Sonar 2094 Digital
GeoAcoustics Digital Side Scan

KONGSBERG

Dual Frequency Digital Side Scan Sonar

Description

The GeoAcoustics Sonar 2094 Digital simultaneously acquires side scan data at two frequencies, 114 and 410 kHz. The signals are directly digitised in the towfish and transmitted via a robust digital connection to the transceiver over a single coaxial cable. Data transmission, processing and filtering are fully digital and raw data over-sampling technology results in extended and optimised range and resolution.

The ground-breaking acquisition technique provides 24 bit dynamic range, covering the entire range of underwater acoustic signals. This makes application of Automatic Gain Control (AGC) and Time Variant Gain (TVG) during acquisition obsolete.

The operator's subjectivity is removed, making side scan feature mapping precisely repeatable and objective for the first time.

The system features the proven, rugged and stable towfish model 159D, with its standard dual frequency transducers.

Towfish attitude and depth sensors are optional as is an RS232 connection that allows interfacing to a standard magnetometer. Users of the GeoAcoustics Dual Frequency Side Scan have the option to upgrade to the latest digital technology, while being able to use their existing towfish and the fitted dual frequency transducers.

System Components

The standard system comprises of the model 159D aluminium towfish rated to 1000 m water depth, and the Digital Side Scan Transceiver together with tow and deck cables to suit the customer's requirements.

Features

- 114 and 410 kHz simultanous dual frequency operation.
- 24bit dynamic range, data acquisition without analog AGC or TVG.
- 20 MHz raw data sampling with dynamic filtering, extended range performance.
- Wide bandwith robust digital data transmission.
- 1000 m depth rated.
- Attitude and depth sensor, optional
- 1 sensor interface, RS232, 24 VDC, 5 W for magnetometer, optional.
- Deck unit with GPS module, optional

Transceiver

The Digital Side Scan transceiver provides power and all interfaces to the towfish. It has an optional GPS interface, which is also used to automatically synchronise the system to UTC time, utilising the 1PPS signal and thus ensuring absolute time stamping. The data is received via a reliable wide bandwidth digital link to the towfish. The operating software, running on the integrated Windows® PC, requires minimal operator interaction to make the data available to the acquisition software.

Towfish

The model 159D has been proven to be very rugged and reliable in even the harshest conditions in operation as the GeoAcoustics Dual Frequency Side Scan towfish. It is fitted with the proven model 196D transducers and the fully digital subsea electronics, consisting of transmit and receive modules, digital signal processing and the wide bandwidth digital link to the transceiver unit.

Options

- Attractive upgrade path from GeoAcoustics Dual Frequency Side Scan.
- Choice of third party data acquisition systems.
- Deck unit with in-build GPS module
- Range of tow cable and winch options.
- Towfish attitude and depth sensors.
- Sensor interface for magnetometer
- 2000 m rated tow fish

Technical Specifications

Digital Side Scan Transceiver

PC Hardware

- Processor: 3GHz Intel® Core™ 2 Duo processor (or better).
- Operating System: Windows Vista® Business with SP1 (32-bit).
- Hard drive: ≥500GB SATAII .
- Memory: 4GB DDR2.
- Optical: Dual Layer DVD±RW.
- Graphics: Integrated NVIDIA® GeForce® 7100.

General

- Power requirements: 110/230VAC selectable input, 50-60 Hz, 250 W.
- Size: 42.8cm W x 49.7 cm D x 18.7 cm H.
- Weight: 17.25 kg.
- Temperature: Storage: -20 to 70°C, Operating: 0 to 40°C.
- Humidity: 10% to 90% RH, non-condensing.
- Bench or rack mountable.

Operating Specifications

- Power output to tow vehicle: Isolated 150 VDC short circuit protected.

Rear Panel Connectors

- Video: DVI-D, HDMI and D-Sub.
- USB, Ethernet, Audio and Parallel.
- 3 x BNC: PPS, Event and GPS Antenna.
- 3 x RS232 ports.
- Amphenol: MS3102A-22-34S for deck cable.

Internal GPS (optional)

- Position accuracy: SBAS Horizontal CEP: 1m, SBAS Horizontal 95%: 3m.
- 1PPS accuracy: ±1msec.

Digital Side Scan Towfish Model 159D

General

- Tow speed: 1 to 12 knots.
- Weight: 16.3kg, 22.5kg, or 38.6kg depending on ballast used.
- Dimension: 11.4cm D by 128.5cm L, 3 fins on tail protrude 7.5cm.
- Frame: Cast aluminium with shear release carry handle/towpoint.
- Nose: Shock absorbing, abrasive resistant urethane.

Transmitter Section

- High frequency: 410 kHz ±0.1%.
- Low frequency: 114 kHz ±0.1%.
- Power output: 3 kW pulse ±20%.
- Pulse length: programmable.
- Pulse fall time: 3 cycles maximum.
- Pulse repetition rate: 50 pulses per second maximum.
- Protection: Open and short circuit protected.
- Efficiency: Greater than 80%.

Receiver Section

- High frequency: 410 kHz.
- Low frequency: 114 kHz.
- Bandwidth: programmable up to 50 kHz.
- Data output: IEEE754 single precision floating point.
- Raw sample rate: 20 MHz.
- Processing gain: >30dB.
- Output data rate: up to 100 ksamples/sec per channel.

Towfish Attitude (optional)

- Heading accuracy: ±0.5º.
- Heading resolution: 0.1º.
- Roll/pitch accuracy: ±0.2º.
- Roll/pitch resolution: 0.1º.
- Depth accuracy: 1% depth.
- Depth resolution: 0.1 m.

Transducers (Model 196D)

- Source level: 223 ± 3dB re 1 µPa@ 1m.
- Beamwidth: 114 kHz - 50º by 1º, 410 kHz - 40º by 0.3º.
- Sensitivity: -190dB re 1V/ µPa.
- Depression angle: 10º ± 1º down.
- Depression angle: 20° ± 1º down.

Digital Cable Link

- Data Rate: up to 24 MBits/s.
- Cable length: 0-6000m.

Interface (optional)

- Connection protocol: RS232.
- Output voltage: 24VDC.
- Power: up to 5 W.
- Baud rate: software selectable, up to 38.4 kbits/sec.

Performance

- Max range (m per side)
  - 114 kHz: 600 m
  - 410 kHz: 150 m
- Max resolution across track
  - 114 kHz: 6 cm
  - 410 kHz: 2 cm
- Resolution along track
  - 114 kHz
    0.9 m at 50 m range
    1.8 m at 100 m range
    3.5 m at 200 m range
    8.7 m at 500 m range
  - 410 kHz
    0.1 m at 20 m range
    0.3 m at 50 m range
    0.5 m at 100 m range
    0.8 m at 150 m range

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