slider may in this case be about 14%. In other embodiments, the count cycle for both oscillators A and B may take from about 0.5 millisecond to about 2 milliseconds, or less than about 5 milliseconds. In other countries, where another frequency of power source is used, the total count time for both oscillators A and B may be adjusted so as to be substantially less than the period of the power source. For instance, the total count time for both oscillators A and B may be less than about 15% of the power source period, or even less than about 10% of the power source period.

[0043] In an alternative embodiment, instead of using a counter the frequencies of ClkA and ClkB may be measured by other means, including by direct frequency measurement. In such a case, a ratio may be taken of the frequencies themselves, instead of the pulse count. However, the two resulting ratios are mathematically identical.

[0044] If it is desired to include additional touch buttons beyond the normal axial finger range, say for page up and page down, a trace consisting of only A or B capacitive input can be used under this area and uniquely identify this state from a normal finger slider position. **FIGS. 5A-5C** show an exemplary embodiment of such a device. In this embodiment, a 1.5 mm thick piece of LEXAN or other insulating material **550** may be milled or otherwise formed to provide a groove, such as an approximately 16 mm radius finger groove **553** that is about 8 mm wide and about 66 mm long. The depth of the finger groove **553** may be such that about a 0.5 mm wall thickness of insulating material **550** remains between the bottom of the finger groove **553** and the conducting plates **551**. The insulating material **550** and the conductive plates **551** may be mounted on a substrate **552**. Although the above dimensions are such that an average finger may comfortably fit in the finger groove **553**, alternative dimensions may be used as desired. For instance, the groove may be about 30 to 50 mm long, or about 50 to 100 mm long. A shorter length may be desirable for use in a laptop, cellular phone, personal digital assistant, or other portable device.

[0045] Near or beyond each of the ends of the finger groove **553**, depressions **560**, **561** may be formed in the insulating material **550** to allow for access to buttons **501**, **502**. These button depressions **560**, **561** may be of any shape such as round, oval, rectangular, or arrow-shaped. As in the case of the finger groove **553**, the button depressions **560**, **561** may also be formed in the insulating material such that only a thin amount of the insulating material remains between the finger and the conductive plates **551**, such as about 0.5 millimeters of insulating material. In further embodiments, there may exist one or more button depressions that may be disposed anywhere near the finger groove, such as at the ends or along the lengthwise sides of the finger groove. The finger groove **553**, depressions **560**, **561**, and/or the buttons **501**, **502** may be used in conjunction with any of the other features and embodiments of the present invention.

[0046] Referring to **FIG. 3B**, the touch slider **300** may be coupled to another device such as a personal computer **370** via an interface such as the serial port **350** and a cable **371** connected to the interface. In this way, the personal computer **370** may receive the data representing the ratio, sum, and/or average of the counts as determined by the microprocessor IC1. The personal computer **370** may then use the data to control various features, such as to control the amount of scrolling on a display. Also, portions of the touch slider **300** may be in the personal computer **370**, such as the microprocessor IC1. The connection between the touch slider **300** and the personal computer **370** may be wired or wireless, e.g., radio frequency or infrared. Where the connection is wired, it may be by any system such as a serial or parallel cable connection. The touch slider **300** may be a separate physical unit from the personal computer **370** or incorporated into the personal computer **370** such as being an integral part of the keyboard or mouse of the personal computer **370**. Although a personal computer **370** is shown, any device may be coupled to or integrated with the touch slider **300** such as a laptop computer, a household appliance, a cellular phone, a desktop phone, a radio or stereo system, a personal digital assistant, an automobile control panel, and/or any other electrical and/or mechanical device in which a touch slider type user interface would be desirable.

[0047] Table 1 below shows the accumulated or counted values for ClkA and ClkB under different finger pressures and different finger positions P1-P5 along the axial direction of the finger groove as actually measured from a prototype of the embodiment of **FIG. 3A**. Table 1 below also shows the ratio-metric measurement f_A/f_B as well as the sum f_A+f_B for each instance. Note that the differences between ClkA and ClkB under the "No Finger Pressure" column is likely due to the connection lengths between each of the conductors and their respective oscillator being slightly different. If desired, this effect can be reduced by making the connection lengths the same between all capacitive nodes and their respective oscillators. The effect of connection length differences may also be reduced by compensating one or both measured frequencies during processing with terms derived during the calibration phase mentioned below.

TABLE 1

	No Pressure				Light Pressure				Heavy Pressure			
Position	A	B	ratio	sum	A	B	ratio	sum	A	B	ratio	sum
P1	2810	2494	1.13	5304	2805	2120	1.33	4925	2490	2037	1.22	4527
P2	2810	2494	1.13	5304	2765	2330	1.19	5095	2741	2302	1.19	5043
P3	2810	2494	1.13	5304	2672	2375	1.13	5047	2642	2356	1.12	4998
P4	2810	2494	1.13	5304	2645	2462	1.07	5107	2589	2430	1.07	5019
P5	2810	2494	1.13	5304	2370	2480	0.956	4850	2230	2455	0.908	4685

[0048] As can be seen from Table 1, the ratio-metric measurement varies depending upon finger position, but is not much affected by changes in finger pressure. For