EX-6 Explorer
Distributed Seismic System

The EX-6 Explorer is a versatile, cost-effective seismic data acquisition system intended for high resolution 2D and 3D reflection surveys. The system combines 24-bit A/D performance in a rugged six-channel box that supports 600 channels of real-time seismic data acquisition in single line operation, and up to 2000 channels on 32 lines in Multiline (3D) operation.

The main elements of the EX-6 system are the Windows laptop running the EX-6 System Software, the EX-6 Acquisition Units (AU), Line Tap Units (LTU), AUX unit, and Line Interface Unit (LIU). AUs are connected together with eight-pair spread cables with six geophone takeouts between boxes and may be distributed arbitrarily around the LTU. New boxes are automatically recognized and addressed by the EX-6 System Software, making the system easy to expand.

■ The System Software

The EX-6 System Software runs under Windows Vista or XP and controls all aspects of data collection, display, storage and printing. The program offers many features, such as dockable toolbars, Explorer style fileviewer and context-sensitive right mouse support, while using the built-in networking facilities of Windows to control operation of the system.

The EX-6 allows you to view the data the way you prefer. Convenient on-screen controls make it easy to expand or contract the seismic data display, scroll to a region of interest, and adjust the trace size. Acquired data may be viewed in wiggle trace, shaded area, and solid variable area, and can be clipped or inverted, low or high pass filtered, and AGCd with adjustable mute. The frequency and period of signals can be easily measured by clicking on the events of interest and velocity lines with multiple segments can be dragged into position to measure the velocity of reflectors and can also serve as guides during firstbreak picking.

For reflection shooting, the EX-6 has line management features such as auto roll, auto save, auto file increment, and a graphical line geometry display showing the shot point, roll direction, total number of channels on line, and active channel positions. And to keep the records straight, the system maintains a running history of all shooting activity in a shot log that can be easily viewed and edited by the operator. The spread may be rolled manually or automatically, and the Look Ahead function can be used to determine how many boxes are available for roll at the front and back of the spread. The system can sum up to 99 stacks, with the ability to unstack and restack after each shot and invert the polarity of stack for shearwave work.

For vibroseis operation, the EX-6 provides AUX channels with independent preamp gain settings for recording the pilot sweep and fast, time-domain correlation for in field quality control.

■ The Acquisition Unit

The Acquisition Unit (AU) is the backbone of the EX-6 system. They accurately amplify and digitize the low-level seismic signals and store and transmit the seismic data back to the laptop for display and permanent storage. The AU electronics are shock mounted in a rugged, cast aluminum enclosure and feature 24-bit A/D conversion on six channels, low-noise preamps with four remotely selectable gains, sample rates of $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2 and 4 ms, and record lengths up to 64 seconds per channel. Each AU has 512K of RAM for data buffering and supports real-time operation at 2ms sample rate with 600 active channels on a single line.

The AU has several power-saving modes that are easily controlled by the operator. When boxes are initially connected to the spread, they are in standby drawing a minimal amount of power waiting for commands from the operator. After recording data, boxes can return to low-power idle mode or be kept powered up for continuous shooting. During move-up, or other crew activity, a single click by the operator places the spread in standby which reduces power consumption to about 45ma per box.

Two LED status indicators on each AU provide a visual indication of the line connection status and operation of the box. When a box is connected to the spread, the LED status indicator flashes to verify the integrity of the cable connection to the adjacent box, which greatly aids in the proper connection of boxes and cables and in troubleshooting any faults without operator intervention.
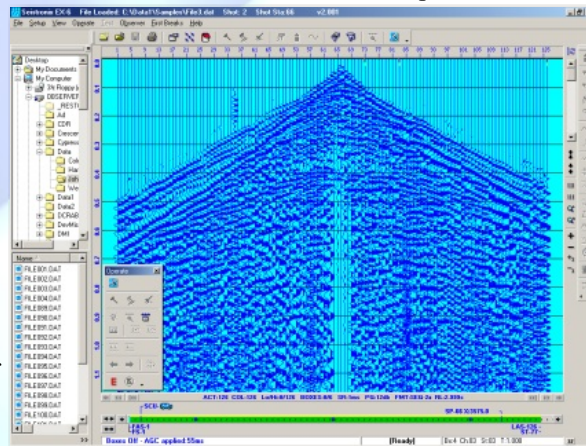
To ensure that data is accurately recorded, the EX-6 provides an extensive array of instrument tests that include amplifier noise, dynamic range, A/D offsets, amplifier pulse, CMR, timing accuracy, crosstalk, phase similarity and gain similarity. Tests can be performed individually, or a complete system test can be performed automatically with the test results logged to disk. To locate geophone and cable problems before they affect your data, the EX-6 offers geophone resistance, geophone pulse, geophone similarity, and cable leakage tests.

