Claims:

1. A detection sensor comprising:

a single electronic board, the single electronic board comprising:

a processor;

a switching device provided by the processor or separately; and

a plurality of independent channels operatively connected to the processor and/or the switching device,

wherein each of the plurality of independent channels comprising an emitter to provide a light source signal, and a detector to process detected light that is interrupted or reflected by an object interacting with the light source signal,

wherein each of the plurality of independent channels is separately programmable by the processor, and

wherein the switching device is configured to independently control one or more operational characteristics of the emitter and/or the detector of the detection sensor in response to a programming signal input to the detection sensor.

2. The sensor of claim 1, wherein the single electronic board further comprises a comparator to compare the detected light to one or more sensor signal thresholds.

3. The sensor of claim 2, wherein the comparator uses a plurality of different adjustable signal thresholds.

4. The sensor of claim 3, comprising a rising threshold and a falling threshold.

5. The sensor of any one of claims 1 to 4, wherein the emitter comprises a light emitting diode (LED).

6. The sensor of any one of claims 1 to 5, wherein the detector comprises a photodetector.

7. The sensor of any one of claims 1 to 6, wherein the plurality of independent channels utilize unmodulated light.

8. The sensor of any one of claims 1 to 7, wherein the single electronic board further comprises a digital to analog converter (DAC) operatively coupled to the plurality of independent channels to adjust an intensity of the light source signal.

9. The sensor of claim 8 when dependent on claim 5, wherein the DAC is operatively coupled to an emitter circuit to control the intensity of the light source signal (24).

10. The sensor of any one of claims 1 to 9, wherein the single electronic board further comprises at least one amplification circuit to amplify a received signal from the detector, wherein the received signal is generated from the detected light.

11. The sensor of claim 10, wherein the at least one amplification circuit provides a feedback signal to the processor.

12. The sensor of claim 10 or claim 11, wherein the received signal is split and processed by a pair of amplifiers.

13. The sensor of claim 12, wherein the pair of amplifiers comprises a transimpedance amplifier and a voltage amplifier for gain adjustment.

14. The sensor of any one of claims 1 to 13, wherein the single electronic board comprises separate adjustment and detection circuitry for each of the plurality of independent channels.

15. The sensor of any one of claims 10 to 14, wherein the processor is configured to monitor an output voltage of the at least one amplification circuit to adjust current sent through the emitter to compensate for effects of ambient temperature variation.

16. A method of signal detection, comprising:

selecting one of a plurality of independent channels of a detection sensor, the detection sensor comprising a single electronic board, the single electronic board comprising a processor, a switching device provided by the processor or separately, and the plurality of independent channels operatively connected to the processor and/or the switching device, each of the plurality of independent channels comprising an emitter to provide a light source signal, and a detector to process detected light that is interrupted or reflected by an object

interacting with the light source signal, wherein each of the plurality of independent channels is separately programmable by the processor;

using the processor and/or the switching device to independently control one or more operational characteristics of the emitter and/or the detector of the detection sensor in response to a programming signal input to the detection sensor;

providing the light source signal using the emitter of the one of the plurality of independent channels; and

receiving and processing the detected light.

17. The method of claim 16, wherein the single electronic board further comprises a comparator, the method further comprising comparing the detected light signal to one or more sensor signal thresholds.

18. The method of claim 17, wherein the comparator uses a plurality of different adjustable signal thresholds.

19. The method of claim 18, comprising a rising threshold and a falling threshold.

20. The method of any one of claims 16 to 19, wherein the emitter comprises a light emitting diode (LED).

21. The method of any one of claims 16 to 20, wherein the detector comprises a photodetector.

22. The method of any one of claims 16 to 21, wherein each of the plurality of independent channels utilize unmodulated light.

23. The method of any one of claims 16 to 22, wherein the single electronic board further comprises a digital to analog converter (DAC) operatively coupled to the plurality of independent channels, the method further comprising adjusting an intensity of the light source signal using the DAC.

24. The method of claim 23 when dependent on claim 20, wherein the DAC is operatively coupled to an emitter circuit to control the intensity of the light source signal (24).

25. The method of any one of claims 16 to 24, wherein the single electronic board further comprises at least one amplification circuit, the method comprising amplifying a received signal generated from the detected light.

26. The method of claim 25, wherein the at least one amplification circuit provides a feedback signal to the processor.

27. The method of claim 25 or claim 26, wherein the received signal is split and processed by a pair of amplifiers.

28. The method of claim 27, wherein the pair of amplifiers comprises using a transimpedance amplifier and a voltage amplifier for gain adjustment.

29. The method of any one of claims 16 to 28, wherein the single electronic board comprises separate adjustment and detection circuitry for each of the plurality of independent channels.

30. The method of any one of claims 25 to 29, further comprising having the processor monitor an output voltage of the at least one amplification circuit to adjust current sent through the emitter to compensate for effects of ambient temperature variation.