cueing •Elimination of code memorization •Visual and auditory feedback
Improved staff training	•Intuitive •Quick and easy to learn •Less intimidating •Simplified selection options •Help and prompt screens •Video footage as a help function
Achieving operational efficiencies and reduced capital expenditure	•Simplified downloaded product changes •Multiple device characteristics ·Alphanumeric input through touch screen ·Intranet browser ·Send/receive emails ·Kiosk and advertising medium

To reap the benefit of increased profit margins through the implementation of touch technology in a retail business, a complete understanding of the various touch technologies available today is required. Each of the touch technologies has its own technical advantages and disadvantages which can impact on their effectiveness within varying retail formats. Retailers must select the most appropriate technology to their business in order to achieve maximum performance and increased profit margins.

Touch Technology Comparison

Developers have produced at least seven different types of touch screens. However, the four touch technologies most commonly used in retail point of sale systems today are:

- Capacitive overlays
- Resistive overlays
- Scanning infrared
- Surface Acoustic Wave

In order to adequately evaluate these touch screen technologies, a standard set of criteria is used to identify the advantages and disadvantages of each. The criteria used for the purposes of this discussion are presented in Table 3.

Table 3 - Touch Technology Evaluation Criteria

Criteria	**Definition**
Response Time	The elapsed time from the initial screen touch until the touch location is ascertained by the electronics of the system.
Accuracy	Precision of touch location from touch panel to touch panel prior to calibration.
Repeatability	Precision of touch location from touch to touch within a single panel after calibration.
Calibration	Precise alignment of the visible touch target with the tactual field above it. In some technologies a touch-screen tactual area electronically "drifts" apart from its corresponding visual target. Ideally a tactual field and its associated visual target should remain locked together.
Clarity	Amount of visual target (light) transmitted through the tactual field overlay to the user.
Touch Resolution	Distribution of touch points among or along screen dimensions.
Parallax	The apparent change in the touch location of a target resulting from a change in the viewer's position. When the viewing angle is no longer directly in front of the screen an inherent physical separation of the visible touch target from the tactual field above it occurs.
Durability	Ability to withstand on-screen dirt/debris, environmental contaminants, and damage from operation or use.

This table is based on text from McDonald and Catullo (1995), Berardinis (1993), Ormond (1993), Sears, Plaisant and Shneiderman (1992), Gerold (1992) and Arnaut and Greenstein (1988).

Capacitive Overlays

Capacitive systems operate using an AC field (current) in the touch screen. The current runs across a glass overlay with a thin metallic coating over the surface of the display screen. Touching the overlay causes the current to flow to the point of contact. The minute change in electrical activity is precisely measured so that the system can calculate exactly where the screen was touched.

Capacitive systems have high resolution, medium to high clarity and good durability. However, the system also suffers from "drift" in the touch location which requires recalibration usually several times a year, to ensure continued accuracy. In addition, the system will only operate if a conductive pointer, such as a bare finger is used. In a work environment that requires gloves, such as food service establishments, counter assistants touching the screen while wearing protective gloves would find this system impossible to use. Finally, wet fingers or other nearby electrical equipment can distort the sensitive monitoring of a capacitive screen which can result in misreadings. In addition, people who have very low conductivity levels are unable activate a capacitive screen.

Resistive Overlays

Resistive touch screens also depend on an overlay. The highly conductive overlay consists of metal and polyester layers with tiny spacers in between which form a microscopic grid pattern and keep each of the layers apart. When the screen is touched the layers are forced together. A tiny electrical current is pulsed through the overlay and when the layers touch a voltage is caused allowing the exact point of contact to be measured.

Advantages of resistive screens include fast response time, high accuracy and repeatability of touch, and high resolution. Resistive screens do not require conductivity by the user, therefore they can be operated by a gloved hand. To register a touch, the user must press firmly on the screen which provides a slight amount of tactile feedback to the user.

Resistive screens also need to be recalibrated, although much less frequently than is required for capacitive screens. Resistive screens experience lower clarity/transmitted light as the overlay interferes with light transmission from the display screen which could affect screen readability in shops or restaurants where low lighting levels might add to the stylish atmosphere.

Unless coated, resistive screens can easily be damaged or scratched and since they are not completely sealed spills may pose a problem, both of which affect the durability of the system.

Scanning Infrared

Scanning Infrared systems depend on an invisible infrared grid pattern directed in front of the display screen. Touching the screen breaks the beam and the light sensitive detectors around the screen register the fact and translate any break in the infrared pattern into exact locations on the screen.

Infrared screens offer fast response times, high levels of accuracy and repeatability, provide good durability and require no calibration. Screen scratches do not interfere with performance of infrared screens and as they can be completely sealed units they are extremely well suited to hostile retail environments such as food service.