- 24-Bit A/D conversion for wide dynamic range
- Multiline, real-time acquisition on 2000 channels at 2ms
- 3D Operation can be controlled using Mesa Script files
- Continuous long-term recording for seismic interferometry
- Comprehensive, automated system performance tests
- Rugged, waterproof, cast aluminum case
- LED status indicators for box status and line integrity
- Intuitive operation under Windows XP/Vista

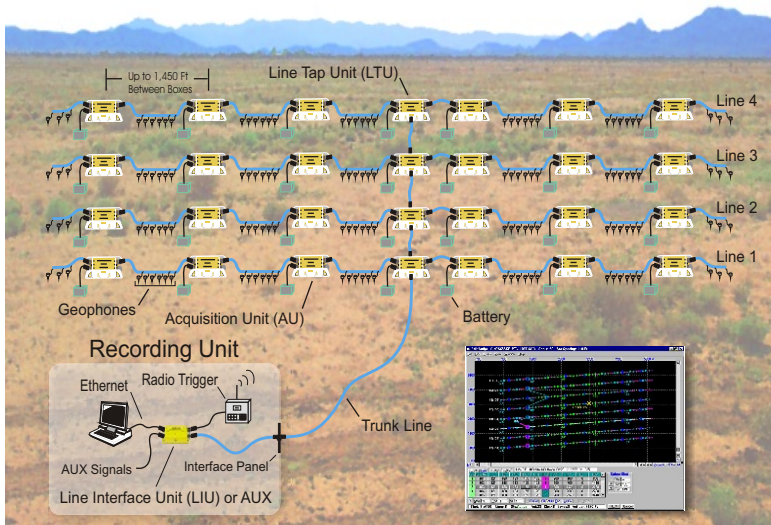# Seistronix

EX-6 GENERAL SPECIFICATIONS

Number of Channels:	6 to 2000 with up to 600 channels per line in real-time at 2ms sample rate
Controller:	Ethernet equipped laptop running Windows XP/Vista
Sample Intervals:	0.125, 0.25, 0.5, 1, 2 and 4 ms
Record Length:	4 ms - 64 sec, 2 ms - 32 sec, 1 ms - 16 sec, .5ms - 8 sec, .25 ms - 4 sec, .125 ms - 2 sec. Continuous recording at 2ms, 1ms and .5ms.
Noise Monitor:	Real-time, viewable between stacks.
Multiline Operation:	2,000 channels on up to 32 lines
CDP Operation:	Automatic or manual roll, in single-line operation
Stacking:	Positive or negative vertical stack with unstack/restack
Cable:	Industry standard 8 pair, 6 takeout reversible cable
Max Box Interval:	1,450 ft
Max Line Interval:	1,450 ft, 2,900 ft with one repeater

ACQUISITION UNIT (AU)

Each EX-6 Acquisition Unit is a self-contained six channel data acquisition system that amplifies, digitizes and buffers the low-level analog seismic signals. The AU processes and forwards commands from the laptop, and relays status and seismic data down the line during data recording.

Channel	6 channels per box
A/D Resolution:	24 bits
Preamp Gain (PG):	12db, 24db, 36db or 48db, remotely selectable
Frequency Response:	.125 ms: 2 - 3,300 Hz, .25 ms: 3 - 1650 Hz, .5 ms: 3 - 825 Hz, 1 ms: 3 - 412 Hz, 2 ms: 3 - 206 Hz, 4 ms: 3 - 103 Hz
Dynamic Range:	120db @ 2 ms PG=12db, 118db @ 2 ms PG=24db (typ)
Distortion (THD):	<.002% at 25 Hz, 2 ms (typ)
Crosstalk:	Greater than 90db
CMR:	Greater than 90db @ 60 Hz
Max Input Signal:	1.6 VRMS @ 12db, 100 mVRMS @ 36db
Input Noise:	.12 VRMS @ 2 ms PG=36db, .70 VRMS @ 2 ms PG=12db (typ)
Anti-Alias Filters:	4 ms 103 Hz, 2 ms 206 Hz, 1 ms 412 Hz, .5 ms 825 Hz, .25 ms 1650 Hz, .125 ms 3300 Hz
Test Oscillator:	10, 25, 50, 60, 100, 125, 200, 250 Hz or variable in 1 Hz increments. Amplitude adjustable in 10 uV steps
Instrument Tests:	Internal digital tests, battery voltage, internal voltage, internal crosstalk, amplifier pulse, CMR, amplifier noise, dynamic range, A/D offsets, gain & phase similarity, system timing, trigger verification, and box communications
Spread Tests:	Geophone pulse, geophone similarity, geophone resistance, spread cable leakage
Connectors:	Two 16-pin connectors for seismic line In/Out Two 8-pin connectors, Batt1 and Batt2 for external battery power and triggering
Status LEDs	Two status LEDs indicate the state of the connection to the adjacent box and flash when data and commands are received.
Power:	12 volt nominal. 45ma standby, 160ma idle and 400ma active
Environmental:	Waterproof
Physical:	10.1" x 6.4" x 2.6", 5.5 lbs
Operating Temp:	-40°C to 70°C

