

CLAIMS

What is claimed is:

1. A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, the touch sensor comprising a plurality of rows and a plurality of columns, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:

defining at least two power states for a touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;

wherein the first operating sensitivity is associated with at least some of the plurality of rows, and the mitigated operating sensitivity is associated with a subset of the at least some of the rows;

simultaneously generating, using the signal generator, signals associated with the mitigated operating sensitivity power state on the subset of the at least some of the rows; and

detecting a touch event by processing at least one touch signal on at least one column, and in response thereto, simultaneously generating, using the signal generator, signals associated with the first operating sensitivity power state on the at least some of the rows.

~~2. The method of claim 1, further comprising a step of automatically detecting that a full level of performance is not required for operation of the touch sensor, and commanding the touch sensor to operate at a lower power, lower performance level by application logic.~~

~~3. The method of claim 2, wherein the application logic comprises logic of an application running on the device.~~

~~4. The method of claim 2, wherein the application logic comprises logic of an operating system running on the device.~~

~~5. The method of claim 2, wherein the application logic comprises logic of circuitry operating on the device.~~

~~6.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated computational processing power requirement.~~

~~7.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated electrical power consumption.~~

~~8.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated event frequency.~~

~~9.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated touch sensitivity.~~

~~10.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated spatial resolution.~~

~~11.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated touch latency.~~

~~12.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated signal to noise ratio.~~

~~13.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated availability of hover detection.~~

~~14.——The method of claim 1, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated frame rate.~~

~~15.——The method of claim 1, wherein the touch event is detected by detecting contact from or proximity to at least one selected from the group consisting of: a user's finger, a stylus or a passive tangible.~~

~~16.2.~~ A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, the touch sensor comprising a plurality of rows and a plurality of columns, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:

defining at least two power states of the touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;

simultaneously generating each of a plurality of signals associated with the mitigated operating sensitivity power state on each row of a first set of at least some of the rows within the plurality of rows, respectively; and

monitoring at least one column to detect a touch event by processing at least one touch signal;

monitoring the touch sensitive device to detect a first operating sensitivity requirement;

simultaneously generating each of a plurality of signals associated with the first operating sensitivity power state on each of the first set of at least some of the rows and on at least one additional row, respectively, in response to as a result of detecting both the touch event and a first operating sensitivity requirement, the signals associated with the first operating sensitivity power state including the signals associated with the mitigated operating sensitivity state.

17.3. The method of claim 162, wherein the touch event is detected by detecting contact from or in proximity to at least one selected from the group consisting of: a user's finger, a stylus or a passive tangible.

18.4. The method of claim 162, further comprising a step of predicting a required power state by analyzing characteristics of the touch event.

~~19.—The method of claim 18, wherein the touch event is detected by detecting at least one selected from the group consisting of: hover or data from a combination of multiple sensors.~~

~~20.—The method of claim 19, wherein the multiple sensors comprise at least two sensors selected from the group consisting of: a capacitive touch sensor, a camera, a proximity sensor, an optical sensor, a turn rate sensor, a gyroscope, a magnetometer, a thermal sensor, a~~

~~pressure sensor, a force sensor, a power management integrated circuit reading, a keyboard, a mouse, or a motion sensor.~~

21.5. The method of claim ~~162~~, further comprising a step of predicting a required power state by utilizing algorithmic prediction techniques to determine temporal characteristics of the touch event or to determine spatial characteristics of the touch event.

~~22. The method of claim 16, further comprising a step of predicting a required power state utilizing algorithmic prediction techniques to determine spatial characteristics of the touch event.~~

23.6. The method of claim ~~162~~, further comprising a step of predicting a required power state utilizing one or more additional system components.

~~24. The method of claim 23, wherein the additional system component comprises a camera, a proximity sensor, an optical sensor, a turn rate sensor, a gyroscope, a magnetometer, a thermal sensor, a pressure sensor, a force sensor, a capacitive touch sensor, a power management integrated circuit reading, a keyboard, a mouse, or a motion sensor.~~

25.7. The method of claim ~~162~~, in which the generation of signals associated with the first operating sensitivity power state occurs after a time delay once the touch event is detected.

