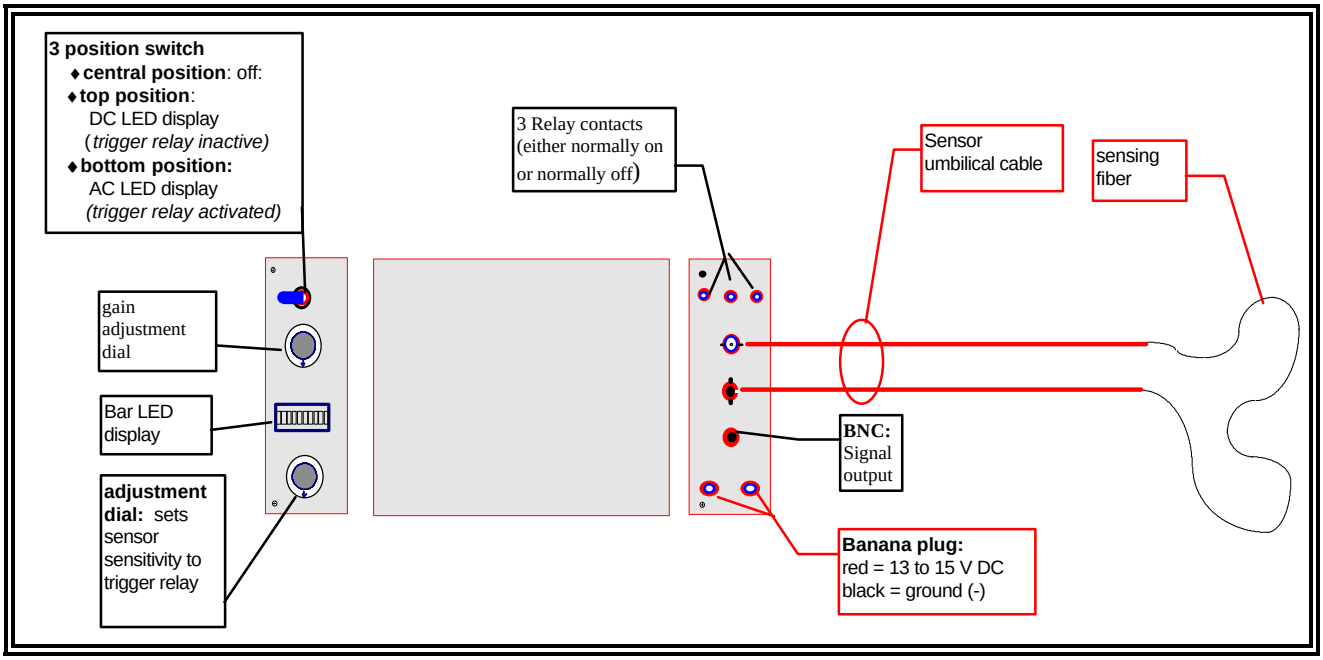
ABACUS OPTICAL MECHANICS INC.

Specializing in Fiber Optic Technology

*1851 Holser Walk #220 * Oxnard * California * 93030*
*(805) 988-1111 * fax (805) 988-0254*
sales (818) 597 0453
E-Mail: Abacus1@Earthlink.net

Contact Fiber Optic Sensor for detection of:

Impact
Vibration
Acceleration
Acoustics
Displacement
- *Intrusion*



Abacus Optical Mechanics fiber optic sensor system consists of an Optoelectronics box and a fiber sensor. The Optoelectronics box consists of a light source, detectors and associated electronics components connected to a fiber trunk. The fiber trunk consists of a cable containing a pair of fibers. Each pair of fibers has a length of Abacus Optical Mechanics proprietary sensor spliced at a designated point along the fiber trunk. The fiber trunk and sensing fiber can be manufactured to any length.

A single strand of the fiber optic sensor can serve as a multifunction sensor including measurement of Vibration, Impact, Acceleration, Acoustics, Displacement and Intrusion.

For further information contact
Anthony Bledin
at (805) 988-1111 or (818) 597-0453

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Specifications

Vibration:

0 to +/- 100 g
DC to 80 kHz
sensitivity 0. 5 g ±1%

Impact:

Sensitivity Less than 1000 ergs impact energy
Triangulate accuracy (3 sensors to -depends on structure: ±1 cm)
Acoustic emission triangulation in plane

Temperature:

Depends on actuator (-100 °C to 300°C)
Accuracy +/- depends on actuator hysteresis

Strain:

10,000 Microstrains (range +/- 1%)
Accuracy +/- 10 microstrains

Enviromental Specifications

Box is capable of withstanding impact of 5g in any axis
operating temperature 0° to 85°C

Size of Optoelectronics Box:

3.6 by 5.3 by 1.5 inches
constructed of Aluminum

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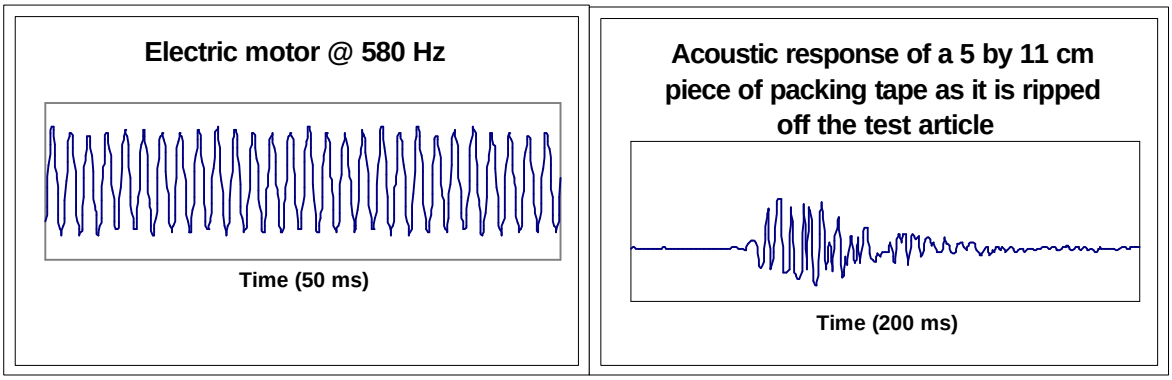
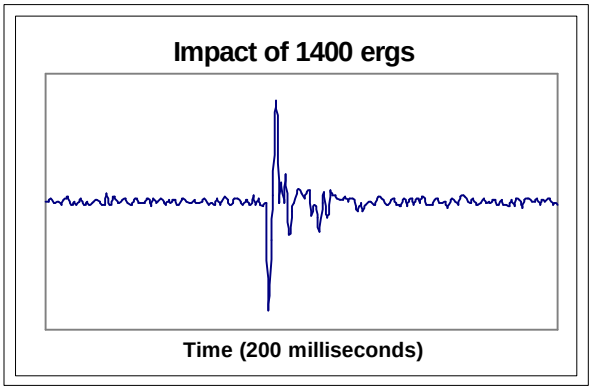
Abacus Optical Mechanics is developing a unique fiber optic sensor; it can be imbedded or bonded to any surface. Our sensor is capable of detecting vibration from D.C. to several Khz.

