

Sigma™

The sum of all cableless experience

Continuous Seismic Recording System



iSeis™

About Us



From the home of Vibroseis, Ponca City, Oklahoma, some of the industry's most experienced seismic system design engineers set out to develop the world's first universal continuous recording seismic system. The result: unrivaled versatility and functionality, a system which has broken records in data acquisition - Sigma.

Only Sigma confronts the issues associated with integrated source control, flexible harvesting, GPS-based timing, system remote control, return of QC/recording status and full data return. Sigma even has the feel of using the most fully capable traditional instruments but without reliance on digital spread cables.

Sigma has been used for almost every type of recording: from simple 2D to complex 3D with multiple vibrators fleets. Sigma's unique features make it the perfect choice for 3C, point receivers, geotechnical, passive, microseismic and permanent monitoring. It can be used on its own or deployed side-by-side with cable recorders using multiple sources. Only Sigma comes with the functionality to take on such a range of work.



Sigma™ is the most advanced, field-proven acquisition system in the world. It works seamlessly with Seismic Source Co. products and other controllers to provide the most fully integrated source control/recorder solution.

Sigma™ unit construction

Serial number
(Highly visible)

Status light
Battery light

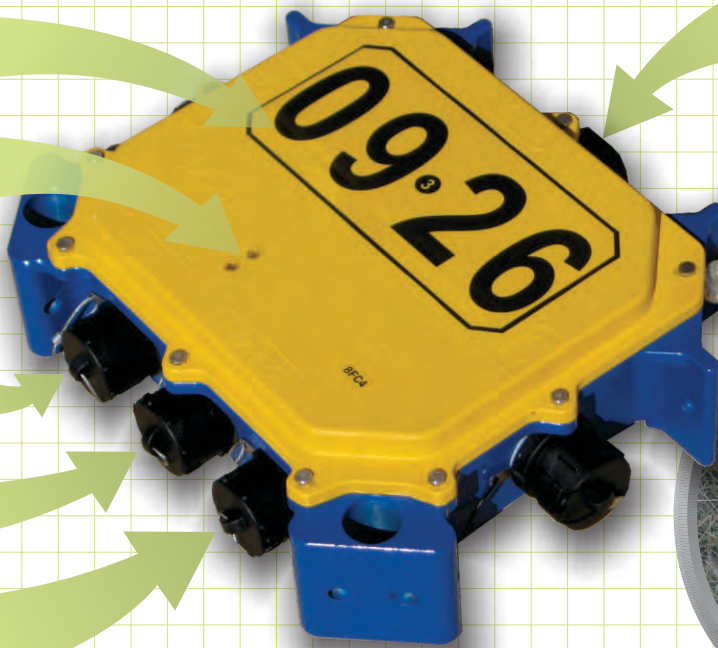
Ethernet connector
(Wi-Fi, Cable, PC)

USB connector

Power connector
(with hot-swap option)

1-3 inputs configuration
("KCK" style is shown)

Rope handle



Very rugged design

Sigma Software

From automated layout to final Seismic Shot Records

Sigma provides a complete integrated Software Solution

The screenshot displays the Sigma Software interface with two source flag views (labeled 1 and 2) and several data tables.

MAC	Box Id	Anchor	Sigma Status	Radio	Comm	Power	Free Memory	S	I
0084EC	40274	8000 - 1128	ACTIVE	Good	Good	11.5 V	100%	✓	✓
00841F	40295	8000 - 1131	ACTIVE	Good	Good	11.9 V	100%	✓	✓
0084A5	40250	8000 - 1134	ACTIVE	Good	Good	12.5 V	100%	✓	✓
0084B8	40264	8000 - 1137	ACTIVE	Good	Good	11.3 V	100%	✓	✓
008435	40348	8000 - 1140	ACTIVE	Good	Good	10.2 V	99%	✓	✓

Line	Station	Sigma ID	Channel	Battery (V)	Battery Status
4000	1013	40005	Mid	11.1	Warning
8000	1097	40113	Mid	11.1	Warning
8000	1107	40286	Mid	10.4	Warning

File#	Status	Line	Station	EPs	ShotID	Date	Time	Chans	Spread
18732	Acquired	5023	1085	4	21048	Jul 20 2011	15:37:53	60	8000/1082 - 8000/1141
331	4	21052	Jul 20 2011	16:20:27	60	8000/1082 - 8000/1141			
323	4	21056	Jul 20 2011	19:48:23	63	8000/1082 - 8000/1084			

