



(19) **United States**

(12) **Patent Application Publication**  
**Yoshikawa et al.**

(10) **Pub. No.: US 2003/0067449 A1**

(43) **Pub. Date: Apr. 10, 2003**

(54) **TOUCH PANEL INPUT DEVICE**

(52) **U.S. Cl. .... 345/173**

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(57) **ABSTRACT**

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(21) **Appl. No.: 10/172,580**

(22) **Filed: Jun. 14, 2002**

(30) **Foreign Application Priority Data**

Oct. 10, 2001 (JP) ..... 2001-312399

**Publication Classification**

(51) **Int. Cl.<sup>7</sup> ..... G09G 5/00**

A piezoelectric substrate is fixed to the movable plate or the support substrate directly or through a drive electrode of the piezoelectric substrate. When a pressure on an input operation surface is detected, a drive voltage is impressed on the drive electrodes of the piezoelectric substrate. In response, the piezoelectric substrate vibrates the movable plate or the support substrate, thereby providing tactile feedback to an operator. Because the movable plate or the support substrate directly vibrates without an independent vibrating source, there is no energy loss or transmission delay caused by transmitting the vibration, and finely control of the contraction and expansion of the piezoelectric substrate allows fine control of the vibration. In one embodiment, the drive voltage is modulated with signals dependent on the location of the pressure. In another embodiment, the drive voltage is modulated with audio frequencies to create a speaker.