Up to 1,450 Ft Between Boxes — Line Tap Unit (LTU) — Line 4, Line 3, Line 2, Line 1 — Geophones — Acquisition Unit (AU) — Battery

Recording Unit — Ethernet — Radio Trigger — AUX Signals — Interface Panel — Line Interface Unit (LIU) or AUX — Trunk Line

LINE TAP UNIT   LTU/LTU-H)

The LTU allows the laptop to be connected anywhere in the spread in single line systems and also provides line-to-line communication in multiline systems.

LTU Specifications:

Channels:	Handles 600 channels in real-time at 2ms sample rate. Greater than 600 channels, system acquisition time Increases (see LTU-H below).
Data Rate:	10 Mbps on the trunk line and low/high side of spread
Distance between LTUs:	1,450 ft, 2,900 with one repeater
Connectors:	Four 16-pin connectors. Trunk line in, trunk line out, low side of spread, high side of spread. Two 8-pin connectors, Batt1 and Batt2 for external battery power and triggering.
Status LEDs:	Four, one each for trunk line in, trunk line out, low side of spread, high side of spread.
Environmental:	Waterproof
Physical:	10.1" x 6.4" x 2.6", 6 lbs
Operating Temp:	-40°C to 70°C
Power:	12 volt nominal. 45ma standby, 120ma operating

LTU-H Specifications:
Same as above with the following differences:

Channels:	Handles 2,000 channels in real-time at 2ms sample rate
Data Rate:	100 Mbps on the trunk line and low/high side of spread
Power:	12 volt nominal. 75ma standby, 300ma operating

LINE INTERFACE UNIT LIU/LIU-H

The LIU provides system-wide triggering and increased distance between the recording vehicle and the spread. The LIU is usually permanently mounted inside the recording vehicle and interfaces to the radio shooting equipment. Alternatively, an AUX unit (AU programmed as an AUX) may be used in place of the LIU to supply triggering and auxiliary channels to the system.

LIU Specifications:

Channels:	Handles 600 channels in real-time at 2ms sample rate. Greater than 600 channels, system acquisition time Increases (see LIU-H below).
Data Rate:	10 Mbps
Distance between LIU and LTU:	1,450 ft, 2,900 with one repeater
Connectors:	Two 16-pin connectors. Trunk line in, trunk line out. Two 8-pin connectors, Batt1 and Batt2 for external battery Power and triggering
Status LEDs:	Two, trunk line in, trunk line out
Environmental:	Waterproof
Physical:	10.1" x 6.4" x 2.6", 5 lbs
Operating Temp:	-40°C to 70°C
Power:	12 volt nominal. 45ma standby, 80ma operating

LIU-H Specifications:
Same as above with the following differences:

Channels:	Handles 2,000 channels in real-time at 2ms sample rate
Data Rate:	100 Mbps
Power:	12 volt nominal. 75ma standby, 250ma operating

BC-10 BATTERY CHARGER

The BC-10 is a three-stage smart charger with ten independent charging stations. It is housed in a waterproof case and runs from 110/220 volts 50/60Hz. There are two LEDs for each battery station that indicate the state of charge.

Number of Stations:	Charges 10 batteries at a time
Charging Current:	2 Amps per station, reverse polarity protected
Charge Indicators:	Red and Green. Indicates state of charge
Charging Stages:	Three-stage: 2A charge, absorption, float
Environmental:	Waterproof with case lid closed
Physical:	18" x 14" x 6.75", 35 lbs
Operating Temp:	-10°C to 40°C
Power:	110-220V, 50/60Hz 340 watts when charging 10 batteries

Specifications subject to change. Rev 1.07 5/08