Checking Status for Broadband Sensors

In the field, you must check:

- Power
- Mass Positions
- Waveforms

**POWER:**
PASSCAL Broadband and Midband sensors are feedback seismometers and require power. At the field station, the sensor is generally powered via the DAS. **Before** the DAS is powered, check the DC power source (battery or power box) for Polarity and Voltages. Power the DAS, check the DAS status, then connect the Sensor to the DAS; the sensor will immediately be powered when connected to the DAS.

**MASS POSITIONS:**
Once the sensor is powered and the masses are unlocked (exceptions: Nanometrics sensors do not have mass-locking mechanisms, nor do Guralp CMG40T models), check the mass position voltages. This can be done with a voltmeter and the Breakout Box or Host Box for Guralps or STS-2's, respectively, or, more commonly, mass positions are checked via PDA (SONY Clie) commands from the DAS. The mass position voltages for 3 elements will be reported on the Clie's screen and you will record them in the field notes (either Installation or Service Sheets). If the DAS is an RT130, the mass position voltages can be written just as they appear on the screen. If the DAS is a Q330, divide the screen values by 10, if you want units of Volts.

Ideally, you want the 3 mass positions to be less than an absolute value of 1.5 Volts for Guralp and Streckeisen sensors. Different sensors behave differently. Guralp 3T sensors will automatically run the mass centering motors, after the mass unlock command is given and the unlocking has completed. Often the 3T masses will be centering after the first try. If not try 2 more times, but if the masses are not then centered, refer to the troubleshooting guide. Streckeisen STS-2 sensors can take many attempts to center. Try up to twelve times, waiting several minutes between each attempt, before consulting the troubleshooting guide. Nanometrics sensors have a smaller full-scale range, so their masses should be less than an absolute value of 0.5 Volts. Usually, Nanometric sensors, Trillium 240's and Trillium 120's, will center immediately, after the first centering command.

**WAVEFORMS:**
Give the sensor a 5-10 minute rest after successfully centering before you monitor the waveforms. The command sequence to monitor waveforms depends on the DAS that's digitizing the sensor input, but the idea is the same. You will be viewing in near-real time the digitizer's output of the sensor's response to ground motion. Using a waveform-monitoring function, make sure no component is flat-lined, either zero signal, or something very large (e.g. 7 million counts). Make sure you can see signals in the data (all three components need testing) corresponding to the number of times you jump on the ground; this is known as the 'stomp' test. Make sure you see long-period signal, as well. You may see 6-second 'signal' produced by the microseism background noise, or you can produce some long-period energy by doing deep-knee bends near the seismometer vault. Play around with the DAS's monitor function until you understand what you are seeing.

If after monitoring waveforms with a PDA you still do not know if the sensor is working properly, acquire DAS data for about 15 minutes, download the data onto your field laptop, and look at the sensor's output in greater detail with pql; check time series, DC offset, and spectral content.

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