

PC-Drum: A simple digital seismograph to replace analog drum

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A low cost PC-based seismic data recorder named PC-Drum has been developed to replace conventional analog drum recorders in developing countries. PC-Drum is superior to the analog system in dynamic range, timing accuracy, digital signal analysis capability, automatic processing, and data transfer.

The system consists of a Windows PC equipped with an AD converter board and a GPS clock. Analog output signals from a seismometer are digitized by the AD converter, and time-stamped by the GPS clock. The digital data is then plotted on a virtual drum on the PC's screen to simulate a drum. Compared to conventional helicorder, the virtual drum can be rolled back and forward, and zoomed in and out to show any portion and any component of the seismic data. The data is simultaneously recorded in Win-format into the hard disk for further processing and data transmission via modem or network.

National Instruments 6034E device is used for AD conversion, which features 16 channels of 16-bit analog input with system timing controller (STC) for time-related functions. STC functions provide an easy way to synchronize the AD conversion to outside timing signal. The Jupiter GPS clock is a product of SPA Corp., which outputs 1PPS (pulse per second) and 10KHz pulse with 50% duty that are both synchronize to UTC. The 1PPS is used to synchronize AD conversion at the beginning of every second. The binary message format 1108 that synchronizes to 1PPS is used to decode the UTC date/time information.

Until now our tests showed that the PC-Drum works well with high stability. A system will be set up in a seismic observatory of Indonesia for long-term test in the very near future. Capability such as alarm function, event data extraction, and support of other AD converter boards and GPS clocks will be added into the present system.