Abstract Title: Touch sensitive mode/scroll control

An input device for electronic equipment includes a touch pad and a means to detect circular or elliptical motion applied to the pad. This motion is used to change the mode of operation of the equipment and can control a scroll function of a computer.
AN INPUT DEVICE

This invention relates to an input device for electronic equipment.

Microprocessors are found in a wide range of electrical equipment, for example, mobile telephones, washing machines, cookers and of course computers. In order for such equipment to be controlled, it is common to have some form of pointing device for use in conjunction with a display device. This allows the user to point at certain objects on the display. In addition the pointing device is normally accompanied by some means for initiating action on an object that is pointed to (e.g., a button that can be pressed or "clicked"). Frequently the information to be displayed is too large for the physical display and a means is provided to allow the user to scroll through the information. A common example is a displayed menu of options, whereby the user can scroll up or down the menu until items of interest come into view. Scrolling could be achieved simply by moving the pointing device up or down, and this is satisfactory where the pointing device does not need to perform the traditional function of pointing at particular displayed objects. However, other applications generally require some additional input device, e.g., a rotary wheel that is generally found on a computer mouse or a button that can be pressed or clicked (perhaps while pointing at a special object on the display that is used to control scrolling).
One common form of pointing device, particularly on laptop computers, is the touch-sensitive pad or touchpad. By moving a finger around the pad, the user can point at different objects on the display. Moreover touchpads are generally sensitive to pressure, such that a moderately sharp tap can be interpreted as a user action. The action of tapping a touch pad is often used to select the object that is currently pointed at. This can obviate the need for a special button or other means for providing this function. However, even with a touchpad, some additional capability is needed if it is to be used for both pointing and scrolling.

According to the invention there is provided an input device for electronic equipment comprising a touch sensitive pad, means coupled to the pad to interpret a user input applied thereto which means being responsive to a particular user input applied to the touch sensitive pad to switch the equipment from a first mode to a second mode wherein the user input applied to the pad is interpreted in accordance with the selected mode.

The user input may be the tracing of a particular pattern such as a circle or ellipse. This may also be context-sensitive or may be accomplished by some other means (e.g., pointing at and performing an action on some displayed object). Some modes may be transient, whereby the tracing of a particular pattern such as a circle or ellipse is interpreted in accordance with the transient mode, but then as soon as some other pattern is traced it is interpreted within the
context of the previous stable mode. Thus, the tracing of a particular pattern will cause the mode to enter the transient mode in which the particular pattern may control a particular operation such as scrolling a display. When the tracing of that pattern ceases the transient mode is left and the last mode returned to.

Preferably, means is provided to indicate to a user the current mode.

In theory, the number of modes is unlimited, but in practice is likely to be limited to two or three modes. For example, there may be a pointing mode and a scrolling mode. A third mode might be a moving or dragging mode for moving objects around the display.

A specific embodiment of the invention will now be described, by way of example only, with reference to the drawings of which:

Figure 1 shown in block diagram form, an input device in accordance with the invention attached to a computer; and

Figure 2 is an explanatory figure.

As is shown in Figure 1, an input device 1 has a touch sensitive pad 2 and a pad controller 3. The pad 2 provides electrical signals to the controller 3 along a bus 4. The signals are interpreted by the controller 3 before appropriate control
signals are passed to a computer 5 via a serial bus 6. The computer 5 has a processor 7, associated memory 8, a display 9.

The controller 3 is programmed to interpret the inputs made by the user to the pad 2 in accordance with the current mode. Interpreted inputs are sent to the processor. An input may be an action to perform within the context of the current mode or a request to switch to a different mode. Thus, a movement on the pad may be used to move a cursor on the screen within a current mode. However, whilst in a current mode if the movement entered at the pad has a particular form then the mode will switch into a second mode. In this embodiment, the particular form is that of a circle or ellipse 11 as shown in the figure. In other embodiments, other forms may be used to change the mode.

In this case, the second mode involves the display of a menu on display 9 and the mode is termed as a “scrolling mode”. The user scrolls the menu up or down by simply tracing a circle or elliptical shape on the pad 2. A clockwise motion scrolls the menu up and an anti-clockwise motion scrolls the menu down. This is depicted in figure 2.

The speed of scrolling of the displayed menu is made to match that of the user motion. In this way, a pleasing connection between the user and the scrolling operation is made.
The size of the circle or other shape is also interpreted by the controller 3. Thus large circles may result in a slower menu scrolling and smaller circles a more rapid scrolling movement.

