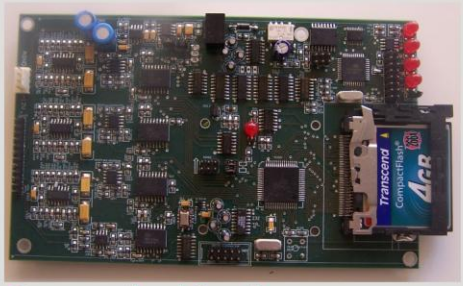
OBS-24: Ultra Low Power, 24bit Ocean Bottom Seismometer

- 24 bit digitizer
- Integrates force-balance sensor electronics
- Ultra Low power consumption
- Removable Compact Flash
- GPS time synchronization
- DPLL with OCXO or Atomic Clock timing source
- Advanced DPLL calibration
- 1.5x10e-10 time drift
- 1-250 samples per second
- 3 seismic channels,
- 1 hydrophone channel
- Continuous Recording Mode
- FAT32 file system
- Operation Range: -20 +70°C
- LDC screen
- Timed or command release
- Submesrible up to 12km

The OBS electronics and battery are housed inside a 43 cm glass sphere. A plastic hat covers the glass sphere for protection. The three component geophone casing is placed outside of the sphere, held by a side arm. The casing is dropped automatically 3-4 hours after the instrument has reached the sea bottom The glass sphere is placed over a metallic base which sinks the OBS to the sea bottom of because of it's weight. The OBS is attached on the metallic base trough a release mechanism, based on a stainless wire which is able to be electrolysed. Release is activated by command or timed when the OBS has to be recovered. The OBS has also some additional parts in order to help the recovery, like a red flag, a radar reflector, and a flashing light. Additionally a VHF radio beacon can be attached to the OBS for detection from large distance in the wavy ocean.



Supported Tools:
Data Viewer
Data Monitor
Data Converter
Helicorder
Processing Software

SENSOR: A special designed sensor casing is provided, to support the 1200 atm. pressure. The coupling has been optimised in order to maximise sensitivity. The electronics have been designed according the force-balance principle in order to extend the frequency band from 0.2Hz to 98Hz, and to increase sensitivity to 1000V/m/s. Additional, a hydrophone channel is used, with a pre-amplifier of gain 4.

DIGITIZER-RECORDER: The digitizer has three seismic and one hydrophone channel. The recorder stores the data into a removable Compact Flash type card (CF). The recording system runs a proprietary embedded DOS-compatible file system, FAT-32 compatible allowing the usage of large volume CF(64Gb). This size is able to store 4-channels data, being sampled @ 250sps, for a period at least 4 months. The digitizer has very high dynamic range, greater than 135bB.

TIMING: Two versions of the OBS-DPLL unit are available, one that uses an extremely precise OCXO crystal oscillator, with accuracy +/-5ppb ($5*10^{-9}$ sec) and another version that uses Atomic Clock with $1,5*10^{-10}$ sec precision. Both initially are getting synchronised from a 12 channels GPS receiver. After the end of the recording period and when the OBS is out of the water, the GPS can be switched on, allowing the system to measure the overall drift of the acquisition period.

Instrument Characteristics

GENERAL	
Number of channels	Four channels, three seismic and one hydrophone
A/D converter	Sigma-Delta, 312KHz base rate, 24bits resolution
CMRR	Better than -100dB
Input resistance	500kOhms differential
Sampling Rate	1 – 250 samples per second
Power	9-18Vdc ~0.636W (53mA@12Vdc)
RMS noise	130dB @ 100sps 140db@50sps
DATA RECORDING	
Media	Removable Compact Flash card, up to 64GBytes
Data file type	CORE24 format, software format converter available
Additional information	Written on file header: Battery voltage, site position
Recording mode	Continuous
Recording Duration	More than four months, when 4 channels continuous recording at 250sps.
TIME BASE	
Type	12 channels GPS receiver for synchronization
Time Accuracy	OCXO Clock: $5*10^{-9}$ sec Atomic Clock: $1,5*10^{-10}$ sec
RELEASE	
Type	Timed or Commanded, based on electrolysis release Mechanism.
SENSOR	
Bandwidth	0.2Hz – 98Hz
Sensitivity	1000V/m/sec
Channels	3 seismic, Z(Vert)-Y(North)-X(East), 1 hydrophone
PHYSICAL	
Gross OBS Weight	58kg
Net OBS Weight	-8kg (8kg buoyancy without the metallic base)
ENVIRONMENT	
Temperature range	-20 to +70 °C
Depth	Up to 12.000m