~~26. The method of claim 25, wherein the time delay comprises one of a plurality of time delays, each of which is associated with one of a corresponding plurality of input event types.~~

~~27. The method of claim 26, wherein one of the plurality of event types comprise a drag and another of the plurality of event types comprises a tap.~~

~~28. The method of claim 24, wherein the time delay is less than 20 milliseconds.~~

~~29. The method of claim 24, wherein the time delay is less than 24 milliseconds.~~

30.8. The method of claim ~~162~~, further comprising a step of automatically detecting that a full level of performance is not required for operation of the touch sensor, and commanding the touch sensor to operate at a lower power, lower performance level by application logic.

~~31. The method of claim 30, wherein the application logic comprises logic of an application running on the device.~~

~~32.— The method of claim 30, wherein the application logic comprises logic of an operating system running on the device.~~

~~33.— The method of claim 30, wherein the application logic comprises logic of circuitry operating on the device.~~

~~34.9.~~ The method of claim ~~162~~, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with:

i) a mitigated computational processing power requirement;

ii) a mitigated electrical power consumption;

iii) a mitigated event frequency;

iv) a mitigated touch sensitivity;

v) a mitigated spatial resolution;

vi) a mitigated touch latency;

vii) a mitigated signal-to-noise ratio;

viii) a mitigated availability of hover detection; or

ix) a mitigated frame rate.

~~35.— The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated electrical power consumption.~~

~~36.— The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated event frequency.~~

~~37.— The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated touch sensitivity.~~

~~38.— The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated spatial resolution.~~

~~39.— The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated touch latency.~~

~~40.— The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated signal to noise ratio.~~

~~41. The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated availability of hover detection.~~

~~42. The method of claim 16, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated frame rate.~~

~~43. The method of claim 16, wherein the touch event is detected by detecting contact from or proximity to at least one selected from the group consisting of: a user's finger, a stylus or a passive tangible.~~

~~44. A self-adapting touch sensitive device having at least two power states, the self-adapting touch sensitive device comprising:~~

~~—— touch surface having a row and a column;~~

~~—— signal generator for generating a first signal or a second signal on the row;~~

~~—— touch signal processor for identifying indicia of the first signal or the second signal on the column; and~~

~~—— switch to direct the signal generator to generate the first signal in response to the touch signal processor identifying indicia of the second signal on the column.~~

~~45. The self-adapting touch sensitive device of claim 44, wherein the touch surface is a touch sensor.~~

~~46. The self-adapting touch sensitive device of claim 44, wherein the touch surface is a multi-touch sensor.~~

~~47. The self-adapting touch sensitive device of claim 44, wherein the touch surface is a low-latency touch sensor.~~

~~48. The self-adapting touch sensitive device of claim 44, wherein the touch surface is a low-latency touch sensor which relies on orthogonal signals.~~

49.10. A self-adapting touch sensitive device having at least two power states, the self-adapting touch sensitive device comprising:

touch surface having a plurality of rows and a plurality of columns, wherein a touch event on the touch surface causes at least part of a signal present on at least one of the

plurality of rows ~~to change in amount to become present~~ on at least one of the plurality of columns;

signal generator having a first signal generation state wherein the signal generator ~~simultaneously~~ generates a first plurality of signals on each of a first subset of the plurality of rows, respectively, and a second signal generation state wherein the signal generator ~~simultaneously~~ generates a second ~~signal plurality of signals~~ on ~~at least one of~~ a second subset of the plurality of rows, ~~respectively, wherein the first subset of the plurality of rows has at least one row in common with the second subset of the plurality of rows;~~

touch signal processor for detecting the presence on at least one of the plurality of columns of at least part of a signal present on at least one of the plurality of rows;

signal generation state switch for switching the signal generator between the first signal generation state and the second signal generation state.

~~50.11.~~ The self-adapting touch sensitive device of claim ~~4910~~, wherein the signal generation state switch is configured to select the second subset of the plurality of rows based on a location of at least one recent touch event.

~~51.12.~~ The self-adapting touch sensitive device of claim ~~5011~~, wherein the signal generation state switch is configured to sample an area around the location at a higher rate.

~~52.13.~~ The self-adapting touch sensitive device of claim ~~5011~~, wherein the signal generation state switch is configured to sample an area around the location at a higher spatial resolution.

~~53.14.~~ The self-adapting touch sensitive device of claim ~~4910~~, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface and applies a plurality of different power states to the different areas.

