SUMMARY

According to a first aspect of the present invention, there is provided a sensor interface circuit for resolving sensor signals from a plurality of sensors into a digital sensor signal, the sensor interface circuit comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto.

Preferably, the monitoring module comprises:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

Preferably, the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

Preferably, the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator.

Preferably, the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

Preferably, the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

Preferably, the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

Preferably, the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

Preferably, the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

According to a second aspect of the present invention, there is provided a sensor system front-end comprising:

a plurality of sensors; and

a sensor interface for resolving sensor signals from the plurality of sensors into a digital sensor signal, the sensor interface comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto, wherein the monitoring module comprises a variable window frequency counting device.

Preferably, the plurality of sensors comprises a plurality of resistive sensors.

Alternatively, the plurality of sensors comprise a plurality of capacitive sensors.

Preferably, the monitoring module comprises:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

Preferably, the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

Preferably, the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator, and wherein the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

Preferably, the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a

dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

Preferably, the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

Preferably, the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

Preferably, the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

According to a third aspect of the present invention, there is provided a relaxation oscillator comprising:

comparators, each having a comparator reference voltage input, a signal input and an output, wherein the comparator reference voltage input of each of the comparators are connected to a comparator reference voltage source;

variable capacitors, wherein the number of the variable capacitors is equal to the number of the comparators, and wherein each of the variable capacitors is connected between a ground voltage potential and the signal input of a corresponding one of the comparators and each of the variable capacitors is controlled to reduce its discharging

capacitance only when its capacitor voltage approximates a voltage of the comparator reference voltage source;

discharge circuits respectively coupled to the variable capacitors, each of the discharge circuits coupled to the respective variable capacitor is coupled to the ground voltage potential and an oscillator output, the discharge circuits are configured to increase a discharge current for the variable capacitors only when a voltage of the variable capacitors approximates the voltage of the comparator reference voltage source;

an oscillator input section for receiving a sensor input from a plurality of sensors and providing the sensor input to each of the signal inputs of the comparators; and

a frequency generation circuit coupled to the output of the comparators and to the oscillator input section for generating an analog signal from the sensor input for provision to an oscillator output of the frequency generation circuit by controlling provision of the sensor input to the signal inputs of the comparators.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way of example only, and in conjunction with the drawings, in which:

Figure 1 depicts a block diagram of a sensor system front-end including a relaxation oscillator based sensor interface circuit according to an embodiment of the present invention;

Figures 2A and 2B illustrate a conventional output frequency counting scheme and an output frequency counting scheme according to a first embodiment of the present invention, respectively;

Figures 3A and 3B illustrate the relationship between the number of oscillator edges and the output oscillation period for the conventional output frequency counting scheme and the output frequency counting scheme according to the first embodiment, respectively;

SUMMARY

According to a first aspect of the present invention, there is provided a sensor interface circuit for resolving sensor signals from a plurality of sensors into a digital sensor signal, the sensor interface circuit comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto, the monitoring module comprising:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

Preferably, the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

Preferably, the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator.

Preferably, the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

Preferably, the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

Preferably, the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

Preferably, the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

Preferably, the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

According to a second aspect of the present invention, there is provided a sensor system front-end comprising:

a plurality of sensors; and

a sensor interface for resolving sensor signals from the plurality of sensors into a digital sensor signal, the sensor interface comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto, wherein the monitoring module comprises a variable window frequency counting device, the monitoring module comprises:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

Preferably, the plurality of sensors comprises a plurality of resistive sensors.

Alternatively, the plurality of sensors comprise a plurality of capacitive sensors.

Preferably, the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

Preferably, the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator, and wherein the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

Preferably, the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a

dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

Preferably, the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

Preferably, the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

Preferably, the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

According to a third aspect of the present invention, there is provided a relaxation oscillator comprising:

comparators, each having a comparator reference voltage input, a signal input and an output, wherein the comparator reference voltage input of each of the comparators are connected to a comparator reference voltage source;

variable capacitors, wherein the number of the variable capacitors is equal to the number of the comparators, and wherein each of the variable capacitors is connected between a ground voltage potential and the signal input of a corresponding one of the comparators and each of the variable capacitors is controlled to reduce its discharging

capacitance only when its capacitor voltage approximates a voltage of the comparator reference voltage source;

discharge circuits respectively coupled to the variable capacitors, each of the discharge circuits coupled to the respective variable capacitor is coupled to the ground voltage potential and an oscillator output, the discharge circuits are configured to increase a discharge current for the variable capacitors only when a voltage of the variable capacitors approximates the voltage of the comparator reference voltage source;

an oscillator input section for receiving a sensor input from a plurality of sensors and providing the sensor input to each of the signal inputs of the comparators; and

a frequency generation circuit coupled to the output of the comparators and to the oscillator input section for generating an analog signal from the sensor input for provision to an oscillator output of the frequency generation circuit by controlling provision of the sensor input to the signal inputs of the comparators.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way of example only, and in conjunction with the drawings, in which:

