QUAKELOGIC
Earthquake Risk Management Solutions

With almost two decades of experience in the field, we have become an expert in instrumentation, seismic station installation, and monitoring. QuakeLogic engineers will define with you the best solution and provide a quality service to ensure optimum performance of your monitoring systems.

GUIDE TO SEISMIC DIGITIZER DYNAMIC RANGE COMPUTATION

1. Introduction to Dynamic Range:

Dynamic Range in seismic digitizers indicates the dB difference between the smallest and largest signal levels the device can accurately process.

2. Noise Floor (Equivalent Input Noise - EIN):

EIN, usually specified in volts at a certain gain, represents the minimum noise level detectable by the device.

3. Maximum Input Level:

This refers to the highest signal level (in volts, peak-to-peak) the digitizer can process without distortion.

4. Conversion to dBu:

Standardize measurements by converting both EIN and Maximum Input Level to dBu (decibels referenced to 0.775 volts). The formula is: Level in dBu = 20 × log10(Voltage in Volts / 0.775).

5. Dynamic Range Calculation:

Dynamic Range is found by subtracting the Noise Floor in dBu from the Maximum Input Level in dBu.

Example Computation:

Suppose a digitizer has an EIN of 0.000025 volts and a Maximum Input Level of 5 volts.

First, convert these values to dBu:

- EIN in dBu = 20 × log10(0.000025 / 0.775) ≈ -111.48 dBu
- Maximum Input Level in dBu = 20 × log10(5 / 0.775) ≈ 34.22 dBu

Next, calculate the Dynamic Range:

Dynamic Range = Maximum Input Level in dBu - EIN in dBu
= 34.22 dBu - (-111.48 dBu)
= 145.7 dB

Therefore, the Dynamic Range of this digitizer is 145.7 dB.

If you have any questions or need further assistance, please don't hesitate to contact us at **support@quakelogic.net**