Vibrator system

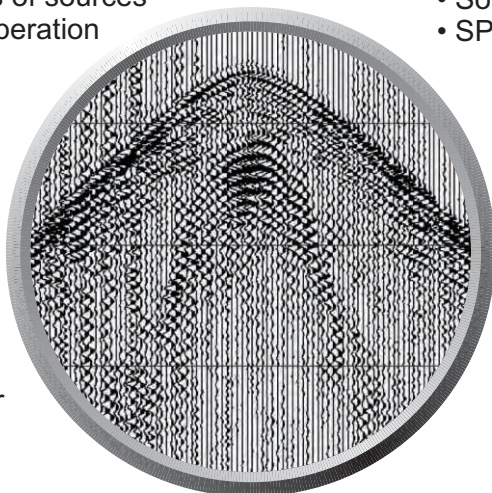
Dynamite operation

Impulsive Sources operation



- Supports all high production Vibroseis modes
- Universal Encoder-II for all types of sources
- Slip-Sweep and ISS modes of operation

- GPS-based flag-less operation
- Source Driven operation
- SPS driven



Data Harvest Software

- Reads Survey and Geometry from ASI file, generated by Sigma Observer
- Reads acquired Sigma Data files
- Outputs Final Gathers in SEG-Y or SEG-D Data Formats

- Passive and Active solution
- 24-bit digital Pilot Reference
- Field correlation and diversity stack
- DC coupling available for improved low frequency

Sigma™ Versatility

Sigma Unit

- 1 to 3 Channels or 3C Sensor
- GPS (or VHF) Clock control
- Built-in MRN for Unit Configuration, Recording Status and Power Control

Layout Options

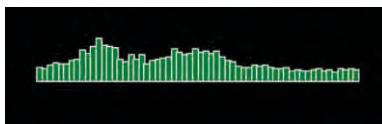
- Autonomous Operation using Internal Storage
- Mesh Radio Network option for “Real-Time” status, Command and Control
- Ethernet (Wi-Fi or Cable) Option for “Real-Time” Data Return
- USB External Storage for Fast Data Collection
- Sigma Float for Transition Zone jobs. Contains Sigma, Wi-Fi and Battery



Small Footprint for Sensitive Environment - **Sigma MRN** provides recording status and **Wi-Fi Drive-by** allows download without directly visiting Receiver Station



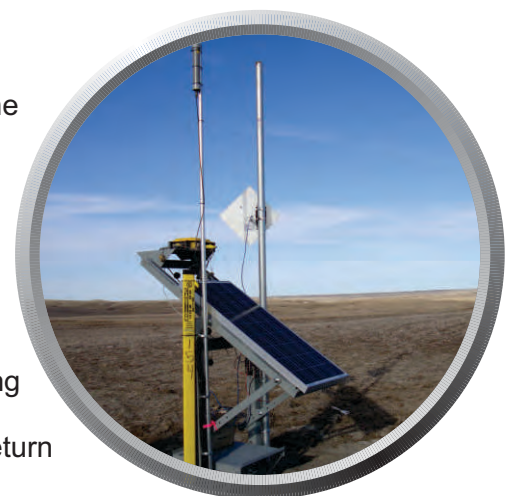
Mesh Radio Network for setting Recording Parameters, Deploying channels, starting Self-Test, commanding On/Off and reporting Status back, including **Real-Time Noise Monitor**



“Cable-free” for **Transition Zone** and other **Difficult Access Areas** Sigma can be set-up with Wi-Fi or USB fast access external storage

Passive and Microseismic Monitoring

Today's **Passive Monitoring** requirements far exceed those found on even the most advanced active land operations. Instrumentation used for traditional surveys is not easily converted to passive acquisition. Sigma has a variety of features which uniquely enable it to undertake all forms of passive and microseismic recording, as well as any active recording challenge.

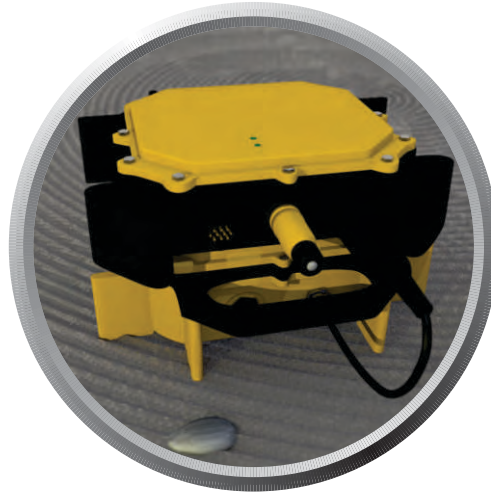


Permanent Passive Monitoring Station with directional Wi-Fi antenna for Real-time data return

