[0043] Output pin C0 controls the conductivity of transistor 211 with pins C1 to C5 having similar conductivity control upon transistors 213, 214, 212, 215 and 216 respectively.

[0044] Transistors 211 and 213 are switched on when a voltage is being applied to the first plane 102 and are switched off when a voltage is being applied to the second plane 103. Similarly, when a voltage is being applied to the second plane 103, transistors 212 and 215 are switched on with transistors 211 and 213 being switched off. In the configuration shown in FIG. 2, with switch 221 receiving an input from buffer 222, output transistors 211 and 213 are switched off with output transistors 212 and 215 being switched on. This is achieved by output pin C0 being placed in a high condition and pin C1 being placed in a low condition. Similarly, pin C3 is placed in a low condition and pin C4 is placed in a high condition.

[0045] In the configuration shown, C3 is placed in a low condition, as previously described. The micro-controller 201 includes a pull-down transistor arranged to sink current from the base of transistor 212, resulting in transistor 212 being switched on to saturation. Consequently, transistor 212 appears as having a very low resistance, thereby placing terminal 111 at the supply voltage of five volts. Resistor 231 (4K7) limits the flow of current out of the micro-controller 201, thereby preventing burn-out of the micro-controller's output transistor.

[0046] Pin C4 is placed in a high state, resulting in transistor 215 being placed in a conducting condition. A serial resistor is not required given that the micro-controller 201 includes internal pull-up resistors, as distinct from a pull-up transistor, such that current flow is restricted. Thus, transistors 212 and 215 are both rendered conductive, resulting in terminal 111 being placed at the positive supply rail voltage and terminal 112 being placed at ground voltage. The capacitors shown in the circuit, such as capacitor 219, limit the rate of transistor transitions thereby reducing rf transmissions from the sensor 101.

[0047] With transistors 212 and 215 placed in their conductive condition, input signals are received from the first plane 102 in the form of a voltage applied to terminal 108. For position detection, this voltage is measured directly and transistor 214 is placed in a non-conductive condition by output pin C2 being placed in a low condition. Under these conditions, the voltage from input terminal 108 is applied to analogue to digital converter 203 via buffer 222 and switch 221.

[0048] In accordance with the present invention, a second electrical property is determined which, in this embodiment, represents the current flowing through the sensor in response to a mechanical interaction. The current measurement is made by placing transistor 214 in a conductive condition, by placing output pin C2 in a high condition. In this condition, current received at terminal 108 is supplied to transistor 214 via resistor 214A, having a resistance of typically 5k selectable so as to correspond to the characteristics of the sensor. A voltage is supplied to A to D converter 203 via buffer 222 and switch 221 but on this occasion the voltage represents a voltage drop, and hence a current, across resistor 214A.

[0049] Thus, transistors 212 and 215 are placed in a conducting condition, transistor 214 is placed in a non-conducting condition, so as to measure voltage, and is then placed in a conducting condition so as to measure current. The roles of the transistors are then reversed, such that output transistors 211 and 213 are placed in a conducting condition, with transistors 212 and 215 being placed in a non-conducting condition (and switch 221 reversed) allowing a voltage to be measured by placing transistor 216 in a non-conducting condition, and then allowing a current to be measured by placing transistor 216 in a conducting condition.

[0050] The cycling of line conditions, in order to make the measurements identified previously, is controlled by a clock resident within micro-controller 201. After each condition has been set up, a twelve bit number is received from the digital to analogue converter 203 and this number is retained within a respective register within micro-controller 201. Thus, after completing a cycle of four measurements, four twelve bit values are stored within the micro-controller 201 for interrogation by the processing device 131. Furthermore, the rate of cycling may be controlled in response to instructions received from the processing device 131.

[0051] Operations performed by micro-controller 201 are detailed in FIG. 3. The micro-controller continually cycles between its four configuration states and each time a new input is produced, representing a current or a voltage in one of the two configurations, new output data is calculated on an on-going basis. Thus, output registers are updated such that the best data is made available if the micro-controller is interrupted by the external processor 131.

[0052] The micro-controller 201 is fully interrupt driven in terms of receiving external interrupts for data interrogation along with internal interrupts in order to initiate a configuration cycle. The external interrupt has a higher priority such that external processor 131 is provided with information as soon as possible in response to making an interrupt request.

[0053] Internally interrupts for the micro-controller 201 are generated by its own internal timer and the procedure shown in FIG. 3 is effectively held in a wait state until a next timer interrupt is received at step 301. The wait state allows voltage levels on connections 107, 108, 111 and 112 to become stable and provides sufficient time for valid data to be received from the analogue to digital converter 203.

[0054] At step 302, an output is received from analogue to digital converter 203 and at step 303 calculations are performed with respect to the most current data received from the analogue to digital converter, so as to convert numerical values relating to voltages and currents into numerical values representing properties of the mechanical interaction. Thus, after performing calculations at step 303, appropriate registers are updated at step 304 and it is these registers that are interrogated in response to an interrupt received from processing system 131.

[0055] At step 305 next conditions for the output lines are set by appropriate logic levels being established for output pins C0 to C6. After the next output condition has been selected, the processor enters a wait state at step 306, allowing the electrical characteristics to settle, whereafter processing continues in response to the next timer interrupt.

[0056] Thus, it should be appreciated that on each iteration of the procedure shown in FIG. 3, one of the output conditions is selected at step 305. Thus, it should be appre-