combination of the two. When the touch panel **904** is touched or depressed, it sends a contact signal to computer **906** via connection **926**. The contact signal indicates that the touch panel has been selected or touched. Computer **906**, which can be any general purpose computer operating under the control of suitable software and for firmware, is coupled to amplifier **922** via connection **928** and instructs amplifier **922** to provide input current to the actuator **924** over connection **930**. Upon receipt of an instruction from the computer **906**, amplifier **922** provides an input current to the actuator **924** via connection **930**. Actuator **924** provides a haptic sensation or effect to the touch-sensitive panel **918**. The processor **906** (or, potentially, another device (not shown) provides a display image or image to display device **914**.

[**0134**] Turning finally to **FIGS. 29, 30** and **31**, these figures illustrate how areas of a touch pad and/or a touch screen or other similar touch input device may be utilized. In each of the figures areas of the touch sensitive surface of the touch input device are associated with particular inputs. In **FIG. 29**, a "+" area and a "−" area are provided. This could be used, for example, to zoom in (+) or zoom out (−) in a graphical environment having a pictorial representation of an image. **FIG. 30** illustrates a version with "+X", "−X", "+Y" and "−Y" which could be used to translate an object or to rotate an object, or to otherwise interact with a graphically depicted object, as desired. Finally, **FIG. 31** provides a similar arrangement to that shown in **FIG. 30**, however, intermediate values (e.g., some −X and some +Y at the same time) may be input in an intuitive manner. In some embodiments, these areas along with some indication as to what they are intended to control at a given point in time may be displayed on a touch screen and haptic feedback provided to the user indicative of rates of input, boundaries and similar conditions in the graphical environment, and the like.

[**0135**] While this invention has been described in terms of several preferred embodiments, it is contemplated that alterations, permutations, and equivalents thereof will become apparent to those skilled in the art upon a reading of the specification and study of the drawings. For example, many different types of actuators can be used to output tactile sensations to the user. Furthermore, many of the features described in one embodiment can be used interchangeably with other embodiments. Furthermore, certain terminology has been used for the purposes of descriptive clarity, and not to limit the present invention. The invention, therefore, is not to be restricted except in the spirit of the appended claims.

What is claimed is:

1. A haptic feedback touch control for inputting signals to a computer and for outputting forces to a user of the touch control, the touch control comprising:

a touch input device including a touch surface operative to input a position signal to a processor of said computer based on a location on said touch surface which said user contacts; and

at least one actuator coupled to said touch input device, said actuator outputting a force on said touch input device to provide a haptic sensation to said user contacting said touch surface, wherein said actuator outputs said force based on a single-discontinuity waveform.

2. The haptic feedback touch control of claim 1, wherein the single-discontinuity waveform is associated with one of a button press or button release.

3. The haptic feedback touch control of claim 2, further comprising moving the touch screen in accordance with a second single-continuity waveform associated with the other of the button press or button release.

4. The control of claim 3, wherein the first second single-continuity waveforms are different from one another.

5. The control of claim 3, wherein the first second single-continuity waveforms are substantially identical to one another.

6. The haptic feedback touch control of claim 1, wherein the single-discontinuity waveform is symmetrical.

7. The haptic feedback touch control of claim 1, wherein the single-discontinuity waveform is asymmetrical.

8. The haptic feedback touch control of claim 1, wherein the touch surface is a touchscreen.

9. The haptic feedback touch control of claim 1, wherein the touch surface is a touchpad.

10. The haptic feedback touch control of claim 1, wherein said contact is effected by a body portion of an operator.

11. The haptic feedback touch control of claim 1, wherein said contact is effected by a stylus manipulated by an operator.

12. The haptic feedback touch control of claim 1, wherein the actuator comprises:

a first structural element having mounting structure mountable to a first component;

a second structural element having mounting structure mountable to a second component;

a first biasing element coupling the first structural element to the second structural element;

a first magnetic device carried by the first structural element, the first magnetic device including a first pole piece; and

a second magnetic device carried by the second structural element, the second magnetic device including a second pole piece;

a first coil disposed about at least one of said first pole piece and said second pole piece;

wherein the first biasing element is arranged to provide a biasing force opposing an attractive magnetic force urging the first and second pole pieces together when current is applied to the first coil and electric current applied to the first coil causes a haptic effect to be generated between the first component on the second component.

13. The haptic feedback touch control of claim 12, wherein the second magnetic device includes a second coil disposed about at least one of said first pole piece and said second pole piece.

14. The haptic feedback touch control of claim 12, further comprising a second biasing element, wherein the second biasing element is arranged to provide a biasing force opposing an attractive magnetic force urging the first and second pole pieces together when current is applied to the first coil.

15. The haptic feedback touch control of claim 12, wherein the first biasing element comprises a spring.