



(19) **United States**

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

(10) **Pub. No.: US 2003/0067451 A1**

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

(54) **CAPACITIVE TOUCH DETECTORS**

(57) **ABSTRACT**

(76) Inventors: **JAMES PETER TAGG**,
CAMBRIDGE, MA (US); **ALISTAIR**
JAMES CAMPBELL, CAMBRIDGE,
MA (US)

Correspondence Address:
Joseph B. Lerch
Darby & Darby P.C.
805 Third Avenue
New York, NY 10022 (US)

(*) Notice: This is a publication of a continued prosecution application (CPA) filed under 37 CFR 1.53(d).

(21) Appl. No.: **08/836,420**

(22) PCT Filed: **Nov. 14, 1995**

(86) PCT No.: **PCT/GB95/02678**

(30) **Foreign Application Priority Data**

Nov. 14, 1994 (GB) 94 22 911.9

Publication Classification

(51) **Int. Cl.⁷ G09G 5/00**

(52) **U.S. Cl. 345/174**

A capacitive touch detector comprises means to improve selectivity—a narrow band buffer. Means for reducing the effect of noise comprise capacitive coupling of the buffer into the detector, which comprises a plurality of sensor pads of different inherent capacitances and means to approximate impedances which include said capacitances and are adapted to operate at respective frequencies to approximate the impedances. At least two multiplexers are arranged in series to lower capacitance loading of the sensor pads. A synchronous demodulator is arranged to be connected as a tracking filter to track the frequency of a capacitance-measuring signal from one to another of the sensor pads, possibly during a scan thereof.

A controller is connected to a number of pads or capacitive sensing zones by way of buffered multiplexer chips and, shielded connectors and cables. The buffered multiplexer chips can be cascaded in series or wired in parallel and are driven from a level translator which can in its simplest form comprise a resistor and capacitor network but should preferably comprise active elements. This ensures that the base voltage on (the voltage first applied in a halfwave to) a sensor pad is also applied to its shield and various parts (e.g. power supply rails, control port, chip substrate) of its associated multiplexer/s. The signals derived from this electronic scanning array are then further processed by a signal processor incorporating a microprocessor. The improvements relate to obtaining and processing the signal both in the analogue and digital domains and allow more reliable touch detection, including interpolation methods.

