Geospace Seismic Recorder (GSX)

USER MANUAL

**7007 Pinemont
Houston, TX 77040 USA**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Any changes or modifications to this device not explicitly approved by the manufacturer could void your authority to operate this equipment.

FCC
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada
(English)
This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

(French)
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

GSX MODULE

Deployment

The GSX should be deployed with the metal plate down. This provides sufficient earth grounding and maximum cooling of the unit as well as providing the GPS receiver in the top to the unit with an ideal "view" of the satellite constellation. The grounding spike should be fastened to the unit prior to deployment to provide maximum earth coupling. The unit should be transported on its side in order to put the unit into standby mode and minimize battery consumption prior to use. Once the unit is ready to be deployed it should be flipped spike down and the GSX will immediately begin power on self-test.

The GSX will test all of its internal circuits followed immediately by an impedance test of the seismic sensors. The LED that can be seen from the top of the GSX will flash codes to indicate the GSX's condition. The GSX will enable the Global Positioning System (GPD) receiver and begin to flash the code that indicates that it is searching for satellites. Within a few seconds the GPS receiver will have sufficient satellite information to obtain a 3 dimensional fix. The flash code will change to indicate this condition and the GSX will now begin to acquire seismic data if it has been programmed to begin recording immediately. See Programming below. After several minutes the internal GSX clock will be sufficiently disciplined and the GPS receiver will be turned off. The flash code will again change to indicate this state. See the flash codes below.

Radio Status Monitoring

A GSX may be connected to a laptop computer and used as a hub to monitor the status of any GSXs within a 50m to 100m radius via a high frequency radio link. In this mode the laptop/hub monitors and logs status information from all of the GSXs that it communicates with. The laptop stores the GPS location, acquisition status, temperature, battery status and the nonvolatile memory status of each GSX. By moving the hub throughout the seismic spread all of the GSXs in the survey may be monitored and logged. This logging may take place during acquisition of seismic data with no adverse effect on the data quality.

Flash Codes

GSX Start-up Error Codes

Critical GSX Error:	LED flashes repeatedly on solid for 1 second followed by off for one second.
Critical Seis Input 1 Error:	LED on solid for 1 second followed by 1 short pulse.
Critical Seis Input 2 Error:	LED on solid for 1 second followed by 2 short pulses.
Critical Seis Input 3 Error:	LED on solid for 1 second followed by 3 short pulses.
Critical Seis Input 4 Error:	LED on solid for 1 second followed by 4 short pulses.
Critical Battery Error:	LED on solid for 1 second followed by 5 short pulses.
Non-Volatile Memory Error:	LED on solid for 1 second followed by 6 short pulses.
Non-Volatile Memory Full:	LED on solid for 1 second followed by 7 short pulses.

GSX Run Time Codes

GPS on but no GPS fix:	One LED flash per second.
GPS on with GPS fix:	Two quick flashes once per second.
Recording with GPS off:	One quick flash each 8 seconds.
Sleeping:	Two quick flashes each 10 seconds.
Running geophone tests:	LED flashes on for 10 ms 5 times per second.

Downloading

The GSX non-volatile memory may be read and cleared by removing the battery connection and inserting the unit into one of the outlets in the GeoReaper. See the GeoReaper User Manual for further instruction.

Programming

The GSX recording parameters such as sample rate, pre-amp gain, record mode, and testing, are programmed and stored in non-volatile memory in the GSX by the GeoReaper. See the GeoReaper User Manual for further instruction.