DAQlink 4 Seismograph

High Resolution Seismic Recording System
with High Speed, Compact Size & Low Power

DAQlink 4 is the fourth generation of portable seismograph systems. It can be configured as a stand-alone monitoring system, a refraction system or a distributed seismic reflection system.

Vscope software controls the seismograph, providing acquisition control, data QC and file storage. This seismograph utilizes industry standard Ethernet for command, control, and fast data file transfer.

**DAQlink 4
24 Channel Seismograph**

System Features:

Cutting-Edge Performance
- 1 to 24 channels per seismograph node
- High-Speed 24bit ADC – up to 64,000 sps
- Wide Bandwidth – DC to 27 KHz
- Low Distortion – <0.00008% THD @ 500 sps
- Wide Dynamic Range – >125 dB @ 500 sps
- Low Noise – <0.2 µV RMS @ 500 sps

Multiple Time Synchronization Modes
- GPS Clock Discipline for Continuous Recording
- VHF/UHF Radio for Underground Use

Multiple Trigger Modes
- Trigger on hammer switch for shot acquisition
- Trigger using GPS time for noise monitoring
- Trigger using LTA/STA for event monitoring
- Two trigger circuits available, one for standard and a second for low-voltage inputs

Multiple Data Storage Methods
- 16 Gbytes internal memory card standard
- External mounted, USB-compatible Memory Plug for data backup and transfer
- Ethernet connection for fast data transfers and remote data storage

Built-in Ethernet Network
- Use network to configure seismograph and monitor acquisition
- Compatible with cables, Wi-Fi and Cellular Data
- Internal FTP server for external data access

Built-in Acceptance Testing
- Instrument Tests:
  - Distortion, Cross-feed, CMRR, Impulse & Noise
- Sensor Tests:
  - Resistance, Frequency, Damping, Sensitivity

Operation Modes:

Operate as Stand-Alone Seismograph
- Use a sledgehammer and hammer switch
- Small, lightweight unit for small, fast crews

Operate as an Acquisition System
- Use a vibrator and Force 3 controller
- Network a computer to Monitor Acquisition, Quality Control Data, and Store Shot Records

Passive Monitoring
- True Continuous Recording
- Use Cellular Modem for Remote Data Collection
- Works with surface or downhole sensors

Automated Event Detection
- Continuously record and store data
- Use LTA/STA Tolerance (Long Term Average / Short Term Average) to detect events
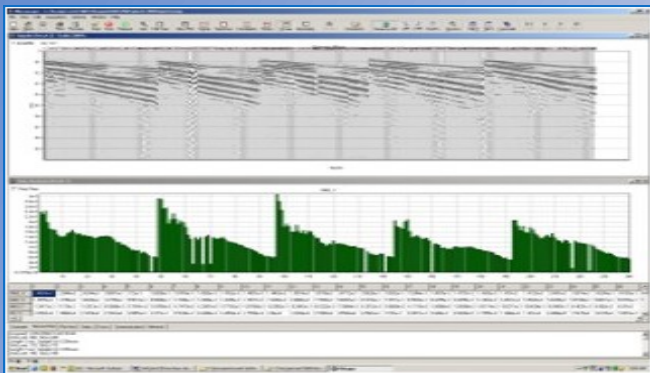- Includes automatic email notifications as events are located

A Stand-Alone Seismograph...

Small Crews

Downhole Data Acquisition

Vscope Acquisition Software

- Configures DAQlink 4 for Acquisition
- Monitors Seismograph Operation
- Offloads and Evaluates Data
- Analysis – Amplitude & Phase Spectra
- RMS Noise and Signal Graphs

For larger systems, DAQlink 4 seismographs are compatible with the full line of iSeis Sigma Field Software, including Source Link & Sigma Observer

Expandability and Flexibility

All DAQlink 4 seismographs are compatible with the entire line of Seismic Source Co source control electronics. This includes the Force 3 Vibroseis controller, the Boom Box 3 dynamite synchronizer and the RTM 3 remote trigger module. DAQlink seismographs are also compatible with the Universal Encoder 3. Use the UE 3 for precise source operation.

Or a Distributed System

Distributed DAQlink 4 System

The Distributed DAQlink 4 System is the combination of a standard DAQlink 4 seismograph and internal, high-speed, network extenders. Using inexpensive twisted pair telephone cable, these network extenders will send triggering times and receive seismic data from other DAQlinks. These cable links can send reach 10,000 ft, or three kilometers in length.

