7-15-02 A/PNV

Please type a plus sign (+) inside this box → ⊞

PTO/SB/16 (02-01)
Approved for use through 10/31/2002 OMB 0651-0032
U.S. Patent and Trademark Office; U S DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Harald	Philipp	Hamble, Hampshire, GB

☐ *Additional inventors are being named on the ___ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (280 characters max)

Capacitive Keyboard with Reduced Keying Ambiguity

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☒ Customer Number [ ] → *Type Customer Number here*

OR

020191

PATENT TRADEMARK OFFICE

☐ Firm or Individual Name	
Address	
Address	
City / State / ZIP	/ /
Country / Telephone / Fax	/ /

ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 6
☒ Drawing(s) *Number of Sheets* 4
☒ Application Data Sheet. See 37 CFR 1.76
☐ CD(s), Number
☒ Other (specify) return card

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.
☒ A check or money order is enclosed to cover the filing fees
☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 50 1012
☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($): 80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.
☐ Yes, the name of the U S Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE David Kiewit

TYPED or PRINTED NAME David Kiewit

TELEPHONE 727 866 0669

Date 07/12/02

REGISTRATION NO. *(if appropriate)* 34640

Docket Number: PKS

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

Application Data Sheet

Application Information

Application Type::	Provisional
Subject Matter::	Utility
Title::	Capacitive Keyboard with Reduced Keying Ambiguity
Attorney Docket Number::	PKS
Total Drawing Sheets::	4
Small Entity?::	Yes

Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	US
Status::	Full Capacity
Given Name::	Harald
Family Name::	Philipp
City of Residence::	Hamble
State or Province of Residence::	Hampshire
Country of Residence::	GB
Street of Mailing Address::	651 Holiday Drive, Bldg. 1, Suite 300
City of Mailing Address::	Pittsburgh
State or Province of Mailing Address::	PA
Country of Mailing Address::	US
Postal or ZIP Code of Mailing Address::	15520

Correspondence Information

Correspondent Customer Number:: 20191

Representative Information

Representative Customer Number::	20191

TITLE: Capacitive Keyboard with Reduced Keying Ambiguity

FIELD OF THE INVENTION

The invention relates to method and apparatus for controlling an array of capacitive position sensors, and, more specifically for preventing accidental false inputs from keys adjacent to a selected key in a capacitive keyboard..

BACKGROUND INFORMATION

Arrays of capacitive proximity sensors are often used in keyboards, keypads and other touch-input apparatus. Two characteristics of capacitive sensors that lead to their use instead of conventional metallic switches are: 1) Capacitive sensors can be made in small sizes, which is desirable if a small, tightly packed keyboard is required; and 2) Capacitive sensors are particularly easy to environmentally seal, which is desirable if the keyboard is to be used in a wet environment or where there is a concern that contaminants may be spilled on the keyboard.

Conventional capacitive sensors, when tightly packed, or when used in the presence of conductive liquid films, suffer a keying ambiguity problem. In a small keyboard, for example, a user's finger is likely to overlap from a desired key to onto adjacent ones. This is especially problematic if the user has large fingers or if he or she presses on the keyboard surface hard enough to deform his or her finger. The same sort of effect is found when a conducting film is spilled on a keyboard, in which case the user's finger is sensed as though it were the size of the puddle. Problems of this sort are particularly acute in cash register keyboards used in food service establishments where beverage and food sauce spills are a frequent occurrence.

In his US Patent 5,730,165, the inventor teaches a capacitive field sensor employing a single coupling plate and a method of detecting a change in capacitance of the coupling plate, Cx, to ground. The apparatus taught in US 5,730,165 comprises pulse circuitry for charging the coupling plate and for subsequently transferring the charge from the plate into a charge detector, which may be a sampling capacitor, Cs. The transferring operation is carried out by means of a transfer switch electrically connected between the coupling plate and the charge detector. The disclosure of US 5,730,165 is herein incorporated by reference.

In his US patent application S/N 09/390,869, the inventor teaches pulse circuitry for measuring capacitance to ground, the circuitry comprising a plurality of electrical switching elements, each of which has one side electrically connected to either a power supply voltage or to a circuit ground point. This circuit arrangement, which may be used with a keyboard as well as for many other applications, is more compatible with available integrated circuit design and manufacturing practices than is prior art pulse circuitry, which commonly had one side of at least one switching element floating. These improved arrangements thereby provide superior performance at a lower manufacturing cost. The disclosure of US patent application S/N 09/390,869 is herein incorporated by reference.

SUMMARY OF THE INVENTION

One aspect of the invention provides a method of removing keying ambiguity by measuring a detected signal strength associated with each key in an array, comparing the measured signal strengths to find a maximum, determining that the key having the maximum signal strength is the unique user-selected key and suppressing or ignoring signals from all other keys as long as the signal from the selected key remains above some nominal threshold value. In this aspect , the array under consideration may be a keyboard, or any convenient subset thereof,

Another aspect of the invention is a capacitive keyboard in which each key has a respective detection integrator counter (DIC) associated with it. Each DIC is a clocked counter that counts up by one incremental value on each clock cycle during which a signal strength from the associated key is above some nominal threshold value, and that counts down by one value if the signal strength is less than the nominal value. A controller receives a respective input from each DIC and determines that one of the keys is active, or selected, when the detection integration (DI) count associated with that key exceeds a selected terminal count value, TC. When one of the keys is active, the controller controls all of the detection integrators associated with keys in a selected neighborhood of the active key to stop counting until the count associated with the active key falls below terminal count value -- i.e., until the key that had been active becomes inactive.

In another aspect of the invention, the signal from one key having a DI count close to TC is compared with the signals from other keys in a neighborhood, and if a signal from one of the other keys is greater than that from the one selected key during the time period before the one selected key is determined to be active, the selected key is cleared of its pending detection status, which may

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.