[0077] sensing circuitry for sensing a signal at the at least one sensing conductive element induced by a touch of a conductive object subjected to the transmitted oscillated signal.

[0078] According to a sixth aspect of the present invention there is provided a touch detection apparatus comprising:

[0079] a sensor comprising a grid array of conductors in a first sense and conductors in a second sense and having junctions therebetween,

[0080] an oscillator for providing an oscillation signal to conductors in the first sense,

[0081] detection circuitry for detecting the oscillation signal when transferred via the junctions to conductors in the second sense, the transference being indicative of capacitive coupling induced by a touch of a conductive object touching the sensor at a respective junction.

[0082] According to a seventh aspect of the present invention there is provided touch detection apparatus comprising:

[0083] a sensor comprising at least one sensing conductive element,

[0084] an oscillator for providing an oscillation signal, the oscillation signal being applied to at least part of the apparatus including the at least one sensing conductive element, and

[0085] detection circuitry for detecting a.c. grounding of the at least one sensing conductive element due to a capacitive connection to a conductive object touching the sensor.

[0086] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The materials, methods, and examples provided herein are illustrative only and not intended to be limiting.

[0087] Implementation of the method and system of the present invention involves performing or completing certain selected tasks or steps manually, automatically, or a combination thereof. Moreover, according to actual instrumentation and equipment of preferred embodiments of the method and system of the present invention, several selected steps could be implemented by hardware or by software on any operating system of any firmware or a combination thereof. For example, as hardware, selected steps of the invention could be implemented as a chip or a circuit. As software, selected steps of the invention could be implemented as a plurality of software instructions being executed by a computer using any suitable operating system. In any case, selected steps of the method and system of the invention could be described as being performed by a data processor, such as a computing platform for executing a plurality of instructions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0088] The invention is herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the preferred embodiments of the present invention only, and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

[0089] In the drawings:

[0090] **FIG. 1A** is a simplified block diagram showing a generalized embodiment of the present invention;

[0091] **FIG. 1B** is a simplified diagram illustrating an embodiment of the present invention in which oscillating energy is transmitted to a finger;

[0092] **FIG. 2** is a simplified diagram illustrating an embodiment of the present invention in which the touching finger provides a capacitive link between sensing conductors on a grid;

[0093] **FIG. 3** is a circuit diagram illustrating the electrical theory of the embodiment of **FIG. 2**;

[0094] **FIG. 4** is a simplified schematic diagram illustrating an embodiment of the present invention in which the detection device is floated using a signal that oscillates with respect to a reference signal and wherein a finger incident upon a conductor provides a capacitive path to ground; **FIG. 5** is a circuit diagram illustrating one version of the embodiment of **FIG. 4**;

[0095] **FIG. 6** is a circuit diagram illustrating a variation of the embodiment of **FIG. 4**;

[0096] **FIG. 7** is a circuit diagram illustrating another variation of the embodiment of **FIG. 4**, in which the conductors are oscillated directly;

[0097] **FIG. 8** is a circuit diagram illustrating a variation of the embodiment of **FIG. 7** in which the conductors are oscillated from their far ends;

[0098] **FIG. 9** is a block diagram of a variation of the embodiment of **FIG. 4** in which isolation is provided by a DC to DC converter;

[0099] **FIG. 10A** is a block diagram illustrating another variation of the embodiment of **FIG. 4** in which isolation by a DC to DC converter is provided between two parts of the detector;

[0100] **FIG. 10B** is a block diagram illustrating a modification to the embodiment of **FIG. 10A** to permit communication between the two parts of the detector;

[0101] **FIG. 11** is a block diagram illustrating coil-based isolation of the detector according to an embodiment of the present invention;

[0102] **FIG. 12** is a block diagram illustrating a variation of the embodiment of **FIG. 11** in which the coil based isolation is used for a part of the detector;

[0103] **FIG. 13** is a block diagram illustrating floating of the detector by placing tandem oscillators on the positive and ground power supply rails;