~~54.— The self-adapting touch sensitive device of claim 53, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface in response to at least one selected from the group consisting of: user preference, programmer preference, application state, operating system settings, and system utilization.~~

~~55.— The self-adapting touch sensitive device of claim 53, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface algorithmically in response to a signal from at least one sensor.~~

~~56.—The self-adapting touch sensitive device of claim 53, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface in response to identification of an activity in which a user of the device is involved.~~

~~57.—The self-adapting touch sensitive device of claim 56, wherein user preference is set in a control panel.~~

~~58.—The self-adapting touch sensitive device of claim 53, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface based on statistics of use of the device by a user.~~

~~59.—The self-adapting touch sensitive device of claim 58, configured such that a trade-off can be made between operating performance and operating sensitivity.~~

~~60.—The self-adapting touch sensitive device of claim 58, configured such that statistical knowledge of probabilities of accurately detecting touch events are used to optimize power consumption of the device by trading off false alarm and correct detection rates so that power consumption and user experience are aligned.~~

~~61.—The self-adapting touch sensitive device of claim 60, configured such that the optimization is performed at design time.~~

~~62.—The self-adapting touch sensitive device of claim 60, configured such that the optimization is performed at manufacturing time.~~

~~63.—The self-adapting touch sensitive device of claim 60, configured to use learning techniques to adapt to a user's history and habits.~~

~~64.—The self-adapting touch sensitive device of claim 59, wherein the statistics are gathered from a plurality of devices under use by users.~~

~~65.—The self-adapting touch sensitive device of claim 59, further comprising using machine learning to adapt action of the device to a particular user or group of users.~~

~~66.15.~~ A self-adapting touch sensitive device having at least two power states, the self-adapting touch sensitive device comprising:

touch surface having a plurality of rows and a plurality of columns, wherein a touch event on the touch surface causes at least part of a signal present on at least one of the

plurality of rows ~~to change in amount to become present~~ on at least one of the plurality of columns;

signal generator for simultaneously generating a plurality of signals on at least some of the plurality of rows, respectively;

touch signal processor for detecting the presence on at least one of the plurality of columns of at least part of a signal present on at least one of the plurality of rows;

power state switch for switching between at least two power states by at least one selected from the group consisting of:

changing the plurality of signals;

changing the at least some of the plurality of rows;

inhibiting the signal generator from generating at least some of the plurality of signals during a time period;

inhibiting the touch signal processor from detecting during a time period; and

changing the at least one of the plurality of columns.

~~67.16.~~ The self-adapting touch sensitive device of claim ~~6615~~, wherein the ~~signal generation~~power state switch is configured to ~~select the second subset~~change the at least some of the plurality of rows based on a location of at least one recent touch event.

~~68.17.~~ The self-adapting touch sensitive device of claim ~~6716~~, wherein ~~the signal generation state switch is configured to sample~~one of the at least two power states is associated with sampling an area around the location at a higher rate.

~~69.18.~~ The self-adapting touch sensitive device of claim ~~6716~~, wherein ~~the signal generation state switch is configured to sample~~one of the at least two power states is associated with sampling an area around the location at a higher spatial resolution.

~~70.19.~~ The self-adapting touch sensitive device of claim ~~6615~~, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface and applies a plurality of different power states to the different areas.

~~71.20.~~ The self-adapting touch sensitive device of claim ~~7019~~, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface:

i) in response to at least one selected from the group consisting of: user-preference, programmer-preference, application state, operating system settings, and system utilization;

ii) algorithmically in response to a signal from at least one sensor;

iii) in response to identification of an activity in which a user of the device is involved; or

iv) based on statistics of use of the device by a user.

~~72. The self-adapting touch sensitive device of claim 70, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface algorithmically in response to a signal from at least one sensor.~~

~~73.21.~~ The self-adapting touch sensitive device of claim ~~70~~19, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface in response to identification of an activity in which a user of the device is involved and user preference is set in a control panel.

