an adder (adders **820**, **821** are shown but others can be present for the other channels) which adds it to the current row specific phase delay value provided by multiplexer **806**. The adders may be ordinary multi-bit digital adders.

[0081] By adding the channel specific and row specific phase delay signals, the adders generate a phase selector signal for each channel (such as, phase selector signal **701**). Thus generated, the phase selector signal indicates the total phase difference between the stimulation signal and the channel input signal received at each channel from the multi-touch display. This phase difference can also be the phase that should be applied to the demodulation signal. Once generated by the adders, the phase selector signal can be sent to the various multiplexers associated with each channel's phase tuning circuit (e.g., multiplexer **700**).

[0082] It is preferred that the row and channel specific phase values are selected so that each single unit of these values is equal to the minimum step in the phase delay as specified by the shift register and the phase clock (e.g., **626** in FIG. **6**B). Also, it is preferred that these values are selected so that the addition of a channel specific and row specific phase delay value does not exceed the maximum achievable phase delay as specified by the size of the shift register and the frequency of the phase clock. However, if the size of the shift register and the frequency of the phase clock are such that an entire demodulation wave period is always saved in the shift register, then the adders can be configured to "roll over" if the sum of the channel specific and frequency specific phase delay values is larger than a single wave form.

[0083] In one embodiment, the adders can include latches for latching their results, so that no unstable signals are sent to the phase tuning circuits. Also, delays of the circuit of FIG. **8** (such as delays of the adders) can be compensated for by anticipating row selection signal **807**. In other words, the row selection signal can be such that it does not indicate the current row being stimulated but a future row about to be stimulated. Thus, the row selector signal may be timed so that by the time the various phase selector signals are generated by the various adders, the stimulation of that future row is initiated.

[0084] In an alternative embodiment, a single adder combined with one or more multiplexers and de-multiplexers can be used. The single adder can process the phase selector signal for each channel individually and use the de-multiplexers to latch the different results in different latches associated with the various channels.

[0085] A person of skill in the art would recognize that different embodiments can use different methods of generation of the demodulation signal. For example, instead of storing a digital representation of the demodulation signal in a look up table, an analog signal can be generated by an analog circuit (e.g. by using voltage controller oscillators, etc.) The analog signal may be sent to an analog delay circuit which selectively alters the phase of the analog signal. The delay circuit may comprise, for example, multiple capacitors and/or inductors through which the signal travels and which change its phase. The phase selector signal may control the analog delay circuit by selecting different paths through which the demodulation signal may travel, wherein each path causes a different delay of the demodulation signal.

[0086] Different methods for generation of the phase selector signal can also be used. For example, instead of storing row and channel phase delay values for each individual row and channel, an embodiment may store a single seed value for a channel and a row each and generate the other values by calculating multiples of the single seed value. In another embodiment, instead of adding channel and row specific phase delay values, a single table may be used which includes a phase delay value of each row and column combination. This single phase delay table can be defined in RAM **112**, and may effectively define a unique phase delay value for each pixel in the multi-touch panel. In yet another embodiment, different sets of phase delay values can be saved, wherein each set corresponds to a different stimulation frequency. Values from the different sets can be selected and used in accordance with the stimulation frequency that is currently being applied.

[0087] In one embodiment phase delay data can be reduced by only including channel and/or row specific phase delay data for only some of the channels or rows. The phase delay data for channels and/or rows that are not specified can be mathematically interpolated from the phase delay data of specified channels and rows based on known mathematical relations of phase delay. For example, if it has been determined that phase delay increases linearly, then channel specific phase delay data may be provided only for the even numbered channels. The phase delay data for an odd channel can be obtained by taking the average of its even numbered neighbors.

[0088] In one embodiment, the various phase delay values can be obtained before manufacture by performing various tests and calculations, and saved in the electronic devices at time of manufacture. However, it is preferred that the phase delay values are obtained by the actual electronic devices themselves during an initialization phase. This is preferred because it may ensure that the various phase delay values are not merely calculated and tested for ideal conditions, but are measured using each device itself, and thus compensate for any differences that may exist between the various manufactured devices.

[0089] The various phase delay values may be determined during a phase compensation initialization mode. This mode may be different than the usual boot initialization performed at power up of an electronic device. In one embodiment the phase compensation initialization mode is performed at time of manufacture of the device. Another embodiment may allow for periodic re-initializations of the phase compensation values to be performed, for example, when the device is serviced.

[0090] Another embodiment may provide that phase compensation initialization can be triggered by the user of the electronic device, or can be performed at startup of the device. This, however, is not preferred as a user may negatively affect phase compensation initialization by touching the screen during the process.

[0091] It is noted that, as discussed above, if ADC **308** is of the averaging type, then if there is a phase difference between demodulation signal **316** and incoming signal **310**, the averaging ADC will output a result that is generally lower than it would be if there were no difference. Therefore, during the phase compensation initialization, the electronic device may automatically load different values into row register **805** and the various channel phase registers and monitor the result **324** for each channel. Provided that the multi-touch panel is not being touched, the highest result can be obtained when the optimal row and channel specific phase delay values are loaded in the various registers. The electronic device may repeat this test by stimulating each different row. The elec-