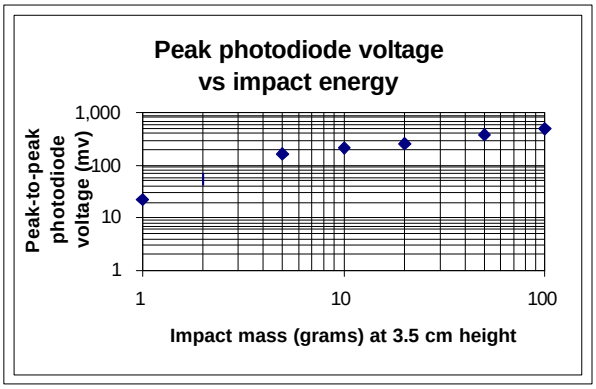
The following data was obtained from a single strand of our proprietary sensor bonded along the long axis of a 163 by 11 by .3 cm epoxy graphite composite test board.



The graph below represents an impact of 1400 ergs on the surface of the composite detected by our imbedded sensor. The impact is the result of a .35g washer being dropped on the surface from 4 cm.

The data in the chart below was obtained from our fiber optic sensor taped to the surface of an epoxy composite board. Impact was obtained by dropping various weights from 3.5 cm. onto the surface of an epoxy composite board.





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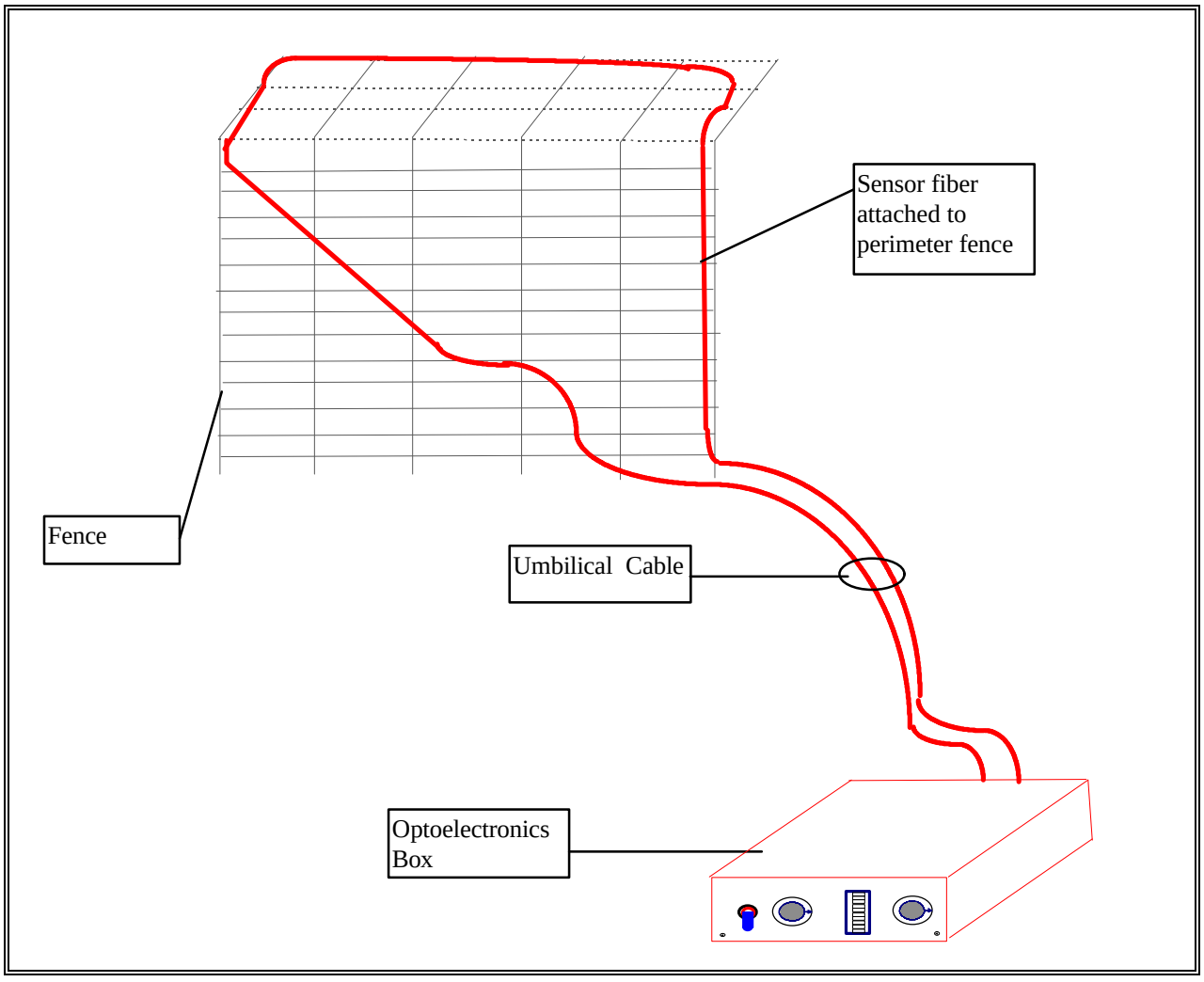
Fiber optic cable security contact sensor (microphone cable system)

Figure 1



The sensor we produce could be used for perimeter security monitoring by either being buried in the ground or attached to a fence Interruption or perturbation of the fiber sensor will result in a signal change which in turn can trigger a security response. The sensitivity of the sensor can be adjusted.