~~74. The self-adapting touch sensitive device of claim 73, wherein user preference is set in a control panel.~~

~~75. The self-adapting touch sensitive device of claim 70, wherein the touch sensor is configured to detect touch events over multiple different areas of the touch surface based on statistics of use of the device by a user.~~

~~76. The self-adapting touch sensitive device of claim 75, configured such that a trade-off can be made between operating performance and operating sensitivity.~~

~~77. The self-adapting touch sensitive device of claim 75, configured such that statistical knowledge of probabilities of accurately detecting touch events are used to optimize power consumption of the device by trading off false alarm and correct detection rates so that power consumption and user experience are aligned.~~

~~78. The self-adapting touch sensitive device of claim 77, configured such that the optimization is performed at design time.~~

~~79. The self-adapting touch sensitive device of claim 77, configured such that the optimization is performed at manufacturing time.~~

~~80. The self-adapting touch sensitive device of claim 77, configured to use learning techniques to adapt to a user's history and habits.~~

~~81. The self-adapting touch sensitive device of claim 76, wherein the statistics are gathered from a plurality of devices under use by users.~~

~~82. The self-adapting touch sensitive device of claim 76, further comprising using machine learning to adapt action of the device to a particular user or group of users.~~

~~83. A self-adapting touch sensitive device having at least two power states, the self-adapting touch sensitive device comprising:~~

~~—— a first touch surface having a first plurality of rows and a first plurality of columns, wherein a touch event on the first touch surface causes at least part of a signal present on at least one of the plurality of rows to become present on at least one of the plurality of columns;~~

~~—— a second touch surface having a second plurality of rows and a second plurality of columns;~~

~~—— one or more signal generator having a first signal generation state wherein it generates a first plurality of signals on each of the first plurality of rows, respectively, and a second signal generation state wherein it generates a second signal on at least one of the first plurality of rows;~~

~~one or more touch signal processor for detecting the presence on at least one of the plurality of columns of at least part of a signal present on at least one of the first plurality of rows and at least one of the second plurality of rows;~~

~~—— one or more signal generation state switch for switching a signal generator between the first signal generation state and the second signal generation state based upon detection of the signal on either the first plurality of rows or the second plurality of rows.~~

~~84. A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:~~

~~—— a touch sensor comprising at least one sensor selected from the set consisting of: a capacitive touch sensor, a camera, a proximity sensor, an optical sensor, a turn rate sensor, a gyroscope, a magnetometer, a thermal sensor, a pressure sensor, a force sensor, a power-management integrated circuit reading, or a motion sensor;~~

~~—defining at least two power states of the touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;~~

~~—generating signals associated with the mitigated operating sensitivity power state on at least some of the rows; and~~

~~—monitoring at least one column to detect a touch event by processing at least one touch signal;~~

~~—monitoring the touch sensitive device to detect a first operating sensitivity requirement;~~

~~—generating signals associated with the first operating sensitivity power state on at least some of the rows as a result of detecting both the touch event and a first operating sensitivity requirement.~~

~~85. The method of claim 84, further comprising a step of predicting the power state associated with the second operating sensitivity based upon input to the touch sensor.~~

~~86. The method of claim 84, wherein the touch event is detected by detecting contact from or proximity to at least one selected from the group consisting of: a user's finger, a stylus or a passive tangible.~~

~~87. The method of claim 84, further comprising a step of predicting a required power state by analyzing characteristics of the touch event.~~

~~88. The method of claim 87, wherein the touch event is detected by detecting at least one selected from the group consisting of: hover or data from a combination of multiple sensors.~~

~~89. The method of claim 88, wherein the multiple sensors comprise at least two sensors selected from the group consisting of: a capacitive touch sensor, a camera, a proximity sensor, an optical sensor, a turn rate sensor, a gyroscope, a magnetometer, a thermal sensor, a pressure sensor, a force sensor, a power management integrated circuit reading, a keyboard, a mouse, or a motion sensor.~~

90.—~~The method of claim 84, further comprising a step of predicting a required power state by utilizing algorithmic prediction techniques to determine temporal characteristics of the touch event.~~

91.—~~The method of claim 84, further comprising a step of predicting a required power state utilizing algorithmic prediction techniques to determine spatial characteristics of the touch event.~~

92.—~~The method of claim 84, further comprising a step of predicting a required power state utilizing one or more additional system components.~~

93.—~~The method of claim 92, wherein the additional system component comprises a camera, a proximity sensor, an optical sensor, a turn rate sensor, a gyroscope, a magnetometer, a thermal sensor, a pressure sensor, a force sensor, a capacitive touch sensor, a power management integrated circuit reading, a keyboard, a mouse, or a motion sensor.~~

94.—~~The method of claim 84, in which the generation of signals associated with the first operating sensitivity power state occurs after a time delay once the touch event is detected.~~

95.—~~The method of claim 94, wherein the time delay comprises one of a plurality of time delays, each of which is associated with one of a corresponding plurality of input event types.~~