Sigma™ Data Collection Options



• Drive-by Wi-Fi Download



• USB Memory Swap



• Direct Data Connection Download

User friendly Software provides clear view of download progress

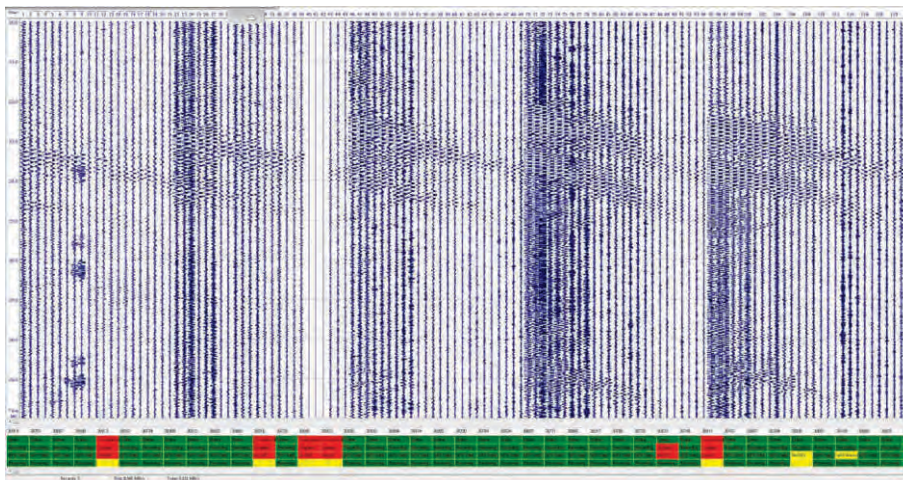
40037	8000	1086	Finished	<div style="width: 100%; background-color: gray;">158</div>	158	158	0	0:01:03	2.42
40295	8000	1131	Downloading	<div style="width: 41%; background-color: green;">41</div>	167	40	0	0:00:09	5.56
40516	8000	1134	Downloading	<div style="width: 36%; background-color: green;">36</div>	166	35	0	0:00:07	7.54
40247	8000	1137	Downloading	<div style="width: 36%; background-color: green;">36</div>	168	35	0	0:00:07	8.02
40411	5000	1019	Idle	<div style="width: 0%; background-color: green;">0</div>	0	0	0		

Sigma USB Data Collection

- Convenient and Simple
- Rugged Construction for Outdoor use
- Simply Replace USB and proceed to next station
- Download Data from USB in truck or at the office



Part of any spread or line can be setup to return seismic data in “real-time”. Wi-Fi or Cable connections are managed by **RTR Program**



RTR maintains network connections and automatically retrieves seismic data. For active projects, RTR outputs records based on information from Sigma Observer™ program. For passive acquisition, RTR outputs concurrent files for the duration of that project.

Sigma SPECIFICATIONS

GENERAL

32-bit ADC
On-board memory 8GB scalable to 64GB (Industrial grade SLC CF card)
Clock synchronization - GPS disciplined or VHF radio synchronization
Download data while recording
Built-in high resolution test oscillator
Compatible with impulsive, vibratory and explosive energy sources
LED status, GPS and battery indicators on unit
Accepts standard geophone, 3C or hydrophone inputs
Built-in Line Test and Instrument Test
Available in 1, 2 or 3 channel versions (no external Y-cable required)
Industry standard KCK type geophone connections
9-26 volt external battery - hot swappable batteries

ACQUISITION

Selectable Gains	0 dB and 24 dB standard (software selectable)
Sample Rates	0.25, 0.50, 1.00, 2.00, 4.00, 8.00 milliseconds
Maximum input	±2.5 volts @ 0 dB gain
Dynamic Range	144 dB system, greater than 127 dB at 4 msec sample rate
Noise Floor	0.1 microvolts RMS at 2 msec sample rate
Total Harmonic Distortion	0.0005%
Common Mode Rejection	0.001%
Anti-Alias Filter	-3 dB, 0.87 Nyquist - Linear or minimum phase (software selectable)
Input Impedance	20 KOhms
Gain Accuracy	1%

ENVIRONMENTAL

Operating temperature range	-40°C to +85°C
Humidity	0 to 100%. Internal humidity reported over Mesh Radio
Active Power Consumption	480 mW/channel recording Full Power Mode
Sleep Power Consumption	1 mW/channel
Size	11.25" x 13" x 3" (286 x 330 x 76 mm)
Weight	7 pounds (3.2 kg)

Specifications subject to change without notification

Ver. 2/11



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