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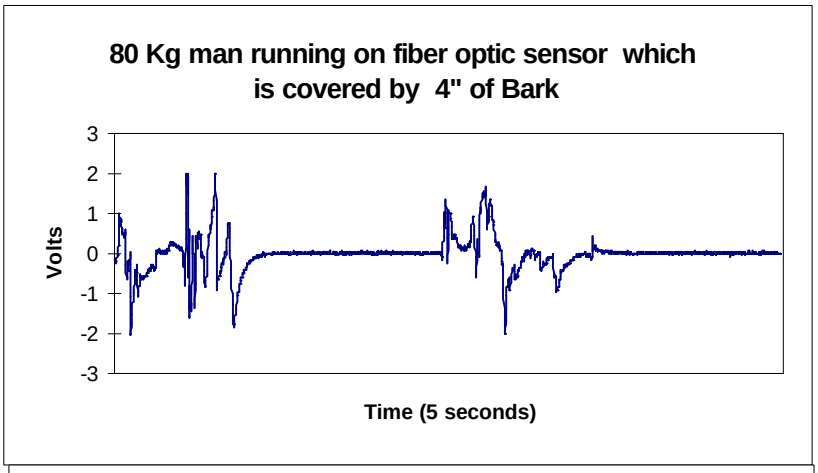
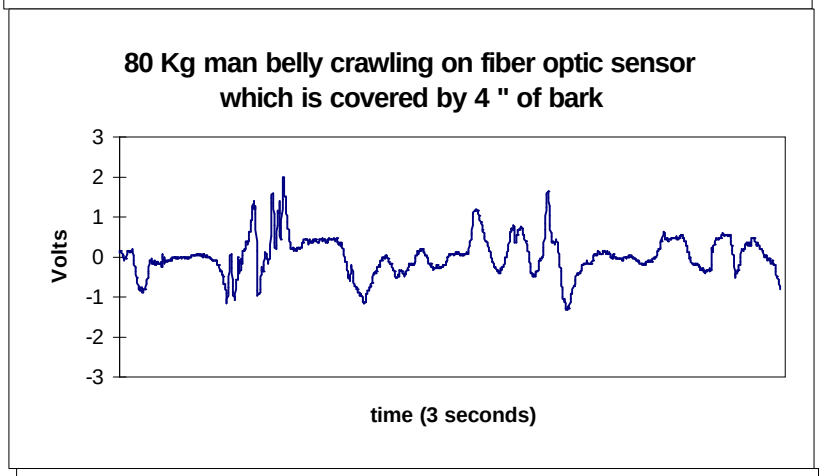
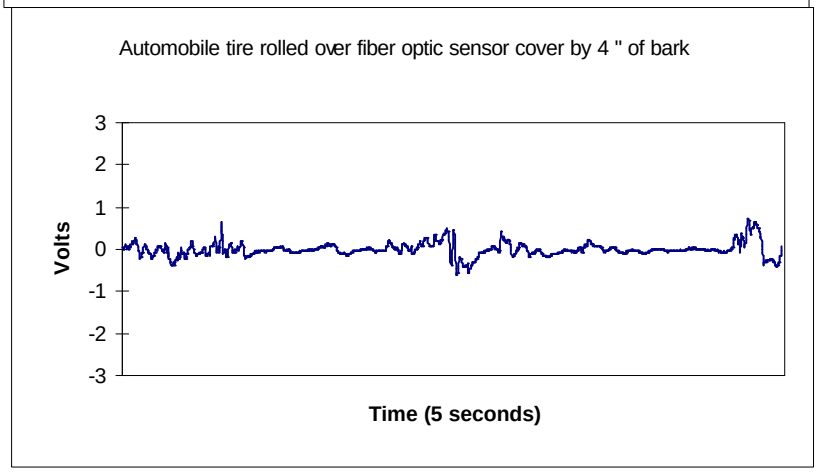
The following data was obtained with a 2.5 meter length of sensor fiber buried beneath 4 inches of bark. .The sensor fiber was placed on concrete.







