

**ELECTRONIC APPARATUS VIBRATION  
GENERATOR, VIBRATORY INFORMING  
METHOD AND METHOD FOR CONTROLLING  
INFORMATION**

**TECHNICAL FIELD**

[0001] The present invention relates to a user interface and vibration generation mechanism of an electronic device.

**BACKGROUND ART**

[0002] PDAs (personal digital assistants), personal computers, ATMs (automatic teller machines), and other various types of electronic devices have, for example, operation buttons or keyboards, touch panels, and other user interfaces. Users use these user interfaces to perform operation inputs to the electronic equipment, such as inputting words and selecting a processing to be executed.

[0003] In the case of a portable electronic device provided with a keyboard or operation buttons, however, keys or operation buttons are of a reduced size, weight, and thickness to conform with an overall reduction in size, weight, and thickness of the device; and, consequently, a user may not be able to feel that a button has been fully depressed. To confirm if depression of keys or operation buttons has been received in a portable electronic device, a user must view contents of a display of a screen of the device.

[0004] In the case of an electronic device provided with a touch panel, a user uses his or her fingertip or an attached pen to operate a touch panel. However, if the fingertip or pen is not properly pointed at the touch panel, or the touch panel is not pressed with sufficient force, the operation will be invalid. To confirm whether a touch operation on a touch panel has been received by an electronic device, as in the above case, a user must view contents of the display.

[0005] There are other types of electronic devices which report to a user, by way of a beep sound and the like, that an operation input has been received, but such an audio report is almost completely ineffective in a noisy environment such as in a street.

**DISCLOSURE OF INVENTION**

[0006] An object of the present invention is to provide an electronic device, a vibration generator, a vibration-type reporting method, and a report control method enabling a user to easily confirm without viewing a screen receipt of an input operation or a response of the electronic device with respect to an operation input.

[0007] To achieve the above object, the present invention provides an electronic device having an operating unit for receiving an operation input, a vibration generator for imparting vibration to a hand-touched portion of the electronic device, and vibration control means for causing the vibration generator to generate vibration when it is detected that an operation input in the operating unit has been received. Further, the present invention provides a vibration-type reporting method for an electronic device whereby a vibration generator provided in the electronic device is caused to vibrate, which vibration is transmitted to a hand-touched portion when it is detected that an operation input to the operating unit is received.

[0008] According to the present invention, the electronic device reports to a user that an operation input has been received, by causing the hand-touched portion of the electronic device to vibrate.

[0009] Further, the present invention provides an electronic device provided with an operating unit for receiving an operation input, a vibration generator for imparting vibration to the operating unit, and vibration control means for causing vibration from the vibration generator in the case of detecting that an operation input to the operating unit is received, the vibration generator being provided with a weight, a support member supporting the weight to allow it to reciprocate, and connected to the operating unit or a base member of the vibration generator in contact with the operating unit; and excitation generating means for imparting excitation to make the weight reciprocate. Further, the present invention provides a vibration-type reporting method in an electronic device comprising driving a vibration generator provided in the electronic device when it is detected that an operation input to an operating unit is received, and having the vibration generator cause reciprocation of a weight connected to the operating unit or a base member of the vibration generator in contact with the operating unit to cause vibration in the operating unit.

[0010] According to the present invention, the electronic device reports to a user that an operation input has been received by causing vibration at the operating unit.

[0011] Further, the present invention provides an electronic device provided with an operating unit for receiving an operation input, a vibration generator for imparting vibration to a user, and vibration control means for causing vibration from the vibration generator in the case of detecting that execution of processing instructed by an operation input to the operating unit has ended. Further, the present invention provides a vibration-type reporting method in an electronic device comprising causing vibration from a vibration generator provided in the electronic device to give vibration to the user in the case of detecting that execution of processing instructed by an operation input to the operating unit has ended.

[0012] According to the present invention, the electronic device reports to a user by vibration that the execution of processing instructed by operation input has ended.

[0013] Further, the present invention provides an electronic device provided with an operating unit for receiving an operation input, a first vibration generator for imparting vibration to the operating unit, a second vibration generator for imparting vibration to a hand-touched portion of the electronic device, and vibration control means for causing vibration from at least one of the first vibration generator and the second vibration generator designated in advance by the user in the case of detecting that an operation input to the operating unit has been received. Further, the present invention provides a vibration-type reporting method in an electronic device comprising causing vibration from at least one of a first vibration generator for imparting vibration to the operating unit and a second vibration generator imparting vibration to a hand-touched portion of the electronic device designated in advance by the user in the case of detecting that an operation input to the operating unit has been received, the first and second vibration generators being provided in the electronic device.