

A reconstruction of "Film Case Seismometer" employing "Arduino" and "Processing"

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We reconstruct so called "Film Case Seismometer (Okamoto,1999)" for class room use. The legacy system had developed about two decades ago and was a full seismograph involving a moving magnet sensor and a PC recording system as a simplified mimic of a modern digitalized seismograph and a logger system. While the sensor was simplified and easy constructed enough, however the recording system was somewhat complicated and employ a specific program language on the limited PC. Therefore, the system was not so far contributed and/or demonstrated at mid-school's class rooms. In this regard, now we try to fully model-change the old system to an innovative style using "Arduino" (one chip micro-computer including both I/O and A/D converter devices) and "Processing" (Java based language for easy programing). The main aspects are as follows,

1) The sensor consists a rounded coil on a acrylic pipe and a strong Neodymium bar magnet hanging with a series rubber band from a main pillar hook. The Neodymium magnet can supply a sufficient signal and an appropriate damping by induced current with a surrounded metal pipe.

2) The recording system and software are improved more simplified and can applicable on any PC or even tablet.

3) The micro-tip used for I/O and A/D converting is "Arduino Uno" (Italian made and a cheap cost, 30 USD), which is easily controlled by a simple software written in Processing language and exchanges signals via USB port.

4) Processing language is used for A/D driving and logging, which is running on any operation system such as Windows, Mac, Linux and even Android.

5) The additional hardware for natural earthquake observation is a circuit employing OP amps for signal boost, which is divert from our legacy system.

6) All system is constructed in a transparent acrylic box for recognizing mechanism at a glance.

7) The wave signal is displayed on PC or tablet at real time with second time-marks and also save to PC as a graphic mode or digital mode at each moment.

8) The logging and displaying capacity can be extended to three channels easily.

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