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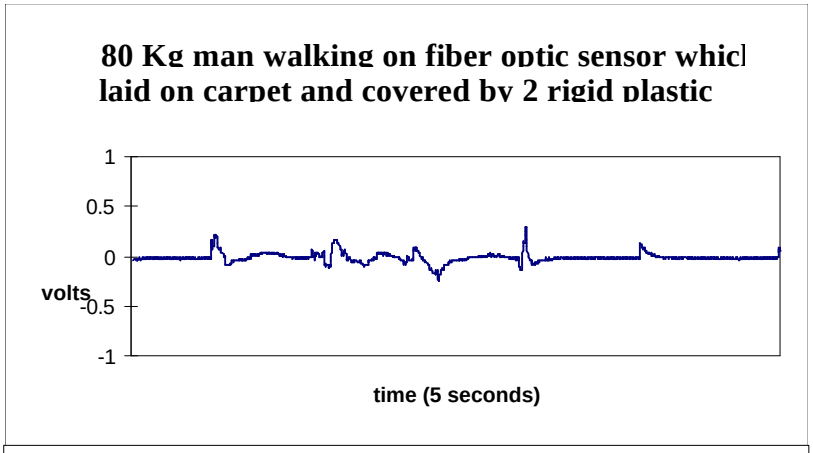
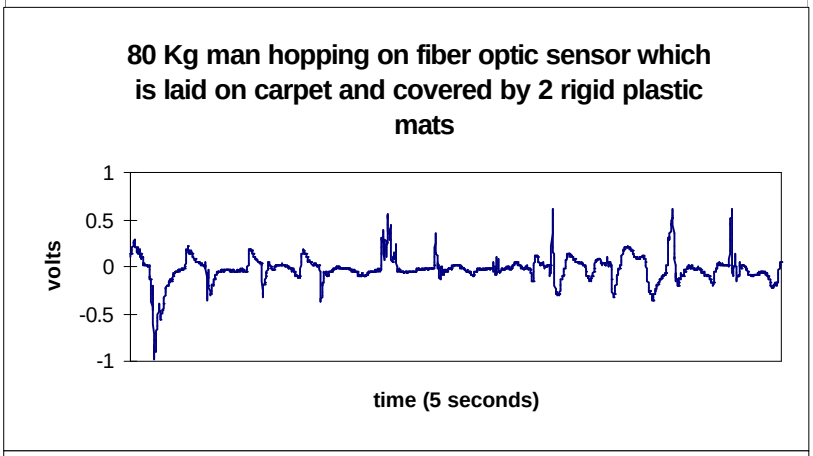
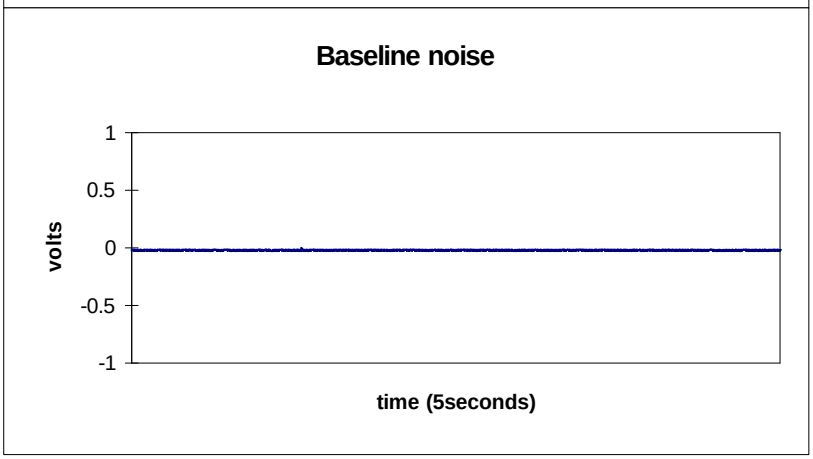
The following data was obtained with a 2.5 meter length of sensor fiber placed on a carpet and covered by 2 rigid plastic mats.







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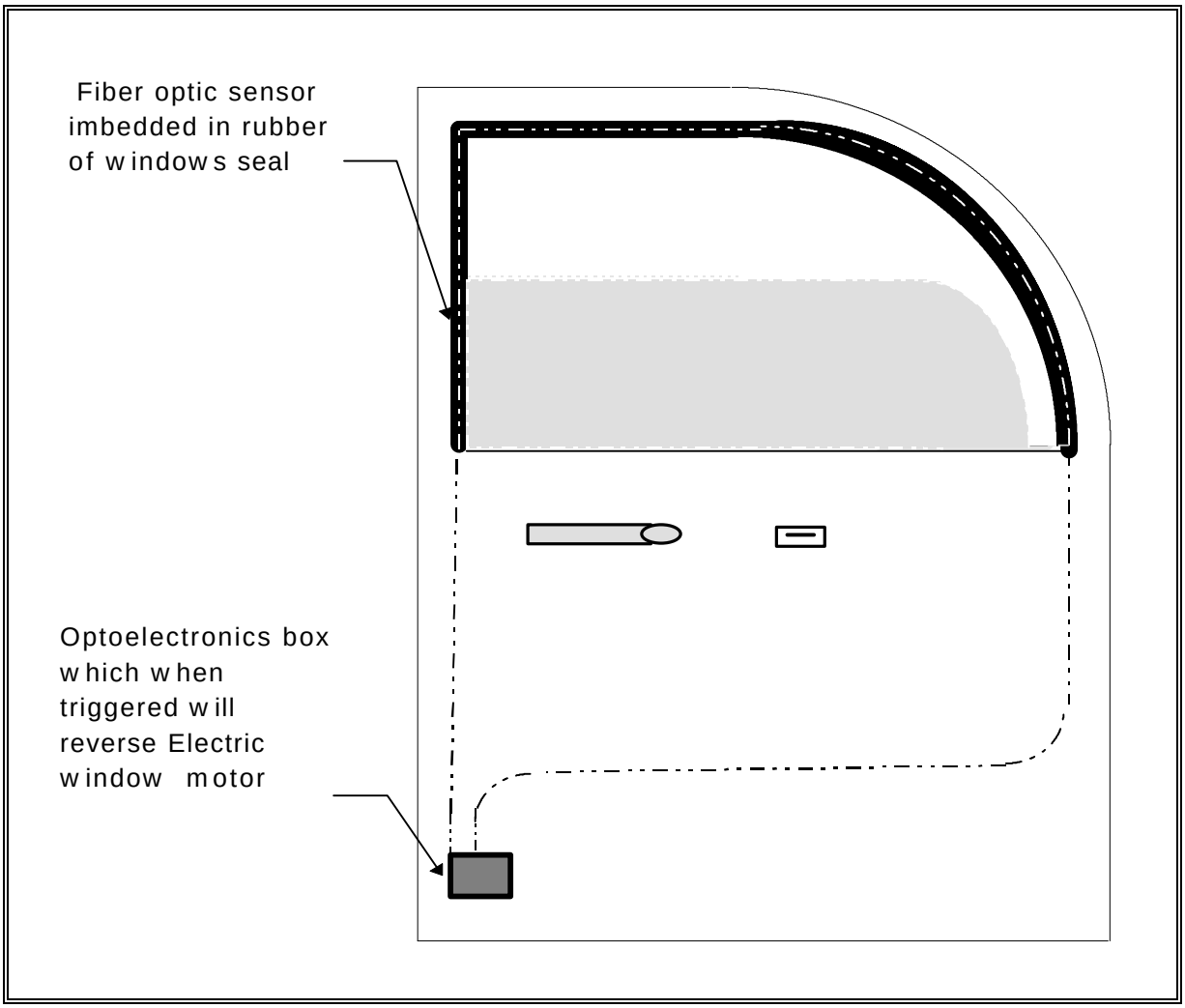
Car door with fiber optic window sensor



