

## TOUCH SCREEN APPARATUS WITH TACTILE INFORMATION

### FIELD OF THE INVENTION

This invention relates to the data processing field. More specifically, this invention is a touch screen display containing tactile information, such as Braille or other symbolic representations.

### BACKGROUND OF THE INVENTION

As the computer industry moves towards user interfaces that are more and more graphically oriented, most users are noticing an improved ease of use. But visually impaired people find graphically oriented computers, automatic teller machines, public information kiosks and the like extremely difficult for them to use, if not outright impossible. This schism between sighted and visually impaired users is even wider with the ever increasing use of touch screen technology, since keyboards or other input devices are no longer required, and the only feedback given to a user is often exclusively visual. A visually impaired user cannot use a conventional touch screen display, since he has no idea where to touch the display to instruct the computer to do what he wants it to do, and cannot receive any sufficient feedback indicating what is happening. Frustrations of not being able to perform the routine daily functions of their sighted friends, such as withdrawing money from an automatic teller machine, makes their disability even more unfortunate, both to them personally and to society as a whole.

### SUMMARY OF THE INVENTION

It is a principle object of the invention to enhance the operation of a computer system.

It is another object of the invention to improve the ease of use of a computer system for visually impaired and sighted users.

It is another object of the invention to improve the ease of use of touch screen displays for visually impaired and sighted users.

It is another object of the invention to improve the ease of use of touch screen displays for visually impaired users without adversely impacting the ease of use of touch screen displays for sighted users.

These and other objects are accomplished by the touch screen apparatus with tactile feedback disclosed herein.

A touch screen apparatus with tactile feedback is disclosed. Tactile information, such as Braille or other symbolic representations, is integrally connected to an area on the touch screen surface. This tactile information can be molded into the touch screen surface as part of its initial manufacturing process, or can be added later by making the tactile information out of epoxy or by placing a plastic sheet containing the tactile information over the touch screen surface. The touch screen display can be part of a desktop or laptop computer, can be part of a computer system in a public information kiosk or automated teller machine application, or can be included as an information panel in stereo equipment, transportation equipment, etc.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows a block diagram of a automated teller machine using the touch screen apparatus with tactile information of the invention.

FIG. 2 shows an isometric view of the touch screen surface of the invention.

FIG. 3 shows a block diagram of a public information kiosk using the touch screen apparatus with tactile information of the invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a block diagram of an exemplary automated teller machine (ATM) using the touch screen apparatus with tactile information of the invention. ATM 10 contains touch screen display 20, processor 40, memory 50, storage unit 60, and speaker 70. ATM 10 also contains a card reader 85, printer 75, money tray 90 and deposit receptacle 95. Touch screen display 20 displays textual data 25 and input touch regions 21-24. Touch screen display 20 has touch screen surface 30. Tactile information 31-34 is integrally connected to touch screen surface 30, and corresponds to input touch regions 21-24, respectively. Tactile information 31, 32, and 33 are one or more dots arranged as prescribed by the international standard Braille character set, and represent the characters "1", "2", and "3", respectively. Tactile information 34 is a symbol located in the lower right hand corner of touch screen surface 30. Preferably, tactile information 31-34 is within touch sensing regions 21-24, but could also be adjacent to these regions or have their own touch regions. Those skilled in the art will appreciate that processor 40, memory 50, and storage 60 are normally not visible by any ATM user, sighted or not, as these devices are kept under the covers of the ATM.

In the preferred embodiment, touch screen display 20 is an IBM Model 8516 touch screen. While this touch screen display detects touch by using strain gage technology, other touch screens, such as those employing optical or electrostatic technology, could also be used and still fall within the spirit and scope of the invention. Processor 40, memory 50, storage 60, and speaker 70 preferably are standard components of a personal computer system, such as an IBM PS/2, although they could also be standalone components. Printer 75, card reader 85, money tray 90, and deposit receptacle 95 are conventionally used in the ATM industry. Description 80 can be read by visually impaired users to inform them about the function of the machine.

FIG. 2 shows an isometric view of touch screen surface 30 of the invention. Touch screen surface 30 has a height 35, and a width 36. In touch screen display 20 of the preferred embodiment, touch screen surface 30 is composed of a single piece of glass, although plastic or other material may be used. Tactile information 31-34 is shown integrally connected to an area of touch screen surface 30. Touch screen surface 30 is relatively smooth and uniform to the touch, except where the area of touch screen surface 30 is integrally connected to tactile information 31-34. Tactile information 31-34 has a depth 37 sufficient to allow tactile information 31-34 to be perceived by human touch. In the preferred embodiment, depth 37 is the Braille standard depth of 0.53 mm, although other values for depth 37 could be used as long as it still results in tactile information 31-34 being perceivable by human touch.