Figure 1 depicts a block diagram of a sensor system front-end including a relaxation oscillator based sensor interface circuit according to an embodiment of the present invention;

Figures 2A and 2B illustrate a conventional output frequency counting scheme and an output frequency counting scheme according to a first embodiment of the present invention, respectively;

Figures 3A and 3B illustrate the relationship between the number of oscillator edges and the output oscillation period for the conventional output frequency counting scheme and the output frequency counting scheme according to the first embodiment, respectively;

CLAIMS

What is claimed is:

1. A sensor interface circuit for resolving sensor signals from a plurality of sensors into a digital sensor signal, the sensor interface circuit comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto.

2. The sensor interface circuit in accordance with Claim 1 wherein the monitoring module comprises:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

3. The sensor interface circuit in accordance with Claim 2 wherein the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined

maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

4. The sensor interface circuit in accordance with Claim 2 wherein the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator.

5. The sensor interface circuit in accordance with Claim 2 wherein the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

6. The sensor interface circuit in accordance with Claim 1 wherein the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

7. The sensor interface circuit in accordance with Claim 6 wherein the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

8. The sensor interface circuit in accordance with Claim 1 wherein the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

9. The sensor interface circuit in accordance with Claim 8 wherein the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

10. A sensor system front-end comprising:

a plurality of sensors; and

a sensor interface for resolving sensor signals from the plurality of sensors into a digital sensor signal, the sensor interface comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto, wherein the monitoring module comprises a variable window frequency counting device.

11. The sensor system in accordance with Claim 10 wherein the plurality of sensors comprise a plurality of resistive sensors.

12. The sensor system in accordance with Claim 10 wherein the plurality of sensors comprise a plurality of capacitive sensors.

13. The sensor system in accordance with Claim 10 wherein the monitoring module comprises:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

14. The sensor system in accordance with Claim 13 wherein the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

15. The sensor system in accordance with Claim 13 wherein the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator, and wherein the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

16. The sensor system in accordance with Claim 10 wherein the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

17. The sensor system in accordance with Claim 16 wherein the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

18. The sensor system in accordance with Claim 10 wherein the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a

discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

19. The sensor system in accordance with Claim 18 wherein the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

20. A relaxation oscillator comprising:

comparators, each having a comparator reference voltage input, a signal input and an output, wherein the comparator reference voltage input of each of the comparators are connected to a comparator reference voltage source;

variable capacitors, wherein the number of the variable capacitors is equal to the number of the comparators, and wherein each of the variable capacitors is connected between a ground voltage potential and the signal input of a corresponding one of the comparators and each of the variable capacitors is controlled to reduce its discharging capacitance only when its capacitor voltage approximates a voltage of the comparator reference voltage source;

discharge circuits respectively coupled to the variable capacitors, each of the discharge circuits coupled to the respective variable capacitor is coupled to the ground

voltage potential and an oscillator output, the discharge circuits are configured to increase a discharge current for the variable capacitors only when a voltage of the variable capacitors approximates the voltage of the comparator reference voltage source;

an oscillator input section for receiving a sensor input from a plurality of sensors and providing the sensor input to each of the signal inputs of the comparators; and

a frequency generation circuit coupled to the output of the comparators and to the oscillator input section for generating an analog signal from the sensor input for provision to an oscillator output of the frequency generation circuit by controlling provision of the sensor input to the signal inputs of the comparators.

CLAIMS

What is claimed is:

1. A sensor interface circuit for resolving sensor signals from a plurality of sensors into a digital sensor signal, the sensor interface circuit comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto, the monitoring module comprising:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

2. The sensor interface circuit in accordance with Claim 1 wherein the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

3. The sensor interface circuit in accordance with Claim 1 wherein the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator.

4. The sensor interface circuit in accordance with Claim 1 wherein the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the relaxation oscillator for frequency counting by the variable window frequency counting device.