To move out of the second mode back to the first, the user stops performing the particular movement and starts making a new movement. This is detected by the controller 3 and the mode reverts to the first mode. In this way the second may be considered to be transient in that the mode reverts to the first mode.

In an enhancement to the embodiment, the initial input to change modes may be used to select a second or a third mode. The second mode is selected by a circle in a clockwise direction and the third mode selected by a circle in an anticlockwise direction. Then control within the second and third modes may be similar to that described above. The third mode may be a scrolling option in the horizontal direction, with the left to right scroll being entered by a clockwise rotation and the right to left scroll being made by an anticlockwise rotation. Other modes may be entered by making other movements.

An indication of the selected mode may be displayed on the display.

In another embodiment of the invention, utilising the same apparatus as described in the first, there is a first mode being a stable pointing mode and a
second mode being a stable scrolling mode. This will now be described with reference to the same figure as the first embodiment.

In this embodiment, the controller 3 interprets the user inputs at the pad 2 as before but this time upon detecting a circular motion 11 it passes a message to the controller 3 to enter a scrolling mode. This mode remains the current mode until a further particular input is detected.

Whilst in the scrolling mode, clockwise motion causes a downwards scrolling and anti-clockwise motion causes upwards scrolling as shown in figure 2.

To revert back from this stable scrolling mode, the user traces a straight-line on the pad 2. This motion is detected by the controller 3 and a mode change is indicated to the processor 7. The mode then reverts back to the stable pointing mode.
CLAIMS

1. An input device for electronic equipment comprising a touch sensitive pad, means coupled to the pad to interpret a user input applied thereto which means being responsive to a particular user input applied to the touch sensitive pad to switch the equipment from a first mode to a second mode where-in the user input applied to the pad is interpreted in accordance with the selected mode.

2. An input device as claimed in claim 1 wherein a first user input applied to the pad causes a switch from a first to a second mode and wherein the mode reverts to the first mode from the second mode upon one of the first user input ceasing or a second user input being applied different to the first.

3. An input device as claimed in claim 1 or 2 wherein the user input to switch between modes is a circular or elliptical motion applied to the touch sensitive pad.

4. An input device as claimed in any preceding claim, wherein in the second mode a third mode may be selected in which third mode a function of the equipment is controlled by a user input applied to the pad.

5. An input device as claimed in any preceding claim, wherein the function of one of the modes is a scrolling function.
6. An input device as claimed in any preceding claim, wherein the speed of the motion is determined to affect the controlled function.

7. An input device as claimed in any preceding claim, wherein the size of the circular or elliptical motion is used to control the function.

8. A computer comprising an input device as claimed in any preceding claim.

9. An input device substantially as hereinbefore described and as illustrated by the accompanying drawings.

10. An input device for electronic equipment comprising a touch sensitive pad, means coupled to the pad, to interpret a user input, to perform a first function of the equipment and being responsive to a particular user input to perform a second function of the equipment.
Amendments to the claims have been filed as follows.

1. An input device for electronic equipment comprising a touch sensitive pad, means coupled to the pad to interpret a user input applied thereto which means being responsive to a particular user input pattern applied to the touch sensitive pad to switch the equipment from a first mode to a second mode wherein the user input pattern applied to the pad is interpreted in accordance with the selected mode.

2. An input device as claimed in claim 1 wherein a first user input applied to the pad causes a switch from a first to a second mode and wherein the mode reverts to the first mode from the second mode upon one of the first user input ceasing or a second user input being applied different to the first.

3. An input device as claimed in claim 1 or 2 wherein the user input to switch between modes is a circular or elliptical motion applied to the touch sensitive pad.

4. An input device as claimed in any preceding claim, wherein in the second mode a third mode may be selected in which third mode a function of the equipment is controlled by a user input applied to the pad.

5. An input device as claimed in any preceding claim, wherein the function of one of the modes is a scrolling function.
6. An input device as claimed in any preceding claim, wherein the speed of the motion is determined to affect the controlled function.

7. An input device as claimed in any preceding claim, wherein the size of the circular or elliptical motion is used to control the function.

8. A computer comprising an input device as claimed in any preceding claim.

9. An input device substantially as hereinbefore described and as illustrated by the accompanying drawings.

10. An input device for electronic equipment comprising a touch sensitive pad, means coupled to the pad, to interpret a user input, to perform a first function of the equipment and being responsive to a particular user input pattern to perform a second function of the equipment.
**Patents Act 1977: Search Report under Section 17**

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