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(54) **HAPTIC FEEDBACK FOR TOUCHPADS AND OTHER TOUCH CONTROLS**

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(52) **U.S. Cl.**
USPC **345/156**

(58) **Field of Classification Search**
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See application file for complete search history.

(56) **References Cited**

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/012,470, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

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(57) **ABSTRACT**

A haptic feedback planar touch control used to provide input to a computer. A touch input device includes a planar touch surface that inputs a position signal to a processor of the computer based on a location of user contact on the touch surface. The computer can position a cursor in a displayed graphical environment based at least in part on the position signal, or perform a different function. At least one actuator is also coupled to the touch input device and outputs a force to provide a haptic sensation to the user contacting the touch surface. The touch input device can be a touchpad separate from the computer's display screen, or can be a touch screen. Output haptic sensations on the touch input device can include pulses, vibrations, and spatial textures. The touch input device can include multiple different regions to control different computer functions.

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Related U.S. Application Data

(63) Continuation of application No. 10/213,940, filed on Aug. 6, 2002, now Pat. No. 7,148,875, which is a continuation-in-part of application No. 09/487,737, filed on Jan. 19, 2000, now Pat. No. 6,429,846, which is a continuation-in-part of application No. 09/467,309, filed on Dec. 17, 1999, now Pat. No. 6,563,487, which is a continuation-in-part of application No. 09/156,802, filed on Sep. 17, 1998, now Pat. No. 6,184,868, which is a continuation-in-part of application No. 09/103,281, filed on Jun. 23, 1998, now Pat. No. 6,088,019, which is a continuation-in-part of application No. 09/253,132, filed on Feb. 18, 1999, now Pat. No. 6,243,078.

