

# GEOMEDIA RESEARCH AND DEVELOPMENT

6040 Strahan Rd.  
El Paso, Texas 79932-1712

Tel. (915) 877-2777  
Fax (915) 877-2777

## PORTABLE SEISMIC PROPERTY ANALYZER: SOIL PSPA-DU Specifications V3.3

### General Description

The PSPA is a laptop computer peripheral used for measuring the stiffness of base materials and soils using seismic wave propagation techniques. The PSPA is simply set on the surface and a computer-controlled electrical solenoid source initiates highly repeatable seismic waveforms that are recorded on three accelerometers. These waveforms are digitized and transferred back to the computer for analysis. The waveforms can be interpreted using standard Ultrasonic Surface Wave techniques. One-button hit initiates acquisition and interpretation, with results in less than 30 seconds. Waveforms, interpretations, and site descriptions are archived for later quality control audits, or for later reanalysis with more sophisticated techniques. The PSPA is attached to a USB port of a personal computer. The typical package includes the PSPA, a 15' USB port cable, a Panasonic Series 74 Toughbook laptop, a polyethylene shipping case, and a package of expendable supplies.

### Source/Sensor Specifications

- Electrical solenoid source with integral accelerometer: computer controlled.  
Accelerometer 5 mV/g sensitivity with resonant frequency > 40 KHz,  
Solenoid source operates on 24 volts/150 ma, driven by TTL level logic,  
Base/Soil ground contact with conical aluminum foot in frequency range of 500 Hz – 5 kHz.
- Two discrete sensor accelerometers  
sensors spaced 6" and 15" from the source,  
100 mV/g sensitivity, resonant frequency > 40 KHz, 2 ma excitation,  
Patented air cylinder suspension for reliable ground coupling without surface preparation.
- Modular sensor spacers permit customized sensor spacing, disassembly for airline carryon.
- Thermistor sensor for temperature measurement in 32–120° F range with 2° F accuracy.
- Dimensions and weight depend on configuration: typical size is 20 lbs, 21" x 9" x 8".

### Data Acquisition Electronics Specifications

- Low-current sleep mode for portable laptop computer operation.
- USB port data transfer and 5V/480 ma power interface to a personal computer.
- Two logic-level source control channels sourcing 20 ma at 5 volts.
- Four transient analog data acquisition channels with:  
automatic software-controlled gain ranging from 0.1 to 10,000  
automatic software-controlled bandpass filters of 200 Hz–5 KHz, 2 KHz–40 KHz,  
sampling speeds from 20 kHz to 390 kHz per channel  
up to 16,000 samples per channel in memory during high speed burst sampling
- Three 2 ma transducer excitation with a signal range of 0-24 volts.
- Two low-speed 10 k-ohm bridge transducer channels for temperature sensors.
- Triggering of data acquisition from the computer or solenoid accelerometer.
- Delta-sigma A/D with DSP insures a minimum dynamic range of 72 db at 50 KHz.

## **Software Specifications**

System Requirements: Pentium CPU or higher with 64 Mbytes RAM, 10 Mbytes disk space. Microsoft Windows 95/98/ME/2000/XP operating systems. Data acquisition hardware and software require one USB 1.0 port.

- SPA Manager: documents general project, site and station information with graphical waveform and interpretation display.
- Acquisition Module: automated acquisition of waveforms with gain adjustment, quality control on signal repeats, software selectable number of waveform repeats.
- Interpretation Module: interactive or automated Ultrasonic Surface Wave interpretation for base, and soil applications.
- Reporting Module: interactive or automated tab-delimited interpretation summary.

## **Warranty**

One year limited warranty covering any defects in workmanship or materials. Software and estimates derived from the software are not warranted to be free from defects.