96.—~~The method of claim 95, wherein one of the plurality of event types comprise a drag and another of the plurality of event types comprises a tap.~~

97.—~~The method of claim 94, wherein the time delay is less than 20 milliseconds.~~

98.—~~The method of claim 94, wherein the time delay is less than 24 milliseconds.~~

99.—~~The method of claim 84, further comprising a step of automatically detecting that a full level of performance is not required for operation of the touch sensor, and commanding the touch sensor to operate at a lower power, lower performance level by application logic.~~

100.—~~The method of claim 99, wherein the application logic comprises logic of an application running on the device.~~

101.—~~The method of claim 99, wherein the application logic comprises logic of an operating system running on the device.~~

~~102.—The method of claim 99, wherein the application logic comprises logic of circuitry operating on the device.~~

~~103.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated computational processing power requirement.~~

~~104.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated electrical power consumption.~~

~~105.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated event frequency.~~

~~106.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated touch sensitivity.~~

~~107.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated spatial resolution.~~

~~108.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated touch latency.~~

~~109.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated signal-to-noise ratio.~~

~~110.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated availability of hover detection.~~

~~111.—The method of claim 84, wherein the power state associated with mitigated operating sensitivity comprises a power state associated with a mitigated frame rate.~~

~~112.—The method of claim 84, wherein the touch event is detected by detecting contact from or proximity to at least one selected from the group consisting of: a user's finger, a stylus or a passive tangible.~~

22. A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, the touch sensor comprising a plurality of rows and a plurality of

columns, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:

defining at least two power states for a touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;

wherein the first operating sensitivity is associated with a first signal level, and the mitigated operating sensitivity is associated with a second signal level that is lower than the first signal level;

simultaneously generating, using the signal generator, signals associated with the mitigated operating sensitivity power state on at least some of the rows; and

detecting a touch event by processing at least one touch signal on at least one column, and in response thereto, simultaneously generating, using the signal generator, signals associated with the first operating sensitivity power state on the at least some of the rows.

23. A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, the touch sensor comprising a plurality of rows and a plurality of columns, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:

defining at least two power states for a touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;

wherein the first operating sensitivity is associated with a first frame rate, and the mitigated operating sensitivity is associated with a mitigated frame rate that is slower than the first frame rate;

simultaneously generating, using the signal generator, signals at the mitigated frame rate associated with the mitigated operating sensitivity power state on at least some of the rows; and

detecting a touch event by processing at least one touch signal on at least one column, and in response thereto, simultaneously generating, using the signal generator, signals at the first frame rate associated with the first operating sensitivity power state on the at least some of the rows.

24. A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, the touch sensor comprising a plurality of rows and a plurality of columns, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:

defining at least two power states for a touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;

wherein the first operating sensitivity is associated with a first frame rate, and the mitigated operating sensitivity is associated with the first frame rate on at least a portion of the touch sensor and a mitigated frame rate that is slower than the first frame rate on at least another portion of the touch sensor;

simultaneously generating, using the signal generator, signals associated with the mitigated operating sensitivity power state on at least some of the rows; and

detecting a touch event by processing at least one touch signal on at least one column, and in response thereto, simultaneously generating, using the signal generator, signals associated with the first operating sensitivity power state on the at least some of the rows.

25. A method for lowering the power used in connection with operation of a touch sensor in a touch sensitive device, the touch sensor comprising a plurality of rows and a plurality of columns, a signal generator for generating signals on the rows and a touch signal processor for detecting touch events from touch signals present on the columns, comprising:

defining at least two power states for a touch sensor, wherein at least one of the at least two power states is associated with a first operating sensitivity of the touch sensor, and at least one other of the at least two power states is associated with mitigated operating sensitivity of the touch sensor, the mitigated operating sensitivity of the touch sensor requiring less power than the first operating sensitivity;

wherein the mitigated operating sensitivity is associated with a first frame rate, and the first operating sensitivity is associated with the first frame rate on at least a portion of the touch sensor and a higher frame rate, that is higher than the first frame rate, on at least another portion of the touch sensor;

simultaneously generating, using the signal generator, signals associated with the mitigated operating sensitivity power state on at least some of the rows; and

detecting a touch event by processing at least one touch signal on at least one column, and in response thereto, simultaneously generating, using the signal generator, signals associated with the first operating sensitivity power state on the at least some of the rows.