5. The sensor interface circuit in accordance with Claim 1 wherein the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

6. The sensor interface circuit in accordance with Claim 5 wherein the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

7. The sensor interface circuit in accordance with Claim 1 wherein the relaxation oscillator further comprises one or more capacitors, and wherein the one or

more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

8. The sensor interface circuit in accordance with Claim 7 wherein the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

9. A sensor system front-end comprising:

a plurality of sensors; and

a sensor interface for resolving sensor signals from the plurality of sensors into a digital sensor signal, the sensor interface comprising:

a relaxation oscillator for receiving and pre-processing the sensor signals to generate an analog sensor signal, the relaxation oscillator comprising one or more dynamic circuits; and

a monitoring module for receiving the analog sensor signal and generating the digital sensor signal in response thereto, wherein the monitoring module comprises a variable window frequency counting device, wherein the monitoring module comprises:

a fixed frequency generation device for generating a clock signal having a fixed frequency of clock pulses; and

a variable window frequency counting device for determining a number of clock pulses within a variable counting window.

10. The sensor system in accordance with Claim 9 wherein the plurality of sensors comprise a plurality of resistive sensors.

11. The sensor system in accordance with Claim 9 wherein the plurality of sensors comprise a plurality of capacitive sensors.

12. The sensor system in accordance with Claim 10 wherein the variable window frequency counting device varies the variable counting window between a predetermined minimum oscillator frequency and a predetermined maximum oscillator frequency, the predetermined minimum oscillator frequency and the predetermined maximum oscillator frequency determined in response to operational parameters of the relaxation oscillator.

13. The sensor system in accordance with Claim 10 wherein the fixed frequency generation device has a fixed frequency determined in response to operational parameters of the relaxation oscillator, and wherein the monitoring module further comprises front end circuitry coupled between the relaxation oscillator and the variable window frequency counting device for pre-processing the analog signal from the

relaxation oscillator for frequency counting by the variable window frequency counting device.

14. The sensor system in accordance with Claim 9 wherein the relaxation oscillator further comprises one or more comparators having a comparator reference voltage, and wherein the one or more dynamic circuits includes a dynamic capacitor circuit coupled to the comparators, the dynamic capacitor circuit being configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage of the one or more comparators.

15. The sensor system in accordance with Claim 14 wherein the dynamic capacitor circuit comprises one or more MOS varactors respectively coupled to the one or more comparators.

16. The sensor system in accordance with Claim 9 wherein the relaxation oscillator further comprises one or more capacitors, and wherein the one or more dynamic circuits includes a dynamic current discharge circuit coupled to the one or more capacitors, the dynamic current discharge circuit being configured to increase a discharge current for the one or more capacitors in response to a determination that a voltage of the one or more capacitors approximates a comparator reference voltage.

17. The sensor system in accordance with Claim 16 wherein the relaxation oscillator further comprises one or more comparators having the comparator reference voltage, and wherein the one or more dynamic circuits further includes a dynamic

capacitor circuit comprising the one or more capacitors and coupled to the comparators, and wherein the dynamic current discharge circuit is configured to increase the discharge current and the dynamic capacitor circuit is configured to reduce its discharge capacitance in response to a determination that its capacitor voltage approximates the comparator reference voltage.

18. A relaxation oscillator comprising:

comparators, each having a comparator reference voltage input, a signal input and an output, wherein the comparator reference voltage input of each of the comparators are connected to a comparator reference voltage source;

variable capacitors, wherein the number of the variable capacitors is equal to the number of the comparators, and wherein each of the variable capacitors is connected between a ground voltage potential and the signal input of a corresponding one of the comparators and each of the variable capacitors is controlled to reduce its discharging capacitance only when its capacitor voltage approximates a voltage of the comparator reference voltage source;

discharge circuits respectively coupled to the variable capacitors, each of the discharge circuits coupled to the respective variable capacitor is coupled to the ground voltage potential and an oscillator output, the discharge circuits are configured to increase a discharge current for the variable capacitors only when a voltage of the variable capacitors approximates the voltage of the comparator reference voltage source;

an oscillator input section for receiving a sensor input from a plurality of sensors and providing the sensor input to each of the signal inputs of the comparators; and

a frequency generation circuit coupled to the output of the comparators and to the oscillator input section for generating an analog signal from the sensor input for provision to an oscillator output of the frequency generation circuit by controlling provision of the sensor input to the signal inputs of the comparators.