The fiber optic "squeeze sensor" for car door windows consist of an optoelectronic box and a loop of fiber optic cable. The optoelectronics boxes contain a light source, photodector and signal processing electronics. Light is injected into one arm of the sensor and is returned by the second arm to the photodector in the optoelectronics box.. The fiber trunk is sensitive to impact and pressure due to a unique combination of fiber properties and splices. When a certain threshold of pressure of impact is reached the electrical window motor is programmed to reverse.

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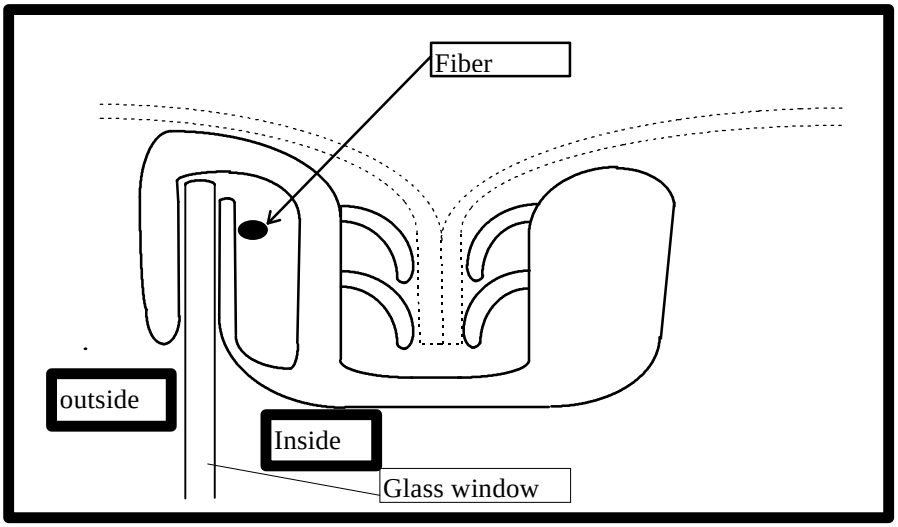
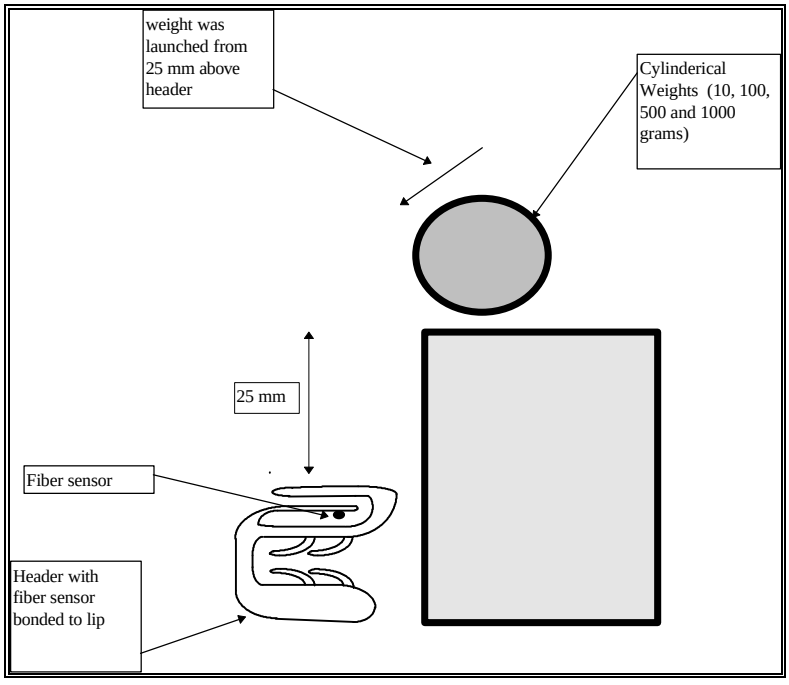
Position of fiber sensor in Header



Data of graphs to follow was obtained in the following manner:



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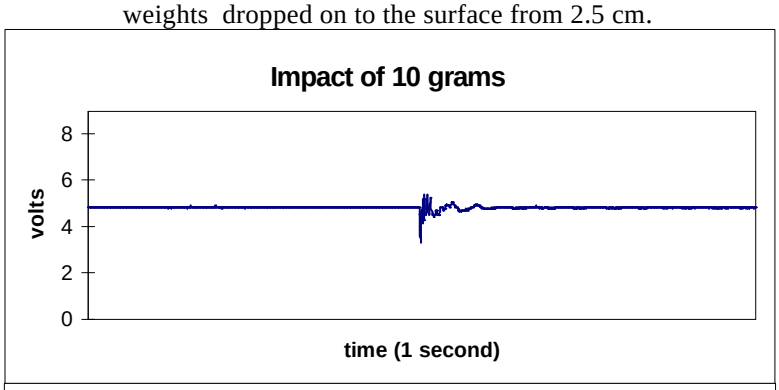
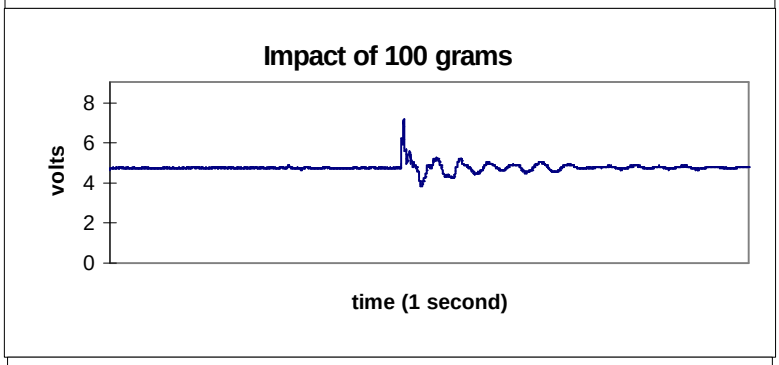
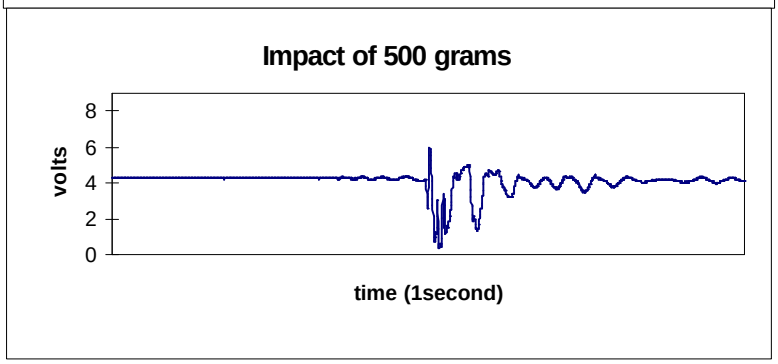
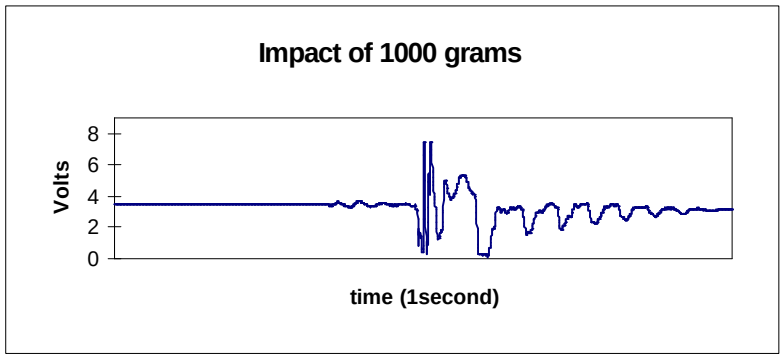
The following graphs were optioned by a fiber optic sensor bonded to the lip of a header section. The impact is the result of weights dropped on to the surface from 2.5 cm.









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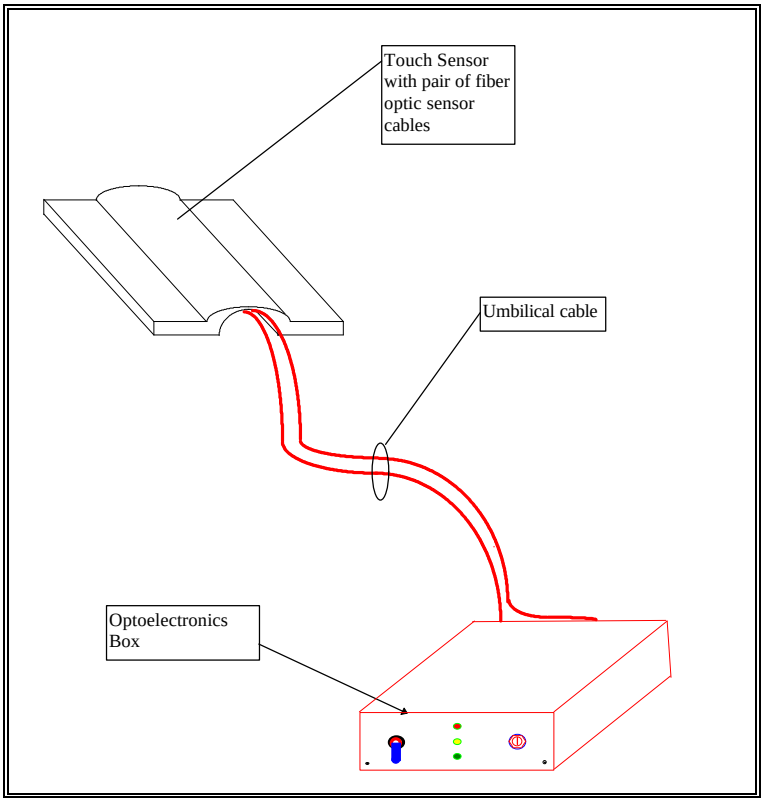
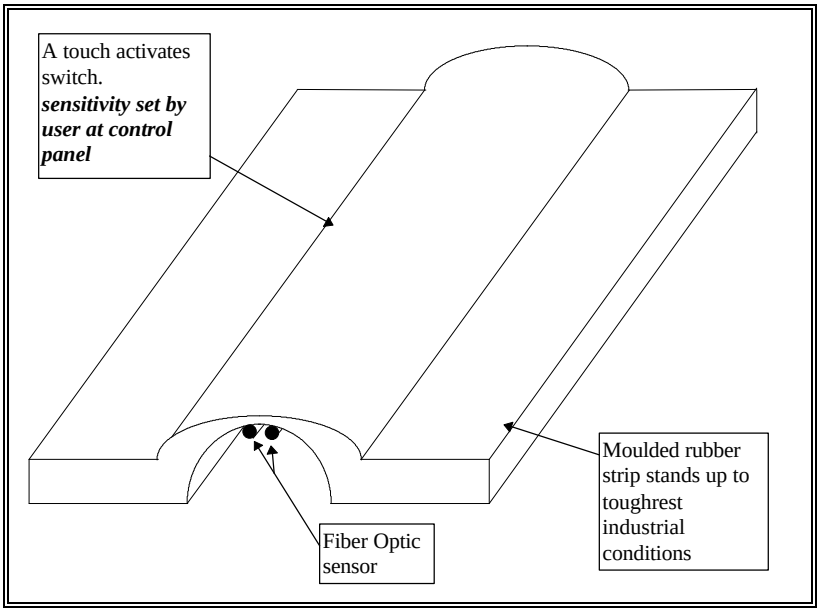
Fiber Optic Touch sensor system



Detailed section of touch sensor



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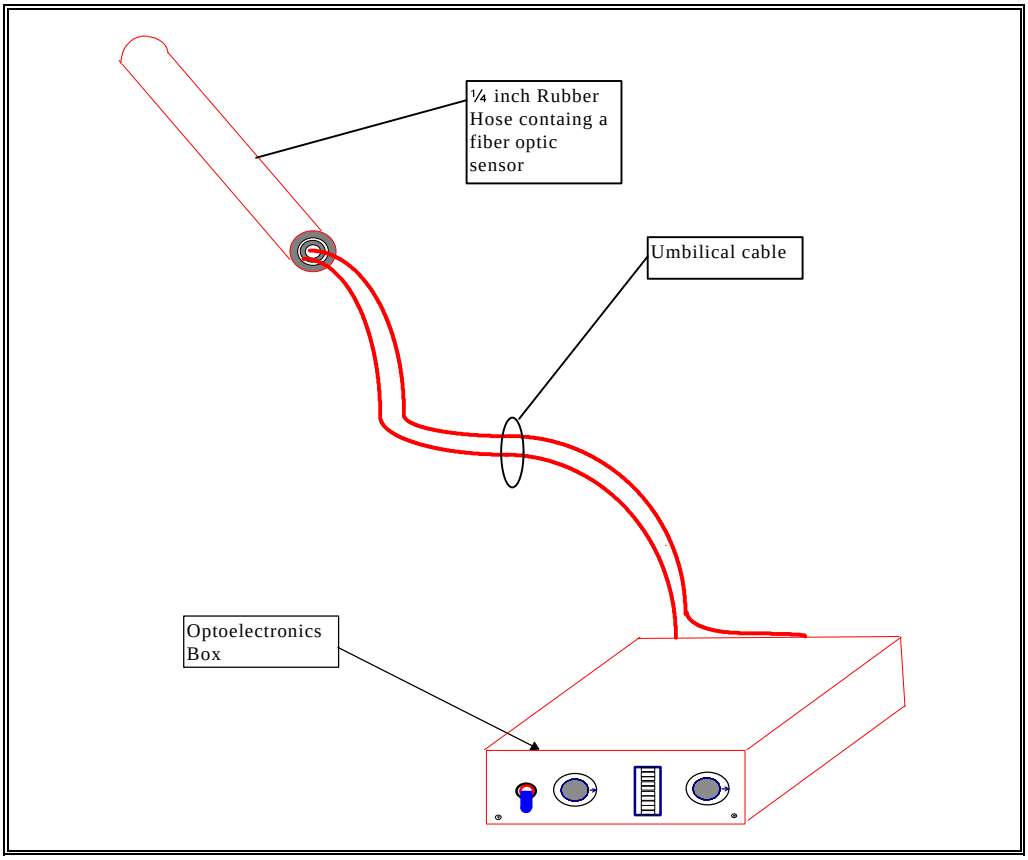
Fiber Optic axle counter sensor system (vehicle counter and weight in motion sensor)



This device is used in automotive traffic control counting the number of vehicle s passing a point as well as the weigh of each axle of the vehicle. The fiber optic “axle counter” fiber optic sensors consist of an optoelectronic box and a loop of fiber optic cable. The optoelectronics boxes contain a light source, photodector and signal processing electronics. Light is injected into one arm of the sensor and is returned by the second arm to the photodector in the optoelectronics box.

The sensing fiber trunk is embedded in the center of a ¼ Inch rubber hose that can be manufactured to any length. This rubber hose is stretched across a street surface. Any impact on the rubber hosed caused by a vehicle passing over the hose results in a change in the optical signal. The rubber hose is sensitive to impact due to the unique sensing fiber properties and splices. The greater the force of impact (which is proportional to speed and weight) the greater the resultant optical signal.

Vehicle speed can be calculated by placing two rubber hose fiber sensor systems spaced at a calculated distance across the street surface. Knowing the impact force and the speed of the vehicle will enable the user to calculate the weight of each axle crossing the fiber sensor rubber hose.the fiber sensor rubber hose.

