**Glass Break Detector**

A **glass break detector** is a sensor used in electronic burglar alarms that detects if a pane of glass is shattered or broken. These sensors are commonly used near glass doors or glass store-front windows to detect if an intruder broke the glass and entered. There are different products in the market which detect glass breaking. Most of them, work with microphones and analyze frequencies. In our project, we’ll use an accelerometer to detect vibrations in the glass as it breaks.

Our product uses a micro-controller and an accelerometer from ST product catalog, which will be chosen according to the required performance.

A glass breaking is detected when the acceleration value of the glass is above the threshold value. Values higher than the threshold represent glass’ motions and vibration while or after breaking. An accelerometer can identify the acceleration and return the value to the micro-controller for analyzing process.

The product will work as following:

1. The accelerometer analyzes the vibrations on the glass constantly.
2. The micro-controller contains an algorithm.
3. The algorithm checks the output values from the accelerometer.
   1. If the value is above the threshold value-
      1. The glass is broken!

For making this program work, we need to identify the threshold accelerate when a glass breaks. Therefore, when we get a value equal or higher from the threshold value, a breaking is detected.

According to the products available today in the market, they use a 3-axis accelerometer that detects . Therefore, the threshold value if lower than 2g. We will know exactly the threshold value after testing few glass breakings.

There is an accelerometer that satisfies this purpose (at least for now) in ST catalog- AIS328DQ.

Some of the feature:

* Wide supply voltage range: 2.4 V to 3.6 V
* Low voltage compatible IOs: 1.8 V
* Ultra low-power mode consumption: down to 10 μA
* ±2g/±4g/±8g dynamically selectable full-scale
* output data rates from 0.5 Hz to 1 kHz

Our micro-controller, STM32F411, works with 100MHz, so it’s able to analyze all the output rates from the accelerometer.

**Window opening detector**