Unlike the overlay technologies, the infrared systems have excellent light transmission and can display bright colors. Some types of touch screens only appear clear and legible when the operator is directly in front. This can be a problem in a busy retail environment where staff need to crowd together or lean across their colleagues to reach the terminal. Infrared is superior to either capacitive or resistive technology in this circumstance as the screen design causes less apparent optical distortion which allows for a wider viewing angle.

Infrared screens have the potential for accidental activation by brushing against the screen (thus breaking the beams) and infrared beams can be blocked if sufficient contaminants build up on the screen.

Surface Acoustic Wave

Surface acoustic wave technology uses a single pane of glass. Acoustic waves are transmitted along both sides of the screen and reflected toward a receiver. A touch is registered when a finger or soft object contacts the screen, absorbing some of the acoustic energy from the waves. The location of the touch is measured as the time between the start of the pulse and the absorption of the signal.

While surface acoustive wave screens offer high clarity, high resolution and good durability, like capacitive and resistive screens they must be occasionally calibrated to ensure continued accuracy.

The response time for surface acoustic wave screens is considerably slower than other types of touch screen technology and the screen will register errors if the screen surface becomes contaminated.

Table 4 provides a summarized comparison of each of the four touch screen technologies discussed. This table is derived from a similar table by McDonald and Catullo (1995), and by text from Berardinis (1993), Ormond (1993), Sears, Plaisant and Shneiderman (1992), Gerold (1992) and Arnaut and Greenstein (1988).

Table 4 - Touch Technology Comparisons

Attributes	**Capacitive**	**Infrared**	**Resistive**	**Surface Acoustic Wave**
Response Time	Medium	Fast	Fast	Slow
Accuracy & Repeatability	Medium	High	High	Medium
Calibration Required	Yes - Frequent	No	Yes - Infrequent	Yes - Infrequent
Clarity	Medium/High	High	Medium	High
Resolution	High	Medium	High	High
Parallax	Low	Low	Low	Low
Durability	Good	Excellent	Fair/Good	Good
Special Concerns	Inoperable with Gloved Hands, Low conductivity traits	Blocked Beams, Accidental Activation	Spills, Scratches	Surface Contamination

As can be seen from the discussion and table above, no single touch screen technology is a suitable choice for all retail formats.

However, in most cases this choice can often be narrowed between infrared and resistive technologies. Calibration of touch screens is not a procedure which can be carried out by store personnel, therefore, the need to continually calibrate capacitive systems can add to cost levels. The slow response time of surface acoustic wave screens can affect customer service levels and limit the uses of the terminal, for example it's ability to display video advertising or to be used as a customer kiosk.

In any case, retailers must base their decision on which technology to adopt by considering the unique characteristics of their retail environment. For example, a restaurant/bar may find durability the most important issue based on the likely exposure to liquid and food spills, a delicatessen or hairdressers may required the use of gloved hands, while a designer fashion store may be operating in dim lighting conditions and considers screen clarity paramount. Therefore, touch screen technology should be selected on an individual by individual basis.

Touch Screen Color Technologies

The final decision with regards to selecting a touch interface involves the concept of color versus monochrome displays. When choosing color as the preferred alternative, there are various options available for image generation on an LCD display which will affect issues such as clarity of the image. It should be noted here that color technologies are standard across and independent of each of the touch technologies discussed above.

The technologies available which generate a color image on LCD displays are described as either Active or Passive. The active technology generates an image through the use of single transistors for each color pixel on the screen. For passive technology, the screen pixels are driven by a scanning technique over row and column. A comparison of advantages and disadvantages of each of these technologies can be found in Table 5.

The latest type of passive display is known as Dual Scan Twisted Neumatic (DSTN) which provides good image resolution, with sufficient clarity and brightness for most environments. The popular DSTN display is an inexpensive alternative to the more advanced, but costly active technology.

Active displays typically use Thin-Film-Transistor (TFT) technology to drive the display. One of the newest technologies available, TFT produces a much clearer screen with brighter colors, better contrast and a far superior image quality than that produced by DSTN technology. TFT screens are much more legible in brightly lit areas or if screens need to be read from a distance. TFT also provides a wider viewing angle which can be a significant performance factor in busy areas. With a faster refresh time, TFT screens are more suitable for showing high quality video and graphics.

Table 5 - Advantages and Disadvantages of DSTN vs TFT Technologies

	DSTN	**TFT**
Viewing angle	Limited	Extended
Image resolution	Good	Excellent
Clarity	Low	High
Brightness	Average	Good
Contrast	Average	Good
Refresh Time	Slow	Fast
Cost	Low	High

The decision as to which type of color technology to implement will vary on a case by case basis, as this decision is dependant on the retail environment in which the terminal will be installed, the proposed uses of the terminal and individual financial considerations.

IBM Touch Solutions

IBM Retail Store Solutions offers retailers reliable touch solutions which are designed specifically for the retail environment. Visit http://www.ibm.com/solutions/retail to discover how IBM can give your business the benefit of touch.

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