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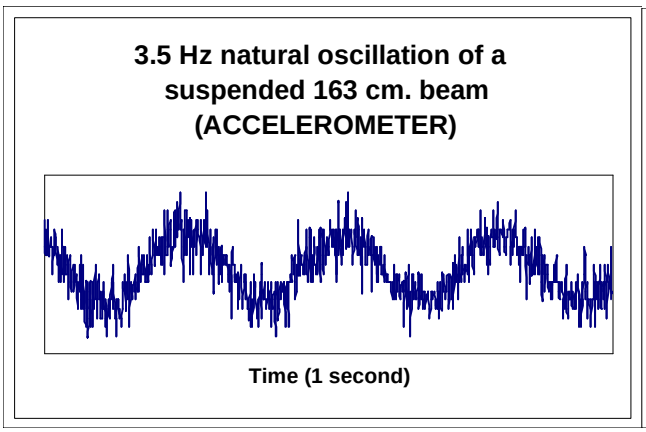
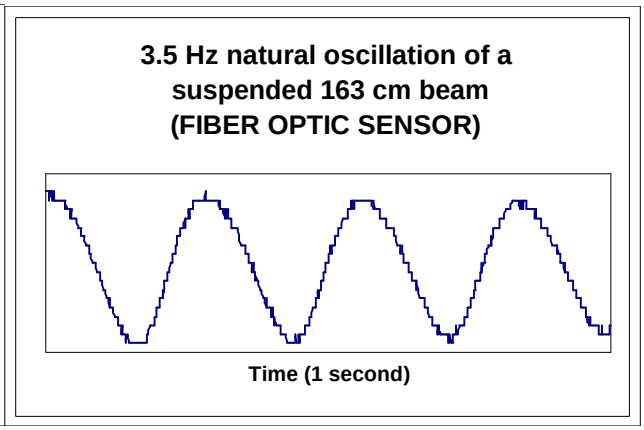
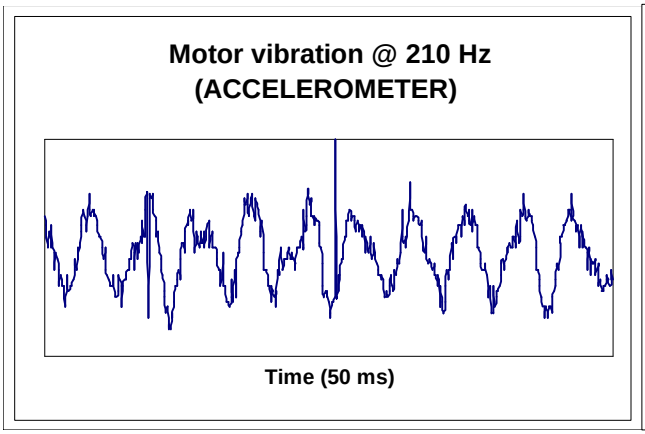
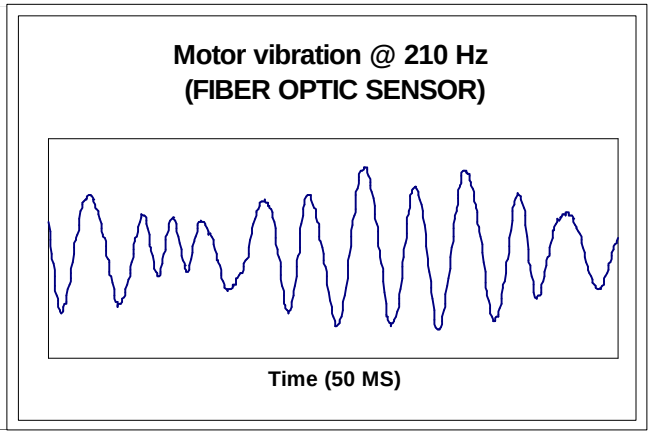
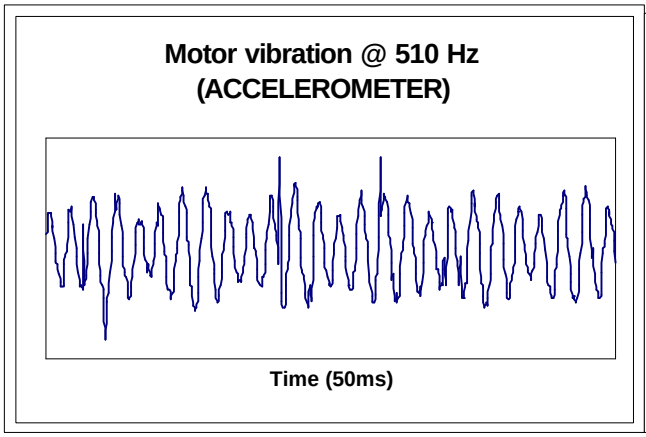
Accelerometer (Entran EGA 125F-5D single axis device) **compared with Abacus' proprietary fiber optic sensor.** Tests performed on an epoxy composite test beam.

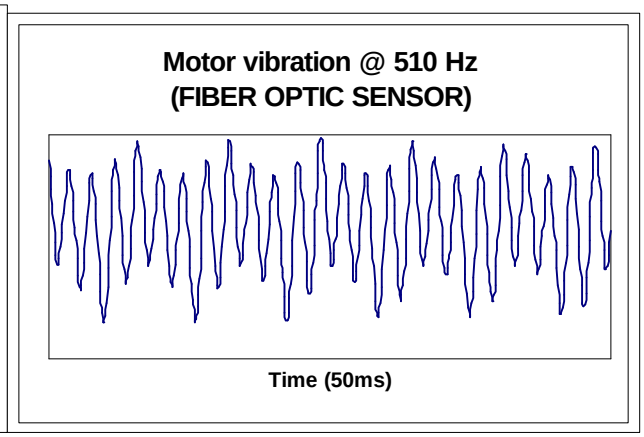












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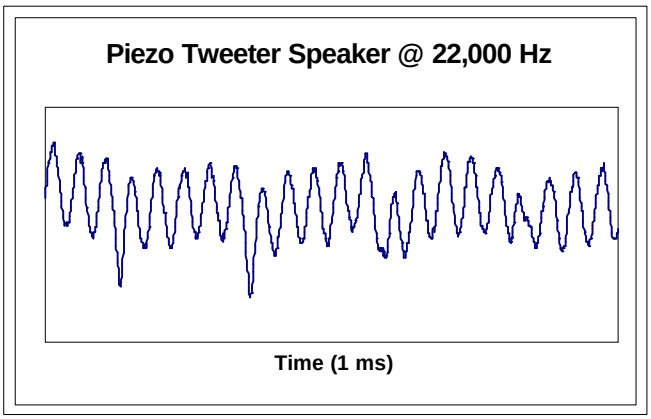
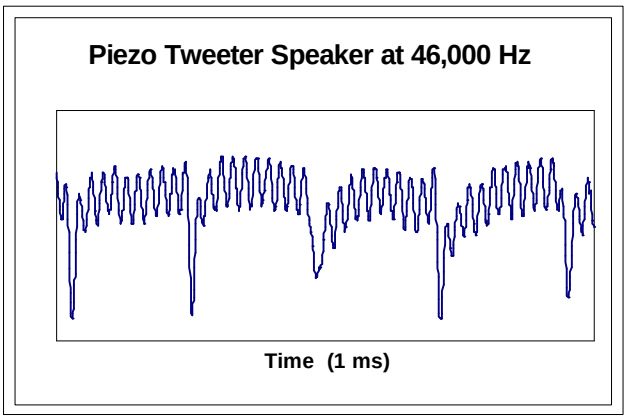
High frequency vibration was detected by abutting Abacus' proprietary fiber optic sensor against a pizo tweeted speaker diaphragm.





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