The entire system is connected to a computer which controls the seismograph network and stores the acquired seismic data. This computer can be simultaneously providing Quality Control as the project is acquired. Seismic data can be stored in Raw (*.dat), SEG-2 (*.sg2), SEG-D (*.sgd), SEG-Y (*.sgy), or ASCII (8.csv), MiniSEED formats.
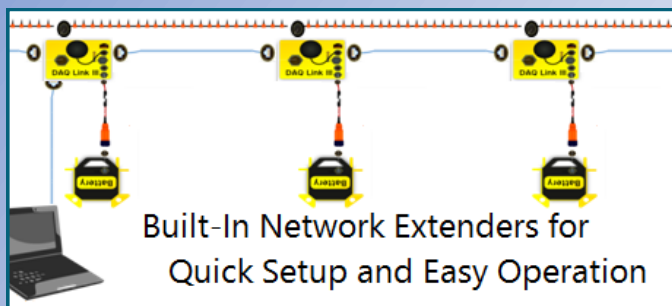

Distributed DAQlink 4

Multiple Node Systems

Large Projects

Built-In Network Extenders for Quick Setup and Easy Operation

Distributed Connection Options

Besides the Network Extender option, seismograph networks can be constructed using a 100Base-T network.

- Cable Solution - 100 meters maximum between network switches

- WiFi solution - typical line of sight or 1 Km with 900 MHz units (distance depends on environment)

- Cellular Data Modem Solution – Connect each DAQlink 4, or the entire DAQlink 4 system, to a cellular data modem and download data from anywhere via the Internet.

Seismograph Comparison

Features and Specifications

Seismic Source

Technical Features

A/D Conversion:
24-bit, high-speed, delta-sigma converters
Dynamic Range:
Greater than 125 dB (measured @ 500 sps)
Crossfeed:
Better than 125 dB (measured @ 500 sps)
Common Mode Rejection:
Better than 100 dB (measured @ 500 sps)
Total Harmonic Distortion
Better than 0.00006% (measured @ 500 sps)
Noise Floor:
0.15 mV RMS (measured @ 500 sps)
Bandwidth:
0 to 32 KHz (unfiltered)
Preamp Gain (User Selectable):
x1 (0 dB), x4 (12 dB) & x16 (24 dB)
Maximum Input Signal:
x1 gain - 6.5 Volts peak to peak
Input Impedance:
100 K Ohms
Digital Filter (User Selectable):
Low-Cut Filter - Disabled, 0.001-120 Hz
Filter Type - Linear or Minimum Phase
Anti-Alias Filter:
85% of the Nyquist frequency
Sampling Interval:
0.0156, 0.0313, 0.0625, 0.125, 0.250,
   0.500, 1.00, 2.00, 4.00, & 8.00 milliseconds
Sampling Rate:
64,000, 32,000; 16,000, 8000, 4000,
   2000, 1000, 500, 250, & 125 sps
Record Length:
Unlimited (with Continuous Recording)
Record Modes:
DAQlink (Triggered by External Event)
Sigma (Continuous Recording)
Trigger Accuracy:
±1 microsecond at any sampling frequency
Pre-Trigger Delay:
Up to 32 seconds
Post-Trigger Delay:
Up to 100 seconds

Physical Features

Internal Network:
100-BaseT Ethernet
Includes real-time data transfer.
Internal CF-Card Memory:
16 Gbytes Standard (can be expanded)
GPS Interface Standard
Internal Clock synchronized to GPS time
GPS Time and Position saved with data
Optional External Removable Memory:
32 Gbytes (can be expanded)
Power Consumption (24 channels):
Less than 0.12 watts/channel
Power Requirements:
9 to 27 VDC
Included Tests:
Internal tests for verification of the
   instrument and the geophone spread
Dimensions:
Dimensions:.....280 x 246 x 56 mm
 ....11.0 x 9.7 x 2.2 inches
Weight:..............2.0 kg
 ....4.4 pounds
Operating Temperature:
-40° to 85° C
Case:
Sturdy Milled Aluminum
Weatherproof seal - IP67

A complete DAQlink 4 Field System typically includes the following:
   1... DAQlink 4 Seismograph
   1... ....Power Cable
   1... ....Ethernet Data Cable
   1... ....Trigger Port Cable
   1... Hammer Switch with Extender Cable
   1... "Y" Cable (for connecting to spread)
   2... 12 Channel Spread Cables
   24. Geophones (customer selects
         frequencies)